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SUPPLEMENT ARTICLE

WILEY

Abstracts

1 | Effect of combined spinal-epidural anesthesia combined with intraoperative tourniquet release management on oxygen saturation in patients with joint replacement

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Shaowu Huang and Xia Xia made the same contribution to this work.

Objective: The effect of combined spinal-epidural anesthesia combined with intraoperative tourniquet release management on oxygen saturation in patients with joint replacement.
Method: Total 180 patients with knee osteoarthritis who chose to undergo TKA in the hospital from May 2018 to 2020 were selected as the research object. They were divided into 90 cases in the study group and 90 cases in the control group according to different anesthesia methods.
Results: The sensory block time, block perfect time, and pain recovery time of the study group were shorter than those of the control group ($p < .05$).
Conclusion: Compared with general anesthesia, the application of combined spinal-epidural anesthesia combined with intraoperative tourniquet release management in TKA can reduce the impact on cerebral oxygen saturation, help improve hemodynamic indications, improve anesthesia effect, and reduce adverse reactions happened.

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2 | Therapeutic effect and safety analysis of continuous veno-venous hemofiltration combined with early enteral nutrition therapy in patients with hyperlipidemic severe acute pancreatitis

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Xing Liu and Lingyan Zhou contributed equally to this work.

Objective: The purpose of the study was to explore the therapeutic effect and safety of continuous veno-venous hemofiltration (CVVH) combined with early enteral nutrition (EEN) therapy in patients with hyperlipidemic severe acute pancreatitis (HSAP).
Methods: A total of 132 patients with HSAP who were treated by CVVH in our hospital from October 2018 to 2019 were selected as study subjects and randomly divided into control and experimental. The control was treated with routine CVVH, while the experimental group received CVVH combined with EEN therapy. The clinical efficacy and safety indicators in the two groups were statistically analyzed.
Results: The total effective rate in the experimental group was significantly higher than that in the control group. The incidence of complications in the experimental group was significantly lower than that in the control group. In addition, the albumin and prealbumin contents in the two groups at 2 weeks after operation were significantly better than those at 1 day after operation, and the albumin and prealbumin contents in the experimental group at 2 weeks after operation were significantly better than those in the control group, with statistical differences.
Conclusion: For patients with HSAP, the CVVH combined with EEN therapy, with more significant therapeutic effect and higher safety of nutrition supply, can effectively relieve patients' conditions, eliminate inflammation, reduce the incidence of complications, and facilitate the rapid recovery of patients' various indicators, which is worthy of application and popularization in clinical practice.

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3 | The application value of combined detection of CT and serum CEA, NSE, and CA125 levels in the early diagnosis of lung cancer

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Objectives: The purpose of this study is to explore the application value of combined detection of tumor markers CEA, NSE, and CA125 with CT in the diagnosis of early lung cancer.

Methods: Fifty cases of lung cancer, 50 cases of benign lung disease, and 50 normal people were selected. The levels of serum tumor markers CEA, CA125, and NSE were detected by electrochemiluminescence. At the same time, CT scan of the lungs was performed.

Results: The serum levels of CEA, CA125, and NSE in the lung cancer group were higher than those in the normal control group and the benign lung disease group. The overall coincidence rates of tumor markers and CT scanning for the diagnosis of lung cancer were 79.6% and 62.8%, respectively. The overall coincidence rate of combined detection was 88.1%. Combined detection is superior to individual detections. The sensitivity of tumor markers (CEA, CA125, NSE) and CT scan for the diagnosis of lung cancer was 49.2% and 78.2%. And the accuracy was 59.8% and 64.5%. The sensitivity of combined detection was 83.1%, and the accuracy was 68.9%.

Conclusions: The combined detection of CT and serum tumor markers (CEA, CA125, NSE) helps to further improve the sensitivity and accuracy of early lung cancer diagnosis.

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4 | Inhibition of HO-1 enhances the anti-tumor role of dihydroartemisinin in colorectal cancer

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Background/Objective: The mechanisms underlying the antitumor roles of dihydroartemisinin (DHA) is more complicated, evidences have shown that iron and heme are essential in this process. Heme oxygenase-1 (HO-1) is an important rate-limiting enzyme for the degradation of ferrous heme, leading to the reduced concentration of ferrous heme and ferrous ions in cells. Therefore, we conjectured the increased expression of HO-1 may repress the anti-tumor role of DHA in tumor cells. In the current study, we aimed to explore the effects of HO-1 in the anti-tumor activity of DHA to the colorectal cancer (CRC) LoVo cells.

Methods: The levels of heme and HO-1 in 40 paired colon cancer tissues and the adjacent normal tissues were detected using immunohistochemical staining (IHC) and fluorescence method, respectively. Pearson correlation test was applied to determine the relationship between heme and HO-1 expression levels in colon cancer tissues. To enhance and repress HO-1 activity, the LoVo cells were treated with 50 mmol/L CoPP and 50 mmol/L SnMP for 36 h. Cell viability and apoptosis were detected by using the MTT and flow cytometry assays, respectively.

Results: HO-1 expression level was significantly increased in colon cancer tissues as compared with the normal tissues, while the heme level was decreased. In addition, HO-1 expression level in colon cancer tissues was negatively correlated with heme level. Cell viability and invasion were significantly enhanced and cell apoptosis was reduced when LoVo cells were treated with CoPP, and SnMP treatment induced an opposite result. Moreover, CoPP treatment decreased the heme content in LoVo cells and SnMP increased heme content. Furthermore, cell viability was repressed and apoptosis was enhanced when LoVo cells were treated with SnMP and DHA together as compared with the DHA treated group.

Conclusion: This study reveals that inhibition of HO-1 can enhance the effects of DHA on inducing cell apoptosis in CRC.

5 | Upregulation of miR-211 in umbilical cord blood-derived mesenchymal stem cells prevent the progression of diabetic nephropathy via inducing autophagy

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Background/Objective: Diabetic nephropathy (DN) is one of the common lethal complications induced by diabetes and is a leading reason for both end-stage renal disease (ESRD) and glomerulosclerosis. It is estimated that about 30%–40% of diabetic patients develop DN, with proteinuria as the main clinical manifestation. Recently,

transplantation of human umbilical cord blood-derived mesenchymal stem cells (hUCB-MSCs) has been identified to prevent diabetic renal injury. In the present study, we aimed to explore the effects of miR-211 upregulated hUCM-MSCs on the treatment of DN.

Methods: Eight-week-old male C57BL/6J mice were divided into control group, diabetes group, hUCB-MSCs group and miR-211-hUCM-MSCs group, with ten mice in each group. Diabetes mice were induced by administration with streptozotocin (STZ) at a dosage of 150 mg/kg via intraperitoneal injection. hUCB-MSCs group and miR-211-hUCM-MSCs group were given 5×10^5 hUCB-MSCs and miR-211-hUCM-MSCs through the tail vein, respectively. After 8 weeks of STZ injection, the plasma glucose, plasma and urinary creatinine, and urinary protein concentrations were measured. In addition, the expression levels of fibronectin, α-SMA, LC3II/I, Beclin1, and p62 were determined by using the western blotting assay.

Results: Administering hUCB-MSCs significantly reduced the levels of plasma creatinine and proteinuria, decreased the expression of Fibronectin, α-SMA, and p62 in the kidney tissues and increased LC3II and Beclin 1 expression levels induced by STZ treatment. And, these roles mediated by hUCB-MSCs transplantation were significantly enhanced when miR-211 was stably overexpressed in hUCB-MSCs.

Conclusion: In conclusion, this study demonstrated that upregulation of miR-211 in hUCB-MSCs could prevent the progression of DN, which might be induced by the enhanced autophagy.

6 | Effect of Suanzaoren decoction on the expression of NMDAR group receptors in Glu/NMDA pathway in traumatic epilepsy model rats

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Objective: To investigate the effects of Suanzaoren decoction on the expression of NMDAR group receptors in the Glu/NMDA pathway of traumatic epilepsy model rats.

Methods: Twenty SD rats were randomly selected as the blank group and the remaining 80 SD rats were treated with traumatic epilepsy then were randomly averagely divided into (1) Suanzaoren Decoction group, (2) Sodium Valproate group, (3) Suanzaoren combined Sodium Valproate group, (4) model group. PRNG, AAEBV, NED, PCH, ENR were detected.

Results: The PRNG in (3) was lower than (1), (2) and higher than the normal group while the (4) has the highest PRNG. The AAEBV and AAEBV in (3) were lower than (1), (2). There is no obvious difference in H&E staining between (1) and (2), the cells are still tightly arranged, the level is slightly unclear, and some inflammatory cells can be seen. The cells in (3) are tightly arranged, the level is clear, aberrant cells less in quantity.

Conclusions: Suanzaoren Decoction inhibits the amplitude and frequency of epileptiform discharge in traumatic epilepsy rats and inhibits the expression of NMDAR receptor and neuropathological damage.

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7 | The role of P311 protein methylation in the proliferation and apoptosis of gastric cancer cells and its effect on the Wnt/β-catenin signaling pathway

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Objectives: To investigate the role of P311 protein methylation in the proliferation and apoptosis of gastric cancer (GC) cells and its influence on the Wnt/β-catenin signaling pathway.

Methods: P311 protein positive rate was determined by immunohistochemistry. P311 protein methylation was determined by methylation specific PCR. CCK-8 method was used to determine the cell proliferation level of two groups. Flow cytometry was used to determine cell apoptosis in the two groups. Real-time fluorescent PCR was used to determine the levels of Wnt, β-catenin, Cyclin D1, and c-Myc mRNA in the two groups.

Results: P311 positive rate in GC tissues (76.60%) were higher than adjacent tissues (10.64%). Cell proliferation of two groups increased significantly with time. The cell proliferation of transfected group was inhibited versus non-transfected group. The apoptosis rates of transfected group (48 and 96 h) were lower than those of non-transfected group. Wnt, β-catenin, Cyclin D1 Gene, and c-Myc gene mRNA levels in transfected cells were higher than those of non-transfected cells.

Conclusions: P311, which highly expressed in GC tissues, can promote cell proliferation and inhibit cell apoptosis by up-regulating the

Wnt/β-catenin pathway. It is expected to become a new target for the treatment of GC.

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8 | Study on isolation and antidiabetic activity of polysaccharides from *Phlebopus Portentosus*

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Objectives: Many studies found that Boletus polysaccharide has many physiological activities, such as anti-oxidation, anti-tumor, improving immunity, but few studies showed its effect on diabetes mellitus. In this study, the polysaccharides from *Phlebopus portentosus* were isolated, and the *Phlebopus portentosus* polysaccharide (PP1) was application value for diabetes mellitus.

Methods: The fruiting bodies were extracted by hot water, deproteinized by Sevag method, eluted by DEAE fiber column, dialyzed by dialysis bag, and further purified by Sephadex G-100 column. The PP1 was obtained by freeze-drying. The diabetic rats constructed by streptozotocin, were grouped randomly and intragastrically administered with 100 mg/kg/d PP1 for 28 days. Their weights and blood glucoses were measured after fasted overnight. The levels of insulin, triglyceride (TG), total cholesterol (TC), low density lipoprotein cholesterol (LDL-C), and high density lipoprotein cholesterol (HDL-C) in serum were detected.

Results: The isolated PP1 has positive effects on body weight, blood sugar, and insulin level in streptozotocin induced diabetic rats. The weight data indicated PP1 could improve the symptoms of weight loss and have a good hypoglycemic effect. The insulin level in diabetic rats was decreased, while that of diabetic rats treated with PP1 was higher than that of the blank control group, indicating PP1 increased insulin sensitivity. Meanwhile, compared with normal rats, the levels of TC, TG, and LDL-C in diabetic rats increased significantly, while HDL-C levels decreased significantly. After treatment with PP1, the levels of TC, TG, and LDL-C in diabetic rats decreased, while HDL-C levels increased significantly compared with untreated rats, suggesting that PP1 can improve dyslipidemia in diabetic rats and reduce the risk of cardiovascular disease.

Conclusions: The isolated PP1 could inhibit the disorder of blood glucose and lipid metabolism, by reducing the content of TG, TC, LDL-C, and increasing the content of HDL-C.

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9 | The value of Fib combined with TEG in the assessment of postpartum hemorrhage in women with planned vaginal delivery

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Purpose: This study aimed to investigate the value of fibrinogen (Fib) combined with thromboelastogram (TEG) in the assessment of postpartum hemorrhage (PPH) in mothers with planned vaginal delivery; Methods: 120 women who delivered vaginally in our hospital were divided into PPH group (50 women) and non-PPH group (70 women). The reaction time (R), clotting time (K), Fib and D-dimer (D-D) levels were compared between two groups. Meanwhile, 50 women with PPH were divided into normal hemorrhage group (28 women) and severe hemorrhage group (22 women). The ROC curves of R, K, Fib, and D-D for predicting postpartum hemorrhage were plotted separately; Results: R, K, and D-D were significantly higher, and Fib was significantly lower in PPH group than in non-PPH group ($p < .05$). Maternal R, K, and D-D were significantly higher and Fib was significantly lower in the severe hemorrhage group than in normal hemorrhage group ($p < .05$); Correlation analysis showed that Fib was negatively correlated with R and K, and D-D was positively correlated with R and K ($p < .05$); AUCs of R, K, Fib, and D-D were .9690, .9917, .8512, .8771 ($p < .05$).

Conclusion: Fib and TEG have good diagnostic value for postpartum hemorrhage in mothers with vaginal delivery, can better predict postpartum hemorrhage, providing a basis for clinical prevention and treatment of postpartum hemorrhage.

10 | Probiotic bacteria in dentistry: a new weapon to face periodontal disease

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Gingivitis is a reversible inflammatory condition of the soft tissues surrounding the tooth, which may evolve toward a destructive form called "periodontitis." The main etiological factor for gingivitis is represented by plaque accumulation.

The first line of periodontal therapy consists of the mechanical removal of accumulated plaque/calculus through scaling, root planning, and polishing, along with specific oral hygiene instructions for the domiciliary maintenance of oral health. Moreover, chemical antimicrobial substances can also support the standard mechanical procedures by decreasing the bacterial load. Hydrogen peroxide, triclosan, and chlorhexidine are the substances more commonly used for this purpose. However, side effects can occur (e.g., tooth discoloration, oral mucosal erosion, taste alteration) especially with the use of chlorhexidine.

Many efforts are being done to develop new alternatives for the antimicrobial treatment of periodontitis and the two main actives proposed are represented by prebiotics and probiotics. The former are constituted by food for bacteria able to stimulate their growth, whereas the latter, according to the definition of the Food and Agriculture Organization (FAO) and the World Health Organization (WHO), are live microorganisms which when administered in adequate amounts confer a health benefit on the host. *Lactobacillus* and *Bifidobacterium* are the probiotic strains most used to promote gastrointestinal health. In recent years, it has been suggested that probiotics could also positively affect the status of the oral health, contrasting bacteria responsible for caries, periodontal disease, and halitosis.

Different mechanisms have been proposed to explain the beneficial action of probiotic organisms, for example, the exclusion and competition with pathogens for nutrients and epithelial cell adhesion, the production of antimicrobial substances against pathogenetic bacteria, an immunomodulatory action, and an enhancement of the mucosal barrier function. In recent years, the following new categories of actives have been developed in addition to the two previously described: paraprobiotics (heat-inactivated bacteria), lysates (bacterial fragments), and post-biotics (concentrated active metabolites).

The aim of this narrative review is to describe the current knowledge on probiotics, with a particular focus on their applicability for periodontal health. Finally, a brief discussion comparing traditional probiotics with the most recent categories of substances will also be carried out.

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11 | MicroRNA-138 regulates myocardial ischemia reperfusion injury by targeting PD-L1

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Objective: MicroRNA plays a regulatory role in oxidative free radical mediated inflammation and apoptosis during ischemia/reperfusion (IR) injury. PD-L1 is the target protein of miR-138, which is widely participated in the systemic response to IR damage. The purpose of this study is to study the correlation between miR-138 and PD-L1 in rat myocardial IR injury model, and to verify the interaction between miR-138 and PD-L1 in H9C2 cell model.

Methods: The mRNA and protein expression of miR-138 and PD-L1 were detected by RT-PCR and Western blot. Cell proliferation was determined by MTT assay.

Results: The results showed that the expression of miR-138 was negatively correlated with the expression of PD-L1 in the IR rat model and the hypoxia and reoxygenation H9C2 cells. The expression of PD-L1 was inhibited by miR-138 analog and enhanced by miR-138 inhibitor, which indicated that miR-138 served as a negative regulator of PD-L1.

Conclusion: This study provides experimental basis for further study of IR injury treatment based on miR-138.

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12 | Finger reconstruction was successfully achieved in a patient with congenital thumb defect combined with first metacarpal defect – A case report

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Objectives: Congenital finger defect is a deformity of the finger. The loss of fingers will have a great negative impact on the growth and development of the body and mind, and the treatment is much more difficult than the treatment of ordinary accidental defects.

Methods: This is a case-study reporting one patient with congenital thumb defect with the first metacarpal defect who treated the finger reconstructive surgery. Preoperative 3D printing model was used to reconstruct the left thumb by taking the right hallux flap, metatarsalangeal joint, and distal-proximal interphalangeal joint of the second right toe, and anterolateral thigh flap.

Results: Through the 3D printing auxiliary technology, the shape of the thumb was restored 1:1 for the patient, and the whole picture of the reconstructed thumb was designed. In addition to reconstruction of the thumb and the first metacarpal, most of the horn and scaphoid defects in the palm were also repaired.

Conclusions: A case of congenital thumb defect combined with first metacarpal bone defect was successfully reconstructed, and the aesthetic and functional features of the patient's finger were restored.

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13 | Application of auricular acupuncture based on the midnight-noon and ebb-flow doctrine in the care of malignant obstruction in pregnancy

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Yuanyuan Gao and Xiaohua Yin contributed equally to this work.

Objective: To evaluate the application value of auricular acupuncture in the care of malignant obstruction in pregnancy.

Methods: A total 150 cases were screened from patients with malignant obstruction of pregnancy and randomized to observation group and control group ($n = 75$). The control group received conventional nursing care, and the observation group was given an auricular acupuncture treatment based on the midnight-noon and ebb-flow doctrine. The clinical nursing outcomes, adverse reactions, clinical indicators such as the time of urinary ketone body turning negative and electrolyte turning negative, psychological conditions were compared between the two groups.

Results: The total treatment efficacy in observation group was significantly higher than that in control group. The overall incidence of adverse reactions in observation group was significantly lower than that of control group. The observation group had a shorter time of ketone body turning negative, electrolyte turning negative than that of control group. Patients in observation group had shorter time of recurrence, fewer times of vomiting than control group.

Conclusion: The incorporation of auricular acupuncture in the treatment of malignant obstruction of pregnancy effectively relieves patients' symptoms of nausea and vomiting.

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14 | Research on urinary surgery using high power thulium doped fiber laser technology

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Objective: Benign prostatic hyperplasia (BPH) is a common disease in many men over middle age, and it is also a high incidence in recent years. In the urology department of the hospital, doctors often meet men with benign prostatic hyperplasia. In the past, the treatment of this disease was usually electric resection. However, this traditional method has great side effects and the patient recovers slowly after operation. Laser is a special artificial light. All the light in its beam has high monochromaticity, high directivity, high brightness and good coherence. It is a better choice to introduce laser therapy technology by using the high-energy characteristics of laser. A thulium doped fiber laser is designed, which can produce 2 micron wavelength laser. The laser is just on the absorption peak of water molecules. The energy of the laser is easily absorbed by water molecules, which is especially suitable for urological surgery. For patients with benign prostatic hyperplasia, the use of this laser can greatly reduce the bleeding phenomenon during the operation and double the operation efficiency.

Methods: Laser treatment for benign prostatic hyperplasia and hypertrophy mainly uses the characteristics of high brightness and high power of thulium doped fiber laser. When the high-power laser generated by the laser is focused on a point of human benign prostatic hyperplasia tissue, it can produce a very high temperature in a very short time, so as to decompose, melt and vaporize the benign prostatic hyperplasia cell tissue, and to achieve the purpose of removing the benign prostatic hyperplasia focus. This method is a local vaporization mode. The laser cuts the tissue piece by piece, and the size of the tissue piece can be controlled by the surgeon.

Results: The lesions of benign prostatic hyperplasia were resected by high-power thulium doped fiber laser. Human tissue absorbs a large amount of laser energy, which is converted into heat energy to vaporize cell tissue directly. This technique has the advantages of good coagulation effect and less damage to human tissue.

Conclusion: For patients with benign prostatic hyperplasia, the use of high-power thulium doped fiber laser has certain advantages over traditional surgery. In the traditional benign prostatic hyperplasia surgery, doctors need to use scalpels and surgical scissors. The use of these tools will inevitably cause bleeding. In order to ensure the smooth progress of the operation, nurses always prepare a lot of hemostatic instruments, absorbent cotton, gauze, and other things, which increases the burden of the operation and consumes a lot of medical materials. Two micron wavelength laser technology uses bare fiber, which can be reused, which can effectively save the operation cost and greatly reduce the treatment cost of patients. The introduction of high-energy laser to replace the traditional scalpel can reduce the patient's bleeding. Thulium doped fiber laser radiates a wavelength of 2 microns, which is easily absorbed by human tissue. At the same time, the laser can also coagulate human tissue and stop bleeding, which improves the safety of patients.

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15 | Atmospheric factors and the incidence of COVID-19

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Objective: Examine the association between the spread of COVID-19 and atmospheric factors in US cities, and try to provide the basis for the novel coronavirus pneumonia countermeasures.

Methods: We investigated the association between the spread of COVID-19 and nine weather parameters: mean temperature, maximum temperature, minimum temperature, mean relative humidity, atmospheric pressure at sea level, total rainfall, humidity, average visibility, average wind speed, and maximum sustained wind speed. Four cities that have the most cases (2020/3/1–2020/10/31) were selected. We calculated the correlation between the daily cases of COVID-19 and each meteorological factor. In this research, we designed four lags: on the day, 3 days ago, 7 days ago, and 14 days ago. Spearman's rank correlation coefficient is adopted to determine the correlation between variables.

Results: The study showed no significant lag in the correlation between weather factors and pneumonia. Temperatures had significant positive correlation with the daily new confirmed cases, and the correlation between minimum temperature and cases was the largest ($r = .643$, $p < .01$ Miami-Dade; $r = .388$, $p < .01$ Cook; $r = .354$, $p < .01$ Harris; $r = .615$, $p < .01$ Los Angeles). Average wind speed was significantly negative correlated with the cases. The average wind speed in Los Angles was the lowest and smoothest, with the most significant correlation ($r = -.545$, $p < .01$). Other atmospheric factors had different correlations with cases in different cities. Atmospheric pressure at sea level had significant negative correlation with the case in Miami-Dade ($r = -.445$, $p < .01$) and Los Angeles ($r = -.398$, $p < .01$), but no significant correlations in Cook and Harris. The average relative humidity was significantly correlated with COVID-19 only in Miami-Dade ($r = .386$, $p < .01$). Total rainfall showed the opposite correlation between Miami-Dade ($r = .297$, $p < .01$) and Los Angles ($r = -.417$, $p < .01$), and it had no significant correlation with the case in Cook and Harris.

Conclusions: There are still many other factors that make it is impossible to predict if the novel coronavirus will reoccur, such as the survival time in vitro, the incubation period. To verify these results, further investigations in other regions are necessary.

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16 | Epidemiological modeling analysis reveals the transmission potential of COVID-19 asymptomatic patients: a prospective study of epidemiological transmission in America

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Objectives: The asymptomatic of COVID-2019 are getting more and more attention from all walks of life.The United States has experienced two periods of rapid growth in COVID-19 infections, with 10 million people now infected. Although asymptomatic populations may have an impact on outbreak control, the transmission potential of asymptomatic populations has not been fully studied.

Methods: We propose a new model to predict the course of the epidemic and simulate the transmission of the asymptomatic. The model considers seven stages of infection: susceptible (S), exposed (E), infected (I), asymptomatic (A), confirmed (C), recovered (R), dead (D), we named it as SEIACRD. We used a model to study the interaction between asymptomatic patients and viral transmission.

Result: Our model confirms that about 39.7 million people will be infected with the virus. Changes in mortality rates will be volatile, first falling and then rising. The number of patients will be affected by the ability to detect asymptomatic persons and contact with asymptomatic infected patients. But these methods had no significant effect on changes in patient mortality.

Conclusion: Asymptomatic patients have no lower risk of transmission than those with symptoms. Now, the number of cases appears to be heading for a third explosion. Unlike the previous two outbreaks, the transmission pressure of this one is more likely to be driven by asymptomatic infection transmission. In our research, improving detection capability is more effective than simply suppressing transmission. And we believe that extensive testing and effective social isolation measures should be adopted to protect more people from the virus.

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17 | Post-pandemic era: promoting regular epidemic prevention and control in radiology department

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Objectives: The novel coronavirus (COVID-19) is still recurring so far. Considering that a great number of patients do examination in the same room and thus are exposed to high risks of cross infection, we should promote the epidemic prevention in the radiology department to prevent cross infection and another outbreak. Therefore, this article aims to share the experience and protocols of the radiology department of our hospital so as to help more hospitals and their radiology medical staff in epidemic prevention.

Methods: We firstly collected three major epidemic prevention policies formulated by the radiology department since the outbreak, and then drew the schematic diagrams of patients' treatment routes under each measure, including the infection control team, the reconfiguration of the radiology department and the Examination procedures for patients with COVID-19. After three stages, we finally provide a specific machine for patients with COVID-19 to examine.

Results: From January 18, 2020, our hospital has received 113 patients with COVID-19, among which 112 patients were discharged and 1 were dead. The total number of outpatients with fever-CT examinations was 2870, that of inpatients were 477. The number of DR exposures was 87, that of US examinations were 207, and that of MRI examinations was 148. No medical workers in the radiology department were diagnosed with COVID-19.

Conclusions: Imaging examination has been an indispensable diagnostic method for COVID-19 since the outbreak. As the global epidemic situation is still unstable at present, radiology departments need to constantly improve the corresponding epidemic prevention and control measures, and formulate effective inspection plans for the patients with COVID-19, which can help patients and staff protect themselves against a high risk of COVID-19.

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18 | Correlation between geomagnetic activity and heart rate variability in patients with coronary heart disease in Yunnan

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Objective: To investigate the relationship between geomagnetic activity and heart rate variability in patients with coronary heart disease in Yunnan.

Methods: Thirty patients with coronary heart disease admitted to the department of geriatric cardiology of the first affiliated hospital of Kunming medical university from March 2018 to September 2019 were selected as the subjects of this study. In the same period, 30 healthy subjects were selected as the control group. Holter examination system was used to examine and monitor the patients of the two groups in the study successively, and the subjects' heart rate variability (HRV) time domain indicators were closely followed for comparative

TABLE 1 Basic information of patients

Group	Cases	Age $\bar{x} \pm s$	Sex Male/female	Hypertension, %	Diabetes *n*, %	Smoking *n*, %	Drinking *n*, %
experience	39	64.8 ± 9.5	25/14	28 (71.8)	21 (53.8)	20 (51.3)	10 (25.6)
control	46	62.5 ± 6.1	20/26	33 (71.7)	11 (23.9)	18 (39.1)	12 (26.1)
p		.190	.058	.995	.005	.262	.963

TABLE 2 Changes of heart rate variability in patients with coronary heart disease before and after geomagnetism

Group	Cases	SDNN (ms)	PNN50 (%)	RMSSD (ms)	TRI	SDANN (ms)
experience	39	102.8 ± 27.2	3.77 ± 11.9	30.9 ± 34.9	26.9 ± 7.1	90.9 ± 22.7
control	39	104.1 ± 25.8	5.6 ± 6.0	29.6 ± 15.4	29.9 ± 6.0	105.0 ± 28.5
p		.047	.785	.823	.044	.015

observation. In order to observe the variation of basic heart rate variability, dynamic electrocardiogram was performed again during geomagnetic activity.

Results: (1) Geomagnetic condition: from March 2018 to 2019, the geomagnetic field was in the active period (Ap value > 29) for 12 days, with an average annual incidence of 3.3%; (2) comparison of heart rate variability before and after geomagnetic change: SDNN, PNN50, RMSSD, TRI and SDANN indicators of CHD patients' heart rate variability before and after geomagnetic change were all lower than those before geomagnetic change ($p < .05$).

Conclusions: during the geomagnetic activity phase, the SDNN, TRI, and SDANN in the heart rate variability indexes of patients with coronary heart disease were all lower than those in the non-geomagnetic activity phase, and geomagnetic variation may affect the autonomic nervous function of patients with coronary heart disease and further promote the disease.

Discuss: Changes in magnetic field caused by space disasters such as solar flares and coronal ejection substances cause heart rate variability in patients with coronary heart disease to decrease, suggesting that it may be another independent factor for coronary heart disease patients except for age, gender, family history, hypertension, diabetes, smoking and obesity. The mechanism may be as follows: 1) the change of geomagnetic field directly leads to the change of human biological magnetic field and the interaction of hydrophilic and hydrophobic groups in human body, so as to change the ionization degree of human metal ions, change the proportion of free OH - and H_2O_2, affect human neuroendocrine system, and change blood pressure and heart rate, Thus, autonomic nerve function is affected at the same time. 2) After the change of geomagnetic field, the blood pressure increases. When the blood pressure increases, the function of subcortical nerve center changes, and the secretion and activity of various neurotransmitters increase, including norepinephrine, vasopressin, dopamine neuropeptide Y, 5-hydroxytryptamine brain natriuretic peptide, resulting in hyperactivity of sympathetic nervous system/increased secretion of plasma catecholamine, This leads to decreased heart rate variability.

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19 | Clinical effect of uterine arteries and gauze packing combined with selective arterial embolization in the treatment of acute primary postpartum hemorrhage

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Objective: To investigate the clinical effect of Uterine Arteries and Gauze Packing combined with selective arterial embolization in the treatment of acute primary postpartum hemorrhage (PPH).

Methods: From June 2018 to June 2020, 100 patients with PPH delivered in obstetrics and gynecology of our hospital were selected as the study subjects, and divided into control group ($n = 50$) and experience group ($n = 50$), according to the order of admission. Among them, patients in the control group were treated with Uterine Arteries and Gauze Packing, while patients in the experience group were treated with Uterine Arteries and Gauze Packing combined with selective arterial embolization. After treatment, the hemostasis efficiency, hysterectomy rate, hospitalization time, hemoglobin levels at 2 and 24 h after delivery and complications in the two groups were analyzed.

Results: After treatment, the hemostasis efficiency of 98% (49/50) in the experience group was significantly higher than that of 76% (38/50) in the control group, $X^2 = 10.70$, $p = .00$, with statistical significance. The hysterectomy rate of 0 in the experience group was significantly

lower than that of 8% (4/50) in the control group, $X^2 = 4.17$, $p = .04$, with statistical significance. The hospitalization time in the experience group (5.94 ± 1.35) d was significantly less than that in the control group (12.35 ± 1.64) d, T = 21.34, $p = .00$, with statistical significance. The hemoglobin levels at first 2 h (106.45 ± 9.52) and first 24 h (115.48 ± 11.08) after delivery in the experience group were significantly higher than those at first 2 h (86.22 ± 11.25) and first 24 h (104.72 ± 11.56) in the control group, T = 9.71, 4.75, $p = .00, .00$, with statistical significance. The complication rate of 4% (2/50) in the experience group was significantly lower than that of 18% (9/50) in the control group, $X^2 = 5.01$, $p = .03$, with statistical significance.

Conclusion: Uterine Arteries and Gauze Packing combined with selective arterial embolization in the clinical treatment of acute PPH can not only improve the clinical hemostasis efficiency and hemoglobin levels, but also reduce the hysterectomy rate, hospitalization time as well as complications.

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20 | Effect comparison of three different anesthesia methods in endobronchial ultrasonography

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Objective: The purpose was to compare the clinical effect of local anesthesia, local anesthesia combined with intravenous analgesia and general intravenous anesthesia in endobronchial ultrasonography (EBUS) examination.

Methods: Fifty four patients undergoing EBUS examination in our hospital from January 1, 2019 to December 30, 2019 were selected, and divided into group A (local anesthesia), group B (local anesthesia combined with intravenous analgesia) and group C (general intravenous anesthesia) according to the anesthesia methods, with 18 cases in each group. The clinical indicators were compared among the three groups.

Results: Among the three groups, group C had the lowest arterial oxygen partial pressure, systolic pressure, and diastolic pressure, and the highest total incidence of adverse reactions, while group A had the highest heart rate, the shortest awakening time and the best satisfaction score ($p < .05$). The respiratory rate of group A and group C was significantly higher than that of group B ($p < .05$).

Conclusion: The three anesthesia methods have their own advantages and disadvantages. Among them, general intravenous anesthesia has the greatest impact on the patients' physical signs during anesthesia, with longer awakening time and more adverse reactions, while local anesthesia combined with intravenous analgesia has the least impact on patients' physical signs.

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21 | The diagnosis value of multislice spiral CT in hepatocellular carcinoma

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Objective: The aim of this study is to explore the diagnosis value of hepatocellular carcinoma by multislice spiral CT.

Methods: Multislice spiral CT (MSCT) and color ultrasound (US) examination were performed on the patients, and the data of examination results were recorded. Pathological examination was performed on the patients, and the accuracy of the examination results of the patients was confirmed according to the laboratory pathological diagnosis.

Results: The sensitivity, accuracy, and negative predictive value of MSCT in the diagnosis of hepatocellular carcinoma were significantly higher than those of US. Compared with patients with hepatic pseudotumor, hepatic focal hyperplastic nodule, and hepatic hemangioma, the onset time and duration of MSCT in patients with primary liver cancer and metastatic liver cancer were longer.

Conclusion: The multislice spiral CT examination method is convenient in the diagnosis of hepatocellular carcinoma, and its examination results are highly consistent with the pathological examination results,

which has practical application value for the clinical diagnosis and treatment of hepatocellular carcinoma.

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22 | Clinical study of minimally invasive percutaneous sintramedullary nail placement in the treatment of elderly intertrochanteric fractures

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Objective: To investigate the clinical effect of percutaneous intramedullary nailing for interfemoral fractures.

Methods: One hundred elderly patients with intertrochanteric fracture were divided into experience and control group. The empirical group used minimally invasive percutaneous intramedullary nail internal fixation and the control group with powered hip screw. Surgical indicators, clinical efficacy, and outcomes were compared between the two groups.

Results: The operation time, intraoperative bleeding amount, hospitalization time and fracture healing time were less than the control group. In the experience group at 1, 3, and 5 days, 6 and 12 months, pain scores were lower than in the control group. The postoperative complication rate was lower in the empirical group than in the control group. Experience group functional scores were higher than the control group.

Conclusion: Compared with dynamic hip screw internal fixation, percutaneous intramedullary nail insertion has short operation time, less trauma, short hospitalization time, less pain, good joint function recovery and good long-term prognosis.

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23 | Changes of APN and hs-CRP levels in patients undergoing restenosis and vascular remodeling after percutaneous transluminal coronary angioplasty

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Objective: To explore the changes of APN and hs-CRP levels in patients undergoing restenosis and vascular remodeling after percutaneous transluminal coronary angioplasty (PTCA).

Methods: Among the patients who were treated in our hospital with PTCA and received postoperative reexamination over the past year, 45 of which who had coronary angiographically confirmed restenosis after stenting were selected as the experimental group and 45 of which who did not exhibit restenosis were selected as the control group, and their changes of APN and hs-CRP indicators before procedure, 24 h after procedure and 6 months after procedure were detected by enzyme linked immunosorbent assay (ELISA).

Results: Compared with the control group 24 h and 6 months after procedure, the experimental group had significantly lower APN indicators ($p < .05$) and significantly higher hs-CRP indicators ($p < .05$).

Conclusion: The APN and hs-CRP indicators are in close relationship with restenosis after PTCA, which can be regarded as one of the key indicators to predict the occurrence of coronary restenosis.

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24 | Time series expression patterns reveal the molecular processes of pancreatic cancer progression

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Objectives: Understanding the detailed process of pancreatic cancer contributes to new treatments to prolong patients' survival time.

Methods: We carried out an in-depth analysis reported by modularization while seeking for critical genes in the pathogenesis of pancreatic cancer so as to identify the molecular mechanisms of the condition using differential analysis, co-expression module analysis, enrichment analysis, and network connectivity analysis. In light of the hypergeometric test, ncRNA (non-coding RNA) and transcription factors that regulate the module would be predicted.

Results: Conclusively, seven co-expression modules were obtained, in which CPA2 and A1BG were significantly differentially expressed in patients who have pancreatic cancer with active regulation in dysfunction modules. The modular genes significantly participated in second-messenger-mediated signaling as well as cellular calcium homeostasis and also controlled the interactions of neuroactive ligand-receptor. Besides, we identified ncRNA pivot including FENDRR and miR-92a-3p as well as transcription Factors pivot including SPI1, STAT5A which significantly regulated the dysfunction module.

Conclusion: This study can help reveal core dysfunction modules, potential regulatory factors, and driver genes for pancreatic cancers, enhancing the understanding of its pathogenesis and providing a reference for prediction with respect to the survival time of patients with this condition.

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25 | Study on the probability of osteoporosis during pregnancy and lactation

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Objective: To explore the probability of osteoporosis (OP) during pregnancy and lactation.

Methods: A total of 800 pregnant and lactating women who came to the Obstetrical Department of our hospital for physical examination from December 2018 to 2020 were selected as the study subject. The pregnant women were divided into the pregnancy group ($n = 372$), the lactating women were the lactation group ($n = 428$), and the healthy women who were not pregnant at the same time were selected as the control group ($n = 386$). Bone mineral density (BMD) was detected in all the subjects, OP was judged according to relevant clinical criteria, and the OP incidence in each group was recorded.

Results: Compared with the control group, the BMD of the pregnancy and lactation groups was significantly lower ($p < .05$), while the OP incidence was obviously higher ($p < .05$).

Conclusion: Pregnancy and lactation can lead to the decrease of BMD in women, during which OP is prone to occur. Therefore, it is very important to moderately supplement vitamin D and calcium, and strengthen the intake of nutrition for the bone health of the mother and fetus.

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26 | Study on the relationship between fluoride exposure of pregnant women in early and middle pregnancy and brain neurodevelopment of infants

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Objective: To explore the relationship between fluoride exposure of pregnant women in early and middle pregnancy and brain neurodevelopment of infants.

Methods: Fifty pregnant women with fluorosis in the early and middle stages of pregnancy admitted to our hospital from July 2018 to 2020 were selected as the study group, and 50 pregnant women in early and middle pregnancy who came to our hospital for physical examination during the same period were selected as the reference group. The urine fluorine content of both groups was measured, the Apgar scores of newborns at 5 and 10 min after birth were evaluated, and the *Denver developmental screening test* was used to evaluate the intelligence and motor development of the newborns.

Results: Compared with the reference group, the study group had obviously higher urine fluoride content, lower Apgar scores of newborns at 5 and 10 min after birth, lower number of normal newborns, and higher number of abnormal newborns.

Conclusion: Fluoride exposure can affect neonatal brain neurodevelopment to a certain extent. Therefore, clinical treatment should be taken in advance for parturients with fluoride exposure to reduce the impact on their infants.

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27 | Application of a low voltage fast response photoelectric sensor array in blind guidance system for patients with eye diseases

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Objective: The number of blind or amblyopic people in China is very large, which is preliminarily estimated to be about 5 to 10 million. For this group of people, the quality of life has decreased seriously. In order to help the blind walk safely and improve their quality of life, countries all over the world have been developing electronic blind guidance systems. However, the development of photodetector is a severe challenge to the miniaturization and energy consumption of equipment. At present, some heterostructure photodetectors have realized low-voltage and fast response photodetectors through reasonable design, which puts forward a solution to this problem. In this study, a low-voltage fast response photoelectric sensor array is designed and applied to the electronic blind guidance equipment to realize the low power consumption and miniaturization of the equipment.

Methods: Firstly, the data collected by attitude acquisition sensor and ultrasonic sensor are transmitted to MCU through I2C. Then, the read data is processed in STM32 single chip microcomputer. Finally, the alarm algorithm is integrated into the program to fuse the data of each sensor to simulate different unexpected conditions of users, so as to produce different alarm methods.

Results: After the system is powered on, each sensor starts to work. The photoelectric sensor uploads the temperature and distance data, the attitude calculation module uploads the angular velocity, acceleration and magnetic field component data of X, Y, and Z axes, and the environmental monitoring module uploads the energy perception information of the front area. All this information is uploaded to STM32 single chip microcomputer. STM32 MCU is read and sent to the computer. The serial port reading program written by LabVIEW 2012 on the computer can read, calculate and display the data uploaded by the single chip microcomputer. Experiments show that the system can simulate various situations that the blind guidance system may encounter in normal use according to the judgment algorithm, and give the judgment results.

Conclusion: The invention is especially suitable for the conditions with complex environment, can be used as an effective supplement for blind guidance and detection in special applications, and has high intelligence and flexibility.

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28 | Application of a new rapid response photoelectrochemical sensor in the detection of cancer marker collagenase

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Objective: In the development of photoelectrochemistry, the research on the sensing mechanism of Photoelectrochemical sensor is more limited. The signal mechanism mainly focuses on the reduction or enhancement of the signal by changing the concentration of electron donors or the change of diffusion efficiency caused by enzyme or affinity reaction. Based on the characteristics of high sensitivity, small volume, easy miniaturization, low price and wide measurement

range, this research is carried out in the fields of chemistry, biology, medicine and environment. Through energy transfer, the local surface plasmon effect (LSPR) and exciton plasmon reaction (EPI) between semiconductor nanocrystals and noble metal nanoparticles can greatly attenuate or even completely inhibit the photocurrent of quantum dots under certain conditions, and the changed photocurrent can be used to determine the analyte directly or indirectly.

Methods: Apoaa was assembled on the electrode. Based on the enzyme-based sensing mode, CdSe QDs was used as the light active material, biotinylated AFP antibody was used as the detection probe, streptavidin was used as the signal capture unit, biotin functionalized apoaa was used as the signal amplification unit, and they were successively assembled on the ITO electrode. Based on in situ enzymatic hydrolysis of biotin, functionalized apoaa releases ascorbic acid as an electron donor to produce photocurrent. Using the photocurrent inhibition caused by the steric effect caused by the binding of antigen and antibody, the ascorbic acid released in situ by enzymatic hydrolysis embedment is used as the electron donor to change the photocurrent signal, in order to construct a "signal on" immunophotoelectrochemical sensor to realize the specific detection of cancer markers.

Results: Dilute to a certain concentration with 10 mM phosphate buffer (pH 7.40) before the test. Different amounts of type IV collagenase were added to human serum for recovery test. For 1.0 μg/ml, 5.0 μg/ml, and 10.0 μ, the recovery of type IV collagenase at g/ml was detected by standard addition method. The results showed that the recoveries were 95%–105%, which showed that the enzyme photoelectrochemical biosensor showed good accuracy and could be used for the detection of actual samples.

Conclusion: In this study, a new rapid response photoelectrochemical sensor was built. This photoelectrochemical platform can detect the cancer marker type IV collagenase through enhanced photocurrent.

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29 | Research on collecting microbial samples of infectious diseases using aviation UAV network

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Objective: Some infectious diseases spread very fast, viruses such as COVID-19, once infected, do great harm to human body. In order to control the spread of infectious diseases, it is necessary to collect microbial samples of infectious diseases for research, understand the nature of infectious diseases and take reasonable measures to prevent them. However, in some places where infectious diseases with great transmission power have occurred, such as hospitals, sending personnel to collect microbial samples is in danger of being infected. In order to reduce this risk, UAV (unmanned aerial vehicle) can be used to collect microbial samples of infectious diseases. Low altitude UAV has the advantages of low cost, high flexibility and easy rapid deployment.

Methods: Using wireless communication technology to control the UAV cluster network is a common method of UAV wireless remote control. With its flexible flight characteristics and good channel characteristics, UAV can stay in the air for a long time, and can also be used as an air base station to provide various communication services. If an infectious disease occurs in an area, then use the aviation UAV to enter the highly dangerous infectious disease area. The UAV is equipped with corresponding sensors to identify the specific situation of the disease, and then use special tools to collect microbial samples of infectious diseases, Including exudates, secretions, tissues, various disease body fluids, etc., for researchers to analyze the nature of infectious disease samples.

Results: Various infectious diseases with high infectivity, such as COVID-19, are easy to spread. For this highly infectious virus, even if people use appropriate equipment and preventive measures, they may still be infected. The collection of microbial samples of infectious diseases by aviation UAV can prevent the staff from directly contacting with the virus of infectious diseases. This way improves the safety of the staff, which is a very effective way to prevent infectious diseases.

Conclusion: Taking advantage of the flexibility of aerial UAV, some microbial samples with highly infectious diseases are collected, which is not only suitable for areas with infectious diseases, but also suitable for hospital wards and other places. Infectious diseases always have certain transmission routes and conditions, infectious diseases can be transmitted in many ways. The same infectious disease can be transmitted in many different ways. Respiratory infectious diseases, such as COVID-19, are mainly transmitted through the respiratory tract. Pathogens exist in the air or form aerosols, forming an air transmission characteristic. Once inhaled into the body, healthy people may be infected. However, as long as we master the mode of transmission of diseases and pay due attention to prevention, we can eliminate the occurrence of infectious diseases. In some areas with poor sanitary conditions and poor hygiene habits, there are more cases of infectious diseases. Therefore, for the prevention of various infectious diseases, especially COVID-19 viruses, we must strengthen personal disinfection, strictly isolate the source of infection, and make reasonable arrangements in management measures to reduce the occurrence of infectious cases.

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30 | Adopt Maslow's hierarchy of needs theory to explore the effect of the government's health informatics education during the COVID'19 pandemic

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Objectives: This study uses Maslow's hierarchy of needs (MHN) theory as a tool to explore the effects of the health information released by the government on community education during the COVID'19 pandemic Taiwan. The purpose of this study is to compare the community's response to content to the five levels of MHN. As a case study to understand the effectiveness of health informatics education

Methods: This study assumes that the health information education provided by the government has different needs, so the effect of content dissemination should be able to be produced in comparison with the five levels of MHN. Through case study to observe the latest health information and education content provided by the government through the online social media platform in July 2021. The social media "face book" obtained used for data collection, and the content is classified into five type of MHN, to comparing the emoji reflected by the general public on the social platform as a statistical basis, we provide design suggestions for the content production of health information education.

Results: The results of this study point out that Central Epidemic Command Center (CECC) of Taiwan released the latest and top content on the "face book" social platform in July 2021 as a summary of MHN including four classes. At the same time, the emoji observations of community participants include six emotions: Great, Big heart, Come on, Hah, Wow, Sad, and Angry. The results that account for the top three are as follows:

1. Physiological needs: "Guidelines for Epidemic Prevention Management" Great (3,913/89.48%), Come on (380/8.68%), Angry (32/0.73%), "public vaccine schedule" Great (17,000/98.12%), Big heart (91/0.52%), Come on (135/0.77%).

2. Safety needs: "Alert Tier Schedule Notification" Great (27,000/86.63%), Come on (2678/11.80%), Angry (755/2.42%), "Online Press Conference Live" Great (386/58.30%), Big heart (118/17.82%), Come on (109/16.46%).

3. Love and belonging needs: "Thanks for the vaccine donation" Great (8782/88.94%), Big heart (986/9.98%), Come on (69/0.69%). 4. Esteem needs: "Command Center News" Great (4816/84.96), Come on (714/12.59%), Angry (64/1.12%).

Conclusions: The conclusion of this study found that CECC of Taiwan provides content at the MHN level including 1–4 levels, with the highest number of emoji responses to content with security requirements. The "public vaccine schedule" content of Physiological needs, the community response "great" reached more than 98%. And there is no content include in the self-actualization needs level. The results of this study provide guidelines for the application of health informatics education to the content production system in the community.

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31 | Prediction for COVID-19's propagation in social time-dependent systems based on the dynamic graph neural networks

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Objectives: In this paper we study the propagation property of COVID-19 according to the data from its epidemic process in China, propose a network dynamics model oriented from graph neural networks, and find the crucial sources of infections and critical paths as well by networking dynamics.

Methods: According to the data of dissemination of COVID-19 in *Jiangsu* of China from July to September 2021, we established the routes of infection processes in a timely and dynamic way. A map of infection, carry and recovery in mall-scale propagation was built, and we adopted graph neural networks (GNN) to analyze the system dynamics by graph Fourier transform and graph filter in the domains of space and frequency. We utilized the methods of graph convolution, graph aggregation, graph attention, and graph classification to highlight the critical nodes, paths, and edges in different time scales

Results: Based on the strong abilities of presentation of G-GCN, MPNN, and NLNN, GNN can be used in the fields of tracing to the sources, key points identification, and fetal nodes capture in various dynamic models of COVID-19 dissemination.

Conclusions: GNN can be used in predicting the dissemination of COVID-19 and forecasting the rate, speed, and range of its infection.

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32 | Correlation between different TCM syndromes of the third lumbar transverse process syndrome and musculoskeletal ultrasound

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Fengfei Liu and Bei He contributed equally to this work.

Objective: To analyze the relationship between different TCM syndromes of the third lumbar transverse process syndrome and musculoskeletal ultrasound.
Methods: Patients with third lumbar transverse process syndrome were selected as the research samples. According to TCM syndrome differentiation, they were divided into Qi Stagnation and Blood Stasis group, Wind-Cold-Damp Retention group and Liver and Kidney Deficiency. Another cases of physical examination were selected as the reference group. The relevant indexes were compared among the four groups. The blood flow of the lesion site was compared among the three groups.
Results: There was significant difference in the thickness of quadratus psoas among the four groups. The thickness of quadratus psoas muscle in Liver and Kidney Deficiency group was lower. There was significant difference in the length of the third lumbar transverse process among the four groups. There was a significant difference in the blood flow grade of the three groups. There was significant difference in Young's modulus of quadratus psoas among the four groups. The Young's modulus of quadratus psoas in Liver and Kidney Deficiency group was highest.
Conclusion: Musculoskeletal ultrasonography in patients with the third lumbar transverse process syndrome has a certain correlation with different TCM syndromes.
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33 | Application of FTS combined with positive psychological in laparoscopic treatment of patients with ectopic pregnancy

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Objective: To explore the application of fast-track surgery (FTS) combined with positive psychological in laparoscopic treatment of ectopic pregnancy.
Methods: Prospectively selected 132 patients with ectopic pregnancy were divided into two groups according to the random number method. The scores of HAMA, HAMD-17, VAS 3 days after the surgery, catheter removal, eating, exhaust, off-bed activity, defecation, length of stay, complications and nursing satisfaction before and after the intervention were compared.
Results: ANOVA showed that the time point effect, the interaction effect of time point and nursing method can significantly affect the change of HAMA and HAMD-17 scores, and the nursing method can have a remarkable impact on the change of HAMD-17 score; compared with the control group, a much more obvious decrease of the scores of HAMA and HAMD-17 in the observation group had been observed. The postoperative VSA score, catheter removal time, eating time, off-bed activity time, defecation time, and length of stay in the observation group were shorter than those in the control group. The complication rate of the observation group was lower than that of the control group (19.70%), and the nursing satisfaction rate was higher than that of the control group (81.82%).
Conclusion: The application of FTS combined with positive psychology in the laparoscopic treatment of ectopic pregnancy can markedly improve the mental state of patients, promote postoperative recovery, reduce the incidence of complications, and improve nursing satisfaction.
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34 | Meta analysis of anterior and posterior internal fixation in the treatment of thoracolumbar spine fractures

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Objective: To systematically evaluate the clinical efficacy of anterior and posterior internal fixation in the treatment of thoracolumbar spine fractures (TSF), aiming to provide data-based references for the selection of clinical treatment for TSF.

Methods: Twelve articles were included by screening key words including thoracolumbar spine fracture, anterior internal fixation, and posterior internal fixation. The anterior group/observation group was treated with anterior internal fixation, and the posterior group/control group was treated with posterior internal fixation. The overall response rate (ORR), complications, Cobb angle, vertebral height, tactile score, and six items of movement score were measured for systematic analysis.

Results: After treatment, the ORR of anterior group was significantly higher than posterior one. The anterior group had less complications than the posterior group. Cobb angle of the anterior group was remarkably greater than posterior group. The anterior group had increased vertebral height than posterior group. The tactile sensation of anterior patients was better than posterior patients. The motor score of the anterior group was obviously higher than posterior group.

Conclusion: Anterior internal fixation is more effective than posterior internal fixation in treating TSF, with better clinical efficacy and thoracolumbar spine function and less complications, which benefits patients' prognosis.

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35 | Effects of wrist ankle acupuncture on postoperative nausea and vomiting in patients with thyroid radiofrequency ablation

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Objective: To study the effects of wrist ankle acupuncture on postoperative nausea and vomiting in patients with thyroid radiofrequency ablation.

Methods: Patients with benign thyroid nodules (BTNs), receiving elective radiofrequency ablation in our hospital from January 2018 to June 2020, were included in this study. Total 33 patients were randomly assigned to the local anesthesia group, given simple local anesthesia (local anesthesia), 26 patients were to the sufentanil group, given intravenous sufentanil combined with local anesthesia, and 31 patients to the wrist ankle acupuncture group, given wrist ankle acupuncture combined with local anesthesia. The following operation indicators of the three groups were compared: operation duration, intraoperative urapidil dosage, intraoperative sufentanil dosage, preoperative and intraoperative blood pressure, nausea and vomiting among the three groups 1 day after the operation.

Results: Statistical differences were obtained in the dosage of sufentanil during the surgery in the three groups. The three groups recorded no obvious difference in the basic and intraoperative blood pressure. In the follow up one day after the operation, the postoperative visual analogue scale (VAS) score and nausea vomiting score of the three groups varied dramatically.

Conclusion: Wrist ankle acupuncture can reduce the dosage of sufentanil in patients with thyroid radiofrequency ablation, to relieve postoperative nausea and vomiting. The analgesia can be maintained for a long time, which can ease postoperative pain with safety and feasibility.

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36 | Design and empirical analysis of the blended learning for polytechnic based on network cognitive clinical psychology

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Objective: In recent years, the enrollment scale of higher vocational colleges has been expanding year by year, the source of students in higher vocational colleges is diversified, and the quality of students is uneven. A series of problems have appeared in teaching management and classroom teaching, which seriously affect the effective implementation of classroom teaching in higher vocational colleges, and the teaching quality has decreased significantly. In this context, in order to improve the quality of classroom teaching in vocational colleges, to ensure that vocational students to master professional knowledge and skills.

Methods: In terms of resources, the popularity of network terminal equipment and wireless network, the establishment and use of network learning space, such as super star platform, QQ group space, WeChat group, UMU platform and so on, so that students can use the fragments of time to learn, "everywhere, at all times"; In terms of teaching mode, post-2000 students are all the Internet aborigines. In order to meet their cognitive needs on the Internet, a mixed learning mode is designed to achieve good teaching interaction and resource sharing between teachers and students before, during, and after class.

Results: There were significant differences between the experimental group (which implemented the mixed teaching mode based on network space) and the control group (which did not implement the mixed teaching mode based on network space). The average score was significantly higher than that of the control group ($p = .012$, $p < .05$), and the difference in learning attitude was statistically significant ($p = .026$, $p < .05$). Through the main effect test, it is found that students' cognition, ease of use of network space, individual needs, learning atmosphere and interaction of the platform all have significant positive influence on the acceptance of blended teaching, and cognition has the most obvious influence on the acceptance. Through the study, it is found that among the groups with lack of cognition, ease of use has the greatest influence on acceptance, followed by individual needs, interaction, and learning atmosphere. In the cognitively rich group, the most important factors affecting acceptability are learning atmosphere, interactivity, individualized needs and ease of use. At the same time, the data also show that the cognitive level can adjust the effects of ease of use, individual needs, learning atmosphere and interactivity on the acceptance of mixed teaching, which has an obvious moderating effect.

Conclusion: Under the premise of homogeneity of research objects, blended teaching in cyberspace is more effective, and the academic performance of teaching is significantly improved. Students can absorb the teaching content, master the corresponding skills, improve their learning attitude and interest in learning significantly. To optimize the teaching effect, it is necessary to further improve the usability and convenience of the mixed network space. In the future design of the mixed teaching mode, the usability experience of higher vocational students and teachers should be fully considered, so as to improve the overall acceptability in the first link of teaching, and pay attention to the personalized needs of the mixed teaching space. Focusing on creating a good learning atmosphere and enhancing the communication and interaction among students, the blended teaching model can not only enhance the emotional establishment among students, but also enhance the information sharing among students.

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37 | The effect of complication prevention nursing for coronary heart disease patients undergoing coronary angiography and coronary stenting

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Objective: To investigate the effect of complication prevention nursing coronary heart disease patients undergoing coronary angiography and coronary stenting.

Methods: Total 84 coronary heart disease patients undergoing coronary angiography and coronary stenting in our hospital were randomly divided into control group and observation group. Both groups received routine care. On this basis, the patients in the observation group were given preventive care for complications. The scores of the Chinese Cardiovascular Patient Quality of Life Assessment Questionnaire (CQQC) and the incidence of complications were measured.

Results: At admission, there was no significant difference in the scores of CQQC between the two groups. At the time of discharge and 2 weeks after discharge, the scores of CQQC in the observation group were higher than those in the control group. The incidence of subcutaneous hematoma and hemorrhage, coronary spasm, thromboembolism, hypotension, and the contrast agent reaction in the observation

group was lower than those in the control group, that is, after nursing, the quality of life of the observation group was significantly better than that of the control group.

Conclusion: On the basis of routine nursing care for patients with coronary heart disease undergoing coronary angiography and coronary stent implantation, prevention of complications can effectively reduce the incidence of complications and improve their quality of life.

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38 | Clinical efficacy of anticoagulant therapy combined with apatinib mesylate in the treatment of venous thrombosis in patients with malignant solid tumors and data analysis of related risk factors

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Objective: To analyze risk factors of venous thrombosis in patients with malignant solid tumors based on Logistic data and the clinical efficacy of apatinib mesylate combined with anticoagulant therapy.

Methods: Total 85 patients with malignant solid tumors combined with venous thrombosis were enrolled in thrombosis group. Another 85 patients with malignant solid tumors without venous thrombosis were non-thrombosis group. Logistic regression analysis was used to analyze risk factors of venous thrombosis in patients with malignant solid tumors.

Results: Risk factors of malignant solid tumors complicated with venous thrombosis found that diabetes, coronary heart disease, treatment patterns, infection, history of thrombosis, tumor compression, central venous catheterization, and long-term bed rest were important risk factors for venous thrombosis. Multivariate Logistic regression analysis showed that age, infection, central venous catheterization, hormonotherapy and CHD were independent risk factors for venous thrombosis in patients with malignant solid tumors. The total effective rate was higher in combined group than in routine group. Coagulation function indexes PT, APTT, and D-dimer were improved in combined group versus routine group.

Conclusion: Logistic regression analysis shows that age, infection, central venous catheterization, hormonotherapy and CHD are high-risk factors of venous thrombosis in patients with malignant tumors, while apatinib mesylate combined with anticoagulant therapy improves the coagulation function of patients.

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39 | Effect of COOK balloon compression combined with ergometrine maleate on bleeding volume and coagulation factors in patients with postpartum hemorrhage after cesarean section

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Objective: To explore the effect of COOK balloon compression combined with ergometrine maleate on bleeding volume and coagulation factors in patients with postpartum hemorrhage after cesarean section.

Methods: Total 120 patients with postpartum hemorrhage after cesarean section admitted to our hospital from February 2020 to 2021 were selected and equally divided into group A and group B according to the order of admission. All patients were treated with ergometrine maleate, while group A was additionally treated with COOK balloon compression. The bleeding volume, effective hemostatic time, coagulation factors, and incidence of adverse reactions were compared between the two groups.

Results: Compared with group B, group A had significantly less bleeding volume ($p < .001$), a higher number of patients with an effective hemostatic time of less than 10 min ($p < .001$), a lower number of patients with an effective hemostatic time of more than 30 min ($p < .05$), and better levels of coagulation factors ($p < .001$). There was no significant difference in the incidence of adverse reactions between the two groups ($p > .05$).

Conclusion: COOK balloon compression combined with ergometrine maleate for patients with postpartum hemorrhage after cesarean section can improve the coagulation factors, shorten the hemostatic time and reduce the amount of postpartum hemorrhage. Safe and effective, this treatment is worthy of promotion.

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40 | Study of the diagnostic and differential value of multiparametric magnetic resonance imaging radiomics in prostate cancer

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Objectives: In this paper, the researchers conducted imaging histological analysis of DCE-MRI, DWI, and DTI prostate images by differentiating benign and malignant prostate lesions with radiomics-based multiparametric magnetic resonance imaging. It provided predictive information for the full range of prostate cancer characteristics and clinical management.

Methods: In this paper, we retrospectively analyzed the clinical data of 96 patients with prostatic lesions admitted to the First Hospital of Qiqihar Medical University from March 2019 to September 2021. These patients received MRI examinations, and we recorded the patients' DKI parameters. They were treated with surgical resection. We used surgical findings as the "gold standard" and divided the patients into prostate hyperplasia group and prostate cancer group, and compared the parameters of DCE-MRI and DKI between the two groups to analyze the diagnostic efficacy of DCE-MRI combined with DKI for prostate lesions. The diagnostic value of multiparametric MRI for prostate cancer was analyzed. SPSS 24.0 statistical software was used to process the data.

Results: The pathological examination results of surgical specimens showed that among 96 patients with prostate lesions, 37 were prostate cancer and 59 were prostate hyperplasia. AK, MK, and RK in prostate cancer group were higher than those in prostate hyperplasia group ($p < .05$).

Conclusions: The results of this study showed that DCE-MRI has some value in the diagnosis of prostate lesions. There are significant differences in several MRI parameters between patients with benign prostate lesions and patients with malignant lesions. The use of a machine learning model based on the radiomic features of multiparametric magnetic resonance imaging (mp MRI) has good diagnostic performance for differentiating prostate cancer from prostate hyperplasia. The combined application of 3.0T mp-MRI can significantly improve the accuracy of prostate hyperplasia and prostate cancer diagnosis, and make accurate diagnosis of prostate cancer and benign prostate lesions from the imaging perspective, which may become an auxiliary diagnostic tool for radiologists in the future.

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41 | Effect of psychotherapy on self-control ability of preschool children

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Objective: The phenomenon of inattention is common in many preschool children, which seriously affects the learning of various skills and the development of intelligence. This paper studies the influencing factors of psychotherapy on children's self-control ability from the perspective of psychology.

Methods: The development of children's self-control ability depends on the maturity of the nervous system. With the rapid development of children's cerebral cortex, the inhibitory function of cerebral cortex also develops gradually, which provides a physiological premise for children's psychological development, followed by the influence of other objective psychological factors. Through the analysis, the main psychological factors affecting children's self-control are: attention and language; The influence of parental rearing style; Emotional factors affect three aspects. Through the comparison method, preschool children in a kindergarten were divided into two groups. Fifty-one children aged 5–6 were selected in the comparison group and 51 children of the same age were selected in the control group. The comparison group intervened in children's self-control ability through psychological guidance. Observe the change of self-control ability.

Results: The results show that, firstly, attention has a great impact on the self-control level of preschool children. The training of cognitive strategies such as imagination and self suggestion can effectively promote children's self-control ability. Secondly, in education, we should pay attention to cultivating children's ability to adjust their emotions and emotions, cultivate children's good positive and enterprising mentality, and improve children's adaptability to the new environment, so as to improve children's self-control ability. In addition, guiding parents to establish effective rearing methods is also an important factor to improve children's self-control ability.

Conclusion: This paper discusses the psychological influencing factors of preschool children's self-control ability, and puts forward the methods to enhance children's self-control ability.

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42 | Case report of short stature with nonspecific skeletal abnormalities caused by NPR2 gene mutation

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Fei Tian and Ming Liu contributed equally to this work.

Objectives: We retrospectively analyzed the clinical data and gene sequencing results of a child with non-symmetric short stature admitted to the Affiliated Hospital of Qingdao University. The child, a 9-year-9-months-old male, presented with slow height growth as the main symptom.

Methods: The physical examination showed a disproportionate short stature without other signs. In addition, the family history indicated that there were family members with short stature, and his father had a bent deformity in both the upper limbs. Normal results were obtained for the endocrine examination and the MRI of pituitary gland.

Results: The results of gene sequencing suggested that a pathogenic mutation of *NPR2* (c. 1638-1640 del TGT) resulted in amino acid change at p.546_547delNVinsN, which was inherited from his father. Short stature caused by *NPR2* gene mutation often occurs in combination with skeletal deformity, and the treatment with growth hormone was partially effective.

Conclusions: Early diagnosis and timely treatment with growth hormone could improve the height and quality of life of the child.

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43 | Application of PEDOT conductive polymer as DNA sensor in screening of *Staphylococcus aureus*

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Objective: *Staphylococcus aureus* is a common pathogenic and lethal pathogen. Immunological methods, electrochemical methods and PCR have been applied to the detection of *Staphylococcus aureus*. However, these methods are cumbersome and can not complete the inspection quickly. In this study, PEDOT conductive polymer was used as DNA sensor to establish a simple and rapid method for the detection of Staphylococcus aureus.

Methods: The PEDOT/RGO interface was formed by electrochemical polymerization of EDOT with graphene oxide as dopant, followed by electrochemical reduction. Then, the specific aptamer was covalently modified on the composite PEDOT/RGO with large surface area, and the highly sensitive and selective detection of *Staphylococcus aureus* was realized by differential pulse voltammetry.

Results: In the concentration range of 50–10^7CFU/ml, the fluorescence intensity increased with the increase of cell concentration. When the cell concentration was greater than 10^7CFU/ml, the fluorescence value did not increase significantly, indicating that the binding between the probe and the target RNA in the bacteria had reached saturation. In the concentration range of 10^2–10^7CFU/ml, there was a good linear relationship between fluorescence value and cell concentration, and the lower detection limit was as low as 50CFU/ml. The results show that the sensor can capture Staphylococcus aureus in total RNA group and has high sensitivity.

Conclusion: According to the principles of resonance energy transfer and fluorescence superposition, a nucleic acid probe nano biosensor based on enzymatic signal amplification was constructed with *Staphylococcus aureus* as the target. The method has the advantages of strong selectivity, simple operation, and low cost.

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44 | Clinical effect of acupuncture combined with acupoint application to treat gastroparesis syndrome after gastric cancer operation

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Objective: The purpose of this study is to detect the clinical effect of acupuncture combined with acupoint application to treat gastroparesis syndrome after gastric cancer operation.
Methods: A total of 80 patients who underwent gastric cancer resection and developed gastroparesis syndrome after the operation were randomly divided into research group and control group, with 40 cases in each group. The control group was only given basic medication. The research group was treated with acupuncture and acupoint application on the basis of the treatment of the control group.
Results: After 14 days of treatment, the average daily gastric drainage in the research group was lower than that in the control group. The time for bowel sounds to return to normal, the time to disappear from abdominal distension, and the time to return to normal diet in the observation group were better than those in the control group, and the differences were statistically significant.
Conclusion: Acupuncture combined with acupoint application to treat gastroparesis syndrome after gastric cancer is beneficial to improve the clinical treatment effect of patients and improve the clinical symptoms of patients.

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45 | Analysis of the effect of the combined application of orthodontics and restoration on malocclusion with dentition defects

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Yu Chen and Haoyuan Guo contributed equally to this work.

Objective: To analyze the effect of the combined application of orthodontics and restoration on malocclusion with dentition defects.
Methods: A total of 114 patients were treated in our hospital from July 2018 to December 2019. The control group was given restoration therapy, and the research group received orthodontics besides restoration.
Results: The research group had higher effective rate and overall satisfaction compared to the control group, and the research group had 98.28% good rate of anterior overbite and overjet compared with 80.70% for the control group, 91.23% good rate of the posterior teeth bite compared with 77.19% for the control group, and 100% teeth regularity rate compared with 80.70% for the control group. The research group had higher improvement compared with the control group. The research group showed lower attachment loss index and debris index but more expensive cost compared with the control group. The two groups got decreased in the four aspects like physical function, oral pain, mental state, and independence, and the research group was significantly lower. The incidence of adverse reactions in the research group was 7.02% while 26.32% for the control group.
Conclusion: The combined application of orthodontics and restoration on malocclusion with dentition defects promotes the teeth recovery of patients, beautifies teeth.

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46 | Effect of respiratory function exercise on lung function, rehabilitation effect and quality of life in elderly patients undergoing radical prostatectomy

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Objective: To explore the effect of breathing exercises on the lung function, rehabilitation effect, and quality of life of elderly patients undergoing radical prostatectomy.

Method: Total 117 elderly patients with radical prostatectomy were divided into a study group and a control group; among them, 57 patients were given conventional care As the control group, 60 patients who underwent respiratory function exercise intervention based on routine care were the study group; the two groups were tested and compared before and after the intervention of the lung capacity as a percentage of the predicted value (VC%), and the forced expiratory volume per second as a percentage of the FEV1%, FVC% as a percentage of predicted value, SpO2, PaO2, PaCO2, ICI-Q-SF score, urine LPP, MUCP, EORTCQLQ-C30 score and the first urination time after surgery, 7 days after the catheter is pulled out The number of urine leaks, the time to restore urinary control, and the occurrence of complications.

Results: After the intervention, the levels of lung function index, respiratory function index level, blood gas index level, urination function, urinary control function, and quality of life of the study group were better than those of the control group, and the incidence of lung-related complications was lower than that of the control group. Control group.

Conclusion: Respiratory function exercises used in elderly patients undergoing radical prostatectomy can effectively maintain or improve postoperative lung function levels, increase oxygen content in their bodies, enhance rehabilitation effects, shorten postoperative recovery time, improve their quality of life, and promote patients recovered and discharged.

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47 | Application of three-dimensional comprehensive nursing model in patients with diabetic ketoacidosis

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Objective: To explore the application of three-dimensional comprehensive nursing model in patients with DKA.

Methods: Total 68 DKA patients selected from March 2019 to 2021 were divided into control group and observation group. Patients in the control group received routine nursing intervention, and patients in the observation group received three-dimensional comprehensive nursing intervention on the basis of the control group. The blood glucose control time, acidosis correction time, urine ketone body conversion time, and hospitalization time of the two groups were recorded, and the nursing care of the two groups was compared.

Results: The time of blood glucose control, acidosis correction time, urinary ketone body conversion time, and hospitalization time in the observation group were significantly shorter than those in the control group. The scores of quality of life, such as health, physiological function, social function, physical pain, emotional function, energy, physiological function, and general health, were higher than those before nursing, and the observation group > control group. The total satisfaction of nursing care of patients in the observation group was significantly better than that of patients in the control group. The incidence of complications in the observation group was significantly lower than that in the control group.

Conclusion: The intervention of the three-dimensional comprehensive nursing model can effectively improve the clinical symptoms of DKA patients, shorten the treatment time, improve the quality of life and nursing satisfaction, and reduce the occurrence of complications in DKA patients.

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48 | Bundle care mode in spine metastases associated vertebral compression fracture: The effect of clinical effect, mental state, and rehabilitation

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Wanfen Song and Meng Zhang contributed equally to this study.

Objective: To explore the effect of bundle care mode on clinical effect, mental state, and rehabilitation in spine metastases associated vertebral compression fracture.

Methods: We enrolled 74 patients with spine metastases associated vertebral compression fracture and randomly divided them into the control group and the intervention group with 37 cases in each group. Conventional nursing and bundle care mode plus were adopted, respectively. Postoperative pain degree, functional status, psychological status, complication rate, and postoperative related indexes were recorded and compared.

Results: Compared with the control group, the intervention group obtained the lower scores of Self-rating Anxiety Scale (SAS), Self-rating Depression Scale (SDS), Oswestry disability index score (ODI), and Visual analog scoring (VAS), the lower rate of complications, and the shorter time of postoperative exhaust, hospital stay, and average activity (all $p < .05$).

Conclusion: Bundle care mode in spine metastases associated vertebral compression fracture could effectively ease the anxiety and depression, improve the treatment effect, and promote recovery, which is worthy of further popularization.

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49 | Mild hypothermia plus sedation in patients with severe craniocerebral injury

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Zhiyong Ma and Hanqing Zang contributed equally to this work.

Objective: To investigate the efficacy, prognosis, and related mechanisms of mild hypothermia plus sedation in patients with severe craniocerebral injury.

Methods: Total 78 patients with severe craniocerebral injury admitted from January 2018 to June 2020. All patients were randomized to the regular group and the joint group. Mild hypothermia and mild hypothermia plus nalmefene were implemented, respectively. After treatment, the clinical efficacy, neurological function indexes, biomarkers of brain injury, cerebral hemodynamic parameters, and prognostic quality indexes were examined and compared.

Results: The total effective rate was better with the joint than the regular. The neurological function indexes, biomarkers of brain injury, cerebral hemodynamic parameters, and prognostic quality indexes of the two groups were comparable before treatment. The joint group showed lower levels of NIHSS, NSE, S100β, βEP, sICAM-1, MBP, AQP-4, and a higher level of BDNF compared with the regular group. After 14 days of treatment, the joint group showed higher Vs and Wv, and lower PI compared with the regular group. At 1 month and 6 months after, the joint showed lower GCS scores and smaller brain edema volume compared with the regular.

Conclusion: In severe craniocerebral injury patients, mild hypothermia plus sedation could improve the clinical efficacy, improve the levels of related factors and proteins.

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50 | Correlation study between the 6-min walk test and blood gas indexes, lung function and quality of life in elderly tuberculosis patients

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Weiming Lang and Fanping Liu contributed equally to this work.

Objective: This study is to investigate the correlation between the 6-min walk testand blood gas indexes, lung function indexes, and quality of life in elderly tuberculosis patients.

Methods: Total 47 elderly tuberculosis cases diagnosed and treated in our hospital between January 2019 and June 2020 were matched for this study and were given standardized anti-tuberculosis and symptomatic treatment. After a course of treatment, the clinical efficacy such as the BGI, 6WMT, LFI, quality of life, and serum indexes of all patients before and after treatment were compared and recorded for the further analysis of the correlation between 6WMT and aforementioned indicators.

Results: The negative rate of sputum bacterial culture of the patients was 82.98%, and the significant absorption rate of tuberculosis lesions was 59.57%. After treatment, an evident growth of the results of 6MWT, BGI, LFI, serum indexes expression level, immunoglobulin level, and quality of life scores was witnessed when compared with those before treatment; Moreover, a remarkably high correlation was obtained between the 6MWT and quality of life, BGI, LFI, immunoglobulin, and serum indexes of elderly tuberculosis patients.

Conclusion: The results of 6MWT can be served as a conducive reference to the assessment of the disease condition, efficacy, related indicators and functions of elderly tuberculosis patients, as 6MWT was closely related to the aforementioned indicators.

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51 | Apoptosis and expression of Bcl-2, Bax, and Caspase-3 in endometrial cancer

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Objective: To investigate apoptosis and expression of B lymphocytoma-2 gene, BCL2-Associated X protein (Bax), cysteinyl aspartate specific protease-3 gene in endometrial cancer.

Methods: Sixty patients with endometrial cancer, 50 patients with uterine myoma and 30 patients with normal uterine hyperplasia who were received by our hospital from February 2018 to June 2020 were selected. Uterine tissues were removed surgically. Apoptosis rates in samples were detected by terminal deoxyribonucleotide transferase-mediated nick end labeling (TUNEL), and expression levels of Bcl-2, Bax, and Caspase3 genes were detected by immunohistochemical staining SP method.

Results: The apoptosis rate of endometrial cancer was significantly lower than that of uterine myoma and normal uterine hyperplasia; the positive expression of Bcl-2 was significantly higher than that of uterine myoma and normal uterine hyperplasia; the positive expression rates of Bax and Caspase-3 were significantly lower than that of uterine myoma and normal uterine hyperplasia ($p < .05$); the positive expression rates of Bcl-2, Bax, and Caspase-3 in endometrial cancer were significant in degrees of differentiation, with statistical difference; and the positive expressions of Bcl-2, Bax, and Caspase3 in different clinical stages was not statistically significant.

Conclusion: Apoptosis rate in endometrial cancer tissues is low, positively correlated with Bax and Caspase3 gene expression and negatively correlated with Bcl-2 gene expression. The Bcl-2, Bax, and Caspase3 genes are closely correlated with differentiation degree of endometrial cancer, but not with clinical stage of endometrial cancer.

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52 | Clinical effect of total intravenous nutrition intervention and traditional nutrition intervention in improving newborn nutrition

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Objective: To explore the effect of total intravenous nutrition intervention and traditional nutrition intervention on the improvement of newborn nutrition.

Methods: Eighty-six low birth weight newborns admitted to our hospital from April 2019 to 2020 were equally randomized into control group and observation group using the odd and even number method. The control group adopted traditional nutrition intervention, the observation group adopted total intravenous nutrition intervention. The nutritional status of the two groups of children was compared.

Results: After 7 days of intervention, the weight, length, head circumference and upper arm circumference of the two groups of newborns increased significantly, and the increase of newborns in the observation group was more significant ($p < .05$). The serum calcium, iron, zinc, magnesium, copper, and other trace elements and nutritional indicators such as serum albumin, prealbumin, and transferrin of the two groups of newborns increased significantly, and the increase of the newborns in the observation group was more notable ($p < .05$). After intervention for 7 days, the RBC-C3bRR and RFER of the newborns in the control group changed significantly ($p > .05$), but the RBC-C3bRR, REIR, and RFER of the newborns in the observation group were significantly higher than those of the control group ($p < .05$).

Conclusion: The use of total intravenous nutrition intervention for low birth weight newborns can effectively supplement trace elements, improve the nutritional status and immune level of newborns, and promote the growth and development of newborns.

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53 | Analysis of the influence of thermal insulation intervention on intraoperative hypothermia and postoperative patients undergoing gynecological laparoscopic surgery

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Objective: To explore effects of different warming interventions during perioperative period on intraoperative and postoperative body temperature and postoperative complications of gynecological patients undergoing laparoscopic total hysterectomy.

Methods: Total 150 patients were divided into three groups. The control group (control) was given intravenous infusion at room temperature during operation. Study group A (A) were heated to 37°C, and study group B (B) was heated with a circulating warm water blanket during operation. The body temperature, HR, MAP, and postoperative adverse reactions of patients were observed and compared.

Results: Wake-up time, extubation time, and hospital stay of B was shorter than A, and A was shorter than control. Body temperature of B was significantly higher than A, and A was significantly higher than the control. The HR and MAP at each time point during and at the end of operation in B was significantly lower than A, and A was significantly lower than control. The incidence of chills and restlessness in B was significantly lower than A, and A was significantly lower than control.

Conclusion: Intraoperative laparoscopic total hysterectomy patients given 37°C infusion fluid, washing fluid and circulating warming water blanket to maintain the patient's normal body temperature, reduce the impact of patients' blood pressure and heart rate, and chills and restlessness occurrence.

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54 | Clinical efficacy of different intramedullary nailing in the treatment of reverse obliquity intertrochanteric fractures

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Objective: To analyze the clinical efficacy of different intramedullary nailing in the treatment of reverse obliquity intertrochanteric fractures.

Methods: The clinical data of 200 patients with reverse obliquity intertrochanteric fractures admitted to the Sixth Hospital of Ningbo from January 2020 to December 2021 were retrospectively analyzed, including 48 cases in the proximal femoral nail anti-rotation (PFNA) group, 46 cases in the interlocking intramedullary nail for proximal femur (InterTan) group, 61 cases in the Gramma nail 3 (Gramma3) group, 45 cases in the Zimmer natural nail (ZNN) group. The operation time, intraoperative blood loss, fracture healing time, postoperative hip scores of the four groups at 3 months after surgery and the last follow-up were compared.

Results: There were no significant differences in postoperative fracture healing time, postoperative hip score at 3 months after surgery and the last follow-up among the four groups ($p > .05$). The PFNA group had a shorter operation time and less blood loss than the InterTan group and the ZNN group, and longer operation time and more blood loss than the Gramma 3 group ($p < .05$). In contrast to the InterTan and ZNN groups, the Gramma3 group obtained a shorter operation time and less blood loss ($p < .05$).

Conclusion: PFNA, InterTan, Gamma 3, and ZNN all yield promising clinical efficacy in the treatment of reverse obliquity intertrochanteric fractures, and proper treatment methods for the patients require thorough consideration.

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55 | Effect of practice characteristics on achievement of intermediate outcomes in patients with Type 2 diabetes

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Objectives: To explore the relationship between practice characteristics and the achievement of intermediate outcomes in patients with diabetes in primary care in the United Kingdom.

Methods: We used a cross sectional study design to evaluate the impact of selected practice characteristics (caseload, numbers of permanent staff, numbers of doctors) upon the achievement of the intermediate outcomes of glycemic control, cholesterol control, and blood pressure control.

Results: The impact of practice characteristics was variable. Increasing caseload provided no obvious advantage in relation to achievement of glycemic control targets. Cholesterol control was positively associated with increasing caseload and etc.

Discussion: Findings are consistent with existing literature. This study adds to the body of evidence which questions the value of the current policy drive for family medicine to be delivered "at scale."

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56 | Study on the effect of laparoscopy combined with endoscopy in patients with gastrointestinal tumor resection and its influence on gastrointestinal function

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Objective: To investigate the effect of laparoscopy combined with endoscopy in patients with gastrointestinal tumor resection and its influence on gastrointestinal function.

Methods: From January 2018 to 2021, 106 patients with gastrointestinal tumor resection were selected. Random number table method was divided into two groups. The control group was treated with traditional open surgery, and the observation group was treated with laparoscopy combined with endoscopic surgery. The patient's effect was evaluated 7 days after the operation, and a 10-month follow-up was completed. The two groups were compared with surgical indicators, gastrointestinal function, gastrointestinal hormones, and postoperative complication.

Results: The amount of blood loss and eating time in the two groups were not statistically significant; the operation time of the observation group was longer than that of the control group; the hospital stay and the time of getting out of bed after surgery were shorter than the control group; postoperative bowel sound recovery, anal exhaust time, and motilin levels in the observation group were shorter (lower) than

those in the control group; gastrin levels were higher than in the control group; the incidence of posterior incision infection, anastomotic bleeding, peritoneal injury, intestinal obstruction, and abdominal adhesions was not statistically significant.

Conclusion: Laparoscopy combined with endoscopy for patients with gastrointestinal tumor resection has less surgical trauma, can shorten the hospitalization and postoperative time of getting out of bed, improve the gastrointestinal function of patients.

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57 | Study on anesthesia of surgical patients with laser generated by thulium doped fiber laser

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Objective: Narcotic drugs are essential drugs in hospitals. Those patients who need surgical treatment often need to operate on narcotic drugs before they can start the operation. Some patients only need to operate with local anesthetics. Patients requiring local anesthetic operation refer to drugs that act on local nerve endings or nerve trunks of human tissues, so as to temporarily block the conduction of sensory afferent nerve impulse and temporarily eliminate the pain sensation at the focus of the patient. The generation and conduction of human nerve sensation is completed through a series of changes in the ion permeability of human nerve cell membrane. However, traditional anesthetics need injection and injection, and some patients are afraid of the pain caused by injection and injection of anesthetics. The laser produced by thulium doped fiber laser is easy to be absorbed by human tissue. Therefore, it can be designed as a painless miniature laser anesthesia device.

Methods: When the laser generated by thulium doped fiber laser is irradiated on the upper epidermis of the patient's skin, a small hole with small diameter can be burned. The diameter of this small hole is only a few millimeters. Because the depth of the small hole is relatively shallow, it will not hurt the nerve tissue under the skin. In this way, the patient will not feel any pain. Liquid anesthetics such as lidocaine are used to enter this small hole. Within a few minutes, the anesthetics can produce anesthetic effect.

Results: Using laser-guided injection of anesthetics, the patient felt no pain. The traditional injection method will cause the patient's feeling of pain and make the patient unwilling to give an injection. Using the laser generated by the fiber laser to guide the injection of anesthetics, this new method is more popular and loved by patients than the traditional injection of anesthetics.

Conclusion: Laser guided anesthesia is a new method without pain. Painless mini laser anesthesia is better than traditional anesthesia. Traditional local anesthetics mainly rely on injection to inject anesthetics into patients, which is inconvenient for some patients who are afraid of pain. Traditional anesthetics mainly prevent the influx of sodium ions, resulting in the failure of action potential and the blocking of nerve conduction, resulting in local anesthesia. Anesthetics can make the patient's brain and central nervous system temporarily lose consciousness and pain, so that doctors can carry out surgery. Through the local application of local anesthetics in the patient's focus, they mainly act on the nerve conduction system of the human body, block the local nerve of the focus and block the nerve conduction pathway. In this way, the feeling of pain cannot be transmitted upward to the central nervous system, so as to achieve the effect of local anesthesia.

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58 | Thulium doped fiber laser and its application in clinical medicine physiotherapy

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Objective: Human cells and tissues can absorb laser energy of specific wavelength. By using the laser emitted by the low-power thulium doped fiber laser to directly irradiate the parts of the human body that need physiotherapy, a series of biological effects that are very beneficial to human health can be formed to achieve the purpose of treating human diseases. Thulium doped fiber laser can be applied to the treatment of many human diseases. Laser can be used for surgical treatment, including various skin inflammation, osteoarthritis, skin burn wound recovery and so on. From the perspective of molecular biology, human cell tissue contains many atoms and molecules, and its absorption peak of laser wavelength is in the 2 micron band, especially the human body contains a lot of water. In the human body, the content of water is particularly large, and the absorption peak of water molecules is just in the 2 micron band, which is the band of thulium doped fiber laser. When 2 micron laser is irradiated

on human tissue, the laser energy in this band can be absorbed by water instantly, and then a strong vaporization effect can be produced. 2 micron band has the advantages of good safety, high efficiency, and good beam quality for human body, and will not cause harm to human eyes. Low power laser is especially suitable for medical physiotherapy.

Methods: Thulium doped fiber laser is used to irradiate the parts of the human body that need physiotherapy. The laser power should be appropriate and not too high. The laser is output from the optical fiber to irradiate the affected part. This method is suitable for the irradiation treatment of lesions on the surface of the human body and some cavities, such as nasal cavity, external auditory canal and so on. For some lesions with large area, a beam expander element can also be added on the laser transmission path to expand the laser beam and reduce the power density of the laser, so that the laser irradiated on the patient will not cause damage to human tissue.

Results: Laser physiotherapy has many advantages. Laser irradiation of human lesions can promote the absorption of inflammation on the skin surface and wound repair. Irradiation of human nasal cavity with low-power laser within a certain time can improve the deformation ability of tissue red blood cells, improve the aggregation of red blood cells and platelets, and promote blood and oxygen supply to the brain. In addition, laser physiotherapy can also improve the aggregation of red blood cells and platelets, improve the oxygen carrying capacity of red blood cells, and restore the original negative charge of red blood cells to normal. The human tissues irradiated by the laser increase the mutual repulsion force, and the originally clustered red blood cells disperse, which can reduce the blood viscosity and improve the human blood circulation.

Conclusion: When the laser is used in physiotherapy, the energy of the laser is introduced into the patient's tissue. At this time, the thermal effect generated by the absorption of laser energy by human tissue can play a good anti-inflammatory role in human lesions, and sometimes it can also play a role in relieving pain. In addition, laser physiotherapy can also adjust the function of human tissue and improve the physiological function of human tissue. Laser physiotherapy can effectively treat human inflammatory, neurological and traumatic pain. Human is an organism. The biological organism absorbs laser and makes some macromolecules in human cells produce beneficial activities, which can improve the regeneration function of human tissue. Human tissue contains a large number of various cell tissues. Selective absorption of laser by these tissues will produce a biological environment conducive to the healthy growth of human cells and promote the healthy growth of human cell tissues.

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59 | Design of thulium doped fiber laser and its application in medical blood cell morphology measurement technology

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Objective: In hospitals, doctors often draw blood from patients in order to accurately diagnose the cause of the disease. Several small bottles of blood are drawn from the patient and sent to the laboratory for laboratory examination. The doctor uses the test results as the basis to analyze the cause of the patient's illness and provide medical basis for the next treatment. However, using this traditional method to draw blood for testing, it needs to wait a long time. On the other hand, it also wastes too much patient blood. According to the principle of blood test, the laser generated by thulium doped fiber laser is used to check the blood and measure the morphology of blood cells. Various data of blood cell morphology can be obtained in a few minutes. Using laser to detect the morphology of blood cells is an efficient blood detection method.

Methods: Thulium doped fiber laser can produce high-quality laser with small pump energy. On the path of laser transmission, a very small thin tube is set as the sample pool of blood samples. Multiple laser receivers are placed around the sample pool to collect the laser reflected from the blood cell sample, and then send these optical signals to the optical signal amplifier for amplification. Finally, the optical signal is converted into electrical signal by photoelectric conversion device, and then sent to a computer for data processing. Relying on the powerful data processing ability of the computer, doctors can quickly get the blood test results.

Results: The quality of blood test results is closely related to the laser quality produced by thulium doped fiber laser. High quality laser will get high quality blood test results. From the abnormal data of blood test results, doctors can analyze what disease the patient has. The causes of many diseases can be analyzed by this blood test method.

Conclusion: Blood test is a common method for doctors to diagnose the causes of patients. The factors that lead to the onset of the disease often appear in the patient's blood. By taking some blood from the patient's body for testing and analyzing the size of various index data contained in the blood, we can correctly diagnose the patient's etiology and provide reliable data for the correct treatment of diseases. In the blood test method, if laser is used to detect blood, this method has advantages compared with traditional blood test methods. Firstly, in terms of time, the method of laser detection of blood is fast and can save a lot of time. Secondly, using laser to detect blood requires less blood, and there is no need to draw too much blood from patients, which saves valuable blood.

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60 | Study on the treatment of hemangioma on human surface skin using tunable wavelength thulium doped fiber laser

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Objective: Hemangioma is a kind of congenital benign tumor, which often occurs in infants before and after birth. Hemangioma can seriously affect the baby's physical and mental health, and the harm is very serious. If hemangioma grows on the patient's head and face, it can destroy the patient's appearance and deformity of facial features, resulting in disfigurement. Because the laser generated by thulium doped fiber laser is easy to be absorbed by human cell tissues, there are different optimal wavelength absorption effects according to different human tissues. Therefore, the laser generated by tunable thulium doped fiber laser can be used to treat hemangioma. According to some biological properties of hemangioma and the response to different laser wavelengths, doctors can use laser to eliminate hemangioma. Because the oxygenated hemoglobin in the blood can selectively absorb a specific wavelength of the laser, it can produce heat to coagulate or destroy the blood vessels, so as to achieve the purpose of laser treatment of hemangioma.

Methods: Laser treatment of hemangioma mainly uses the thermal effect of laser absorbed by human cells and tissues. When the laser irradiates the hemangioma in the focus area, the hemangioma cell tissue absorbs the laser wavelength, so that the hemangioma tissue absorbs a large amount of laser energy, that is, heat. These heats can damage vascular endothelial cells, agglutinate red blood cells and form thrombus, resulting in lumen occlusion. At this time, where the laser has irradiated, the hemangioma tissue will shrink and absorb, so as to achieve the purpose of treatment.

Results: Due to the low laser power, low laser intensity and low laser energy, the depth of laser irradiation on human tissue is limited and will not cause damage to deep tissue. It is safe for the human body to completely remove the diseased tissue with hemangioma surgery. Laser therapy is effective for superficial hemangioma on the surface of human body.

Conclusion: Hemangioma is a common disease and a relatively high incidence rate of cancer. In particular, hemangiomas distributed on the surface of the human body, such as in the human face, will seriously affect the physical and mental health of patients. This hemangioma disease can be treated with thulium doped fiber laser. However, when using laser to treat this hemangioma on the surface of the human body, we should pay special attention to controlling the power of the laser, and the laser energy should not be too high. If the laser energy is too high, it will destroy the deep cell tissue on the surface of the human body and cause damage to the patient. The treatment depth of laser is generally within .2–.4mm of the surface skin of human body. If the depth exceeds .4 mm, the laser will damage the deep tissue to some extent, resulting in obvious scars on the human surface. This phenomenon should be avoided as far as possible.

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61 | Research on medical cosmetic wrinkle removal technology using laser generated by thulium doped fiber laser

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Objective: Using a certain wavelength of laser for beauty and wrinkle removal is one of the more popular modern beauty techniques. Young people's skin contains a lot of moisture, so young people's skin is elastic. When people's skin is not well maintained, wrinkles will occur. At this time, the dermis of the skin becomes thinner, the collagen contained in the skin is reduced, and the skin will lack luster and elasticity. The laser emitted by thulium doped fiber laser is easily absorbed by the surface of human skin, resulting in certain biological effects. This biological effect can be used for beauty. Irradiating the skin surface with laser can stimulate the surface cell tissue to produce new collagen and various intercellular matrix, and tissue reconstruction. In this way, the dermis can be thickened and the wrinkled surface skin due to the reduction of collagen can be filled, so as to achieve the goal of laser beauty.

Methods: The laser emitted by thulium doped fiber laser irradiates the skin on the surface of the human body. When the skin tissue is irradiated by the laser, it will absorb the energy of the laser, stimulate the damaged collagen layer and produce new collagen tissue. Under the stimulation of laser, the damaged collagen layer under the skin will be continuously repaired, the skin texture will be improved, the new collagen tissue will grow at a normal speed, the symptoms of skin wrinkles can be significantly improved, and the skin will restore luster and elasticity.

Results: Irradiate the skin with laser for about 30 min each time. The treatment time is short, painless and does not need anesthesia. This cosmetic method is mild and the skin recovery speed is fast. Because the laser power used is relatively small, it will not cause any trauma to

the surface tissue of the human body. After 2–3 courses of treatment, laser beauty can effectively improve facial skin relaxation, remove deep wrinkles, improve the overall face, and achieve the beauty effect of rejuvenating and beautifying the skin.

Conclusion: The biological effect of irradiating the surface of human body with the laser emitted by thulium doped fiber laser can remove deep wrinkles and effectively improve the loose state of facial skin. Laser wrinkle removal has no side effects. Cosmetic treatment with laser will not produce scars. Another advantage of laser beauty is that laser wrinkle removal can accurately control the scope and depth of skin grinding. Because the power of the laser is relatively small, it can effectively avoid side effects such as thermal injury, promote the healing process of the skin, and will not produce any trauma and damage to the tissue, with high safety. After laser beauty treatment, it can quickly improve the skin quality, tighten the skin, improve the large pores on the surface of the human body, and make the skin as smooth and tender as water. It can enable beauty lovers to resume their normal work and life in a shorter time.

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62 | Study the clinical effect of acupoint application combined with ear point pressing bean in the treatment of elderly patients with primary hypertension complicated with sleep disorder

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Objective: To explore the clinical effect of acupoint application combined with ear point pressing in the treatment of primary hypertension in the elderly.

Methods: Patients diagnosed with essential hypertension in the elderly were divided into control group and observation group according to random number table method. The control group was given simple oral antihypertensive drugs basing on routine care, while the observation group was treated with acupoint application combined with ear point pressing bean. Compare the clinical efficacy, blood pressure level, scores of PSQI and SF-36 of the two groups.

Results: 1. The total efficiency of observation group was significantly higher than that of the control group, $p < .05$.

2. The difference of systolic blood pressure before and after treatment was significant in the observation group ($p < .05$), the systolic blood pressure of observation group after treatment was significantly lower than that of the control group ($p < .05$).

3. There were significant differences in the scores of PSQI and SF-36 before and after treatment of the observation group (both $p < .05$).The differences in the scores of PF, GH, SF between the two groups after 2 weeks treatment were significant (all $p < .05$).

Conclusion: Acupoint application combined with ear point pressing bean is effective in the treatment of elderly patients with primary hypertension complicated with sleep disorder, which can improve the blood pressure level and the quality of sleep and life, it has high clinical application value.

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63 | Modeling and analysis of factors contributing to postoperative delirium in elderly orthopaedic patients based on logistic regression analysis

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Objectives: Delirium, as a common and serious postoperative complication, afflicts elderly orthopedic patients for a long time and affects their prognosis and rehabilitation. This study aims to predict postoperative delirium (POD) in elderly orthopedic patients.

Methods: By taking 74 elderly orthopedic patients admitted to our hospital as the samples, various data of the patients were collected, such as age, gender, height, weight, BMI, education level, smoking and drinking history, basic diseases (hypertension, diabetes,

dyslipidemia, cerebrovascular disease, or mental illness), blood biochemistry (preoperative albumin, hematocrit), electrolytes, waiting time of operation, operation time, and intraoperative blood transfusion. The T-test method was applied to screen the relevant risk factors. After stratifying the continuous risk factors, logical regression analysis was used to screen out independent risk factors, and to establish the postoperative delirium risk prediction model for elderly orthopedic patients.

Results: On the basis of the analysis, seven patients (9.5%) suffered from postoperative delirium, four males (57.1%), and three females (42.9%). There were statistical differences in age, education level, cerebrovascular disease or mental illness, preoperative albumin, and intraoperative transfusion of allogeneic blood ($p < .10$), but there was no statistical difference in other statistical indicators ($p > .10$), such as height, weight, BMI, hypertension, diabetes, dyslipidemia, preoperative hematocrit, perioperative electrolyte disturbance, time from admission to surgery, duration of operation and intraoperative infusion of autologous blood. Logistic regression analysis results showed that age (OR: 3.57, $p = .087$), education level below elementary school (OR: 2.107, $p = .003$), allogeneic blood (OR: 5.65, $p = .042$) were independent risk factors leading to delirium disease.

Conclusions: Old age, history of cerebrovascular disease or mental disorders, low education level, preoperative low albumin and intraoperative allogeneic blood transfusion are related to the occurrence of delirium disease.

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64 | TCM syndrome features of type 2 diabetes: A real-world study of electronic medical data based on hospital information system

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Ming Xiang and Xiangdong Lin are joint first authors.

Objectives: To explore the clinical characteristics of patients with type 2 diabetes through in-depth mining of a large amount of data generated from real-world clinical practice.

Methods: The real-world data of patients admitted to the First Hospital of Hunan University of Chinese Medicine from January 2011 to December 2020 for type 2 diabetes were collected from the hospital information system. A database was established based on those data. SPSS 22.0 were used to descriptive analyze.

Results: (1) Of the 50460 patients with type 2 diabetes, 27,739 were male and 22,720 were female. Patients were mainly Han nationality (49,993, 99.0%), and Tujia nationality was the second (161, .3%). (2) Average age was (65.27 ± 11.83), patients aged 65 was the most (1830, 3.6%). Marital status was as follows, married (49,470, 98.4%), widowed (459, .9%), unmarried (189, .3%), divorce (130, .2%). (3) Patients' work was as follows, retiree (17,822, 35.3%), peasant (3957, 7.8%), worker (1349, 2.6%). (4) Average number of hospitalizations was (3.10 ± 20.74). Average length of stay was (13.01 ± 24.87) days. (5) Apoplexia (Stroke), Xiao Ke Disease (Diabetes), Xiong-Bi-Xin-Tong (Chest Stuffiness and Pains) is the main disease diagnosed by Chinese Medicine and Top 5 Syndrome types of Chinese Medicine were Deficiency of Liver and Kidney, Deficiency of Qi and Yin, Qi Stagnation Blood Stasis, Yin Deficiency of Liver and Kidney, Lung Heat and Fluid Injury.

Conclusions: We can preliminarily understand the basic clinical characteristics of patients with type 2 diabetes in the real world, which provides a certain reference for clinicians to treat type 2 diabetes. By analyzing the massive data of real-world type 2 diabetes, we can build a TCM intelligent syndrome differentiation model based on machine learning algorithm further.

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65 | Tissue-factor targeted recombinant RTL-CCR2 as an injectable therapy to control cerebral hematoma

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Objectives: Our previous study showed that recombinant CCR2 effectively inhibited hematoma via orthotopic injection in mouse intracerebral hemorrhage model. In this study, we sought to develop an injectable tissue-factor (TF) targeted CCR2 to control cerebral hematoma.

Methods: TF was chosen as a target, because our previous study showed an increased TF expression at the focus of intracerebral cerebral hemorrhage (ICH). RTL was chosen as TF-targeted peptide. RTL-CCR2 was heterologously expressed in *E. coli* and purified using His-tag affinity and size-exclusion chromatography. RTL-CCR2 was characterized by SDS-PAGE, TOF, and Western blotting. ICH was induced by intracranial injection of collagenase in adult SD mice. Recombinant CCR2 and RTL-CCR2 were respectively injected in ICH mice intravenously. Hematoma volume and hemorrhagic injury analysis was examined by brain slices and immunohistochemistry. Behavioral tests were performed in all mice.

Results: Recombinant RTL-CCR2 exhibited monomer bands that corresponded well with the respective molecular weight. The result of TOF showed that the peak of nucleo plasmic relation was about 37KD, which was consistent with the result of SDS-PAGE. Western blotting indicated RTL was recognized by monoclonal antibody, confirming that RTL-CCR2 had antigenic activity. The recombinant RTL-CCR2 treated group showed a significantly smaller hematoma size compared with the CCR2 group via i.v.-injection, and the results were consistent with the H&E and luxol fast blue/cresyl violet staining results. The neuronal deficit score of CCR2 group mice was higher than which of the RTL-CCR2 treated ICH mice.

Conclusions: RTL-CCR2 had better therapeutic effect than CCR2 via i.v.-injection, suggesting it could be a potential injectable TF targeted therapy to control cerebral hematoma.

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66 | Filling the missing values of pregnancy examination data to improve the prediction of gestational diabetes mellitus

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Objectives: Gestational diabetes mellitus is a common pregnancy complication, which seriously threatens the life safety of pregnant women and adversely affect the growth and development of the fetus. Therefore, it is of great significance to detect and prevent it at early stage of pregnancy. Each pregnant woman will undergo multiple tests at different gestational week. This progress produces lots of pregnancy examination data which reflect changes in physical indicators. But the missing rate of these data is very high because of the uncertainty of checking time and items, which causes difficulty to analyze its temporal characteristics with recurrent neural network. In this paper, some methods are used to fill in the missing values in pregnancy examination data to improve the prediction accuracy.

Methods: The data used here is real pregnancy examination data from a hospital. We analyzed data from 17,570 pregnant women. The data was produced at 12–24 weeks of gestation. We selected 10 common checking items, like weight, blood pressure, abdominal girth, and so on. Logistic regression was used to analyze the physical indicators in the last examination within 24 weeks as a baseline. Then we used three methods. to fill the missing value in the data from 12 to 24 gestational week, filling with fixed values, filling with K-nearest neighbor (KNN) method and filling with Long-short term memory (LSTM) method. The filled data was used to train a recurrent neural network (RNN) and compare the prediction accuracy.

Results: In the baseline test, the area under the receiver operating curve (AUC) is .619. After filling the missing data with fixed value, the prediction AUC is .648. Using KNN method and LSTM method, the prediction AUC can be raised to .657 and .662, respectively.

Conclusions: The result demonstrates that filling the missing data and analyzing it with RNN can improve the prediction accuracy of gestational diabetes by identifying the changes in maternal physical indicators over time.

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67 | A study on the method of evaluating the concentration of visual weak person in smart pad contents using eye tracking

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Objectives: Researchers using eye-tracking technology conducted an experiment to track eye movement by measuring EMG and EOG. Evaluate the concentration level of smart pad content users using eye tracking technology. The subjects of this study are as follows. A visually impaired person who can perceive objects, but cannot see details. This study will help UIUX according to user's eyesight and eye movement in content development.

Methods: First, three smart pad contents were selected by genre and an experiment was conducted through an eye tracking device. The program used for the experiment is Tobii Studio, and there are two cameras. One of the cameras is a device that measures the gaze movement of the subject and records the gaze movement when the experiment is conducted. The experiment was conducted on 10 male visual weak persons and 10 female visual weak persons in their teens, 20s and 30s who use smart pad contents a lot. As a result of the eye-tracking experiment, in the case of teenagers and 20s, the results of the gaze time and the number of gazes were similar. However, in the case of those in their 30s, it was found that the gaze time was short and the number of gazes was high. In addition, in the case of teenagers and 20s, the proportion of gaze was concentrated on one part, and in the case of 30s, the proportion of gaze was dispersed in several places compared to those in their teens and 20s. By measuring the concentration of smart pad contents of a visually weak person using eye tracking technology, it will be possible to suggest an efficient design method considering the user's convenience to the smart pad contents designer.

Conclusions: Research on eye tracking technology has been conducted by content genre so far, and it has been targeted at the general public. However, a concentration evaluation study targeting visually weak persons has not yet been attempted. This study will help to create smart pad contents suitable for visually weak person.

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68 | An unsupervised finetuning framework for 2D/3D vascular registration oriented to incomplete 2D blood vessels

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Objectives: Registering preoperative 3D computed tomography angiography (CTA) to intraoperative 2D digital subtraction angiography (DSA) can complete the invisible part of 2D vessel by 3D-2D projection, which is useful for the guidance of vascular interventional surgery. However, ground-truth transformation parameters are usually unavailable for real DSAs, thus only synthetic images generated from digitally reconstructed radiograph (DRR) can be used for network training. In our research, a 3D-2D projection module is designed to build an end-to-end 2D/3D registration framework.

Methods: The framework consists of a ResNet-like regression network and a 3D-2D projection module. The regression network receives the central DRR and target images as input and predicts corresponding 6-DOF transformation parameters. Then the projection module generates the projection image with output transformation parameters. We implement the projection module by simplifying the ray casting algorithm. The sampling method proposed in Spatial Transformer Network (STN) is applied to enable backward propagation. In the training process, we first pre-train the regression network using labeled DRRs and then finetune the whole network using incomplete vessel images without labels. Recall and mean squared error (MSE) between the output and the input target images are calculated as the loss function of finetuning process.

Results: We tested our method on DRR datasets generated from a real patient's CT image. DRRs of incomplete vessels are generated in the range of $\pm 20°$ rotation and ± 15 mm translation. The dice, sensitivity (Sen) and mean target registration error (mTRE) on incomplete vessel datasets reaches 82.9%, 87.9%, 2.08 mm, which are 76.8%, 78.9%, 2.45 mm before finetuning. Results show that the proposed method can improve registration accuracy for incomplete 2D vessels.

Conclusions: This paper develops an unsupervised 2D/3D registration framework that can support finetuning on unlabeled real images. Experiments show the improvement in the registration of incomplete vessel images. Designing better base architecture for the regression network is what we focus on in the future.

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69 | Icariin facilitating bone-derived mesenchymal stem cells to differentiation into both vascularization and osteogenic

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Objectives: Human bone-derived mesenchymal stem cells (hBMSCs) have two potentials, which are the multidimensional differentiation and self-renewal, especially differentiation into osteocytes. Icariin (ICA), can induce hBMSCs differentiation into osteocytes by various ways, and into vascular endothelial cells. But, these two capacities real in different conditions. A few repots about in same conditions ICA can induce hBMSCs differentiation into both osteocytes and vascular endothelial cells. Herein, an attempt of specific concentration ICA inducing bBMSCs to differentiation into the angiogenesis and osteogenic, is implement to observe the relationship between ICA concentration and the angiogenesis and osteogenic differentiation of bBMSCs, and to speculate and discuss its mechanism of action, so as to provide experimental basis for the application of hBMSCs in human bone tissue engineering.

Methods: Determine the optimal concentration range of ICA inducing hBMSCs by CCK-8 test. Set up groups ,which are including 0, 1, 1, 5, 10, 20, 30, 40, and 50 μM group, and 0 μM group were used as the control group for comparison, then, set up six groups to detect the secretion of vascular endothelial cell growth factor (VEGF) and the transcription factor Runx2 by ELISA and qPCR, and to detect the expression by Western Blot.

Results: The result of CCK-8 testing is that two groups, which are .1 and 1 μM groups ($p < .05$), have sign significant cell proliferation, when after the 72 h of each groups of ICA culturing hBMSCs, especially 1 μM group ($p < .01$), other groups' cell proliferation deceased. Detecting the secretion of VEGF in cell medium supernatant: the expression of VEGF is more than arthers in .1 and 1 μM groups, especially the latter by ELISA and qPCR, and the testing by Western Blot proves it. Similarly, detecting the secretion of Runx2 of hBMSCs: the expression quantity in .1 μM group and 1 μM group is more, and the latter group is most by ELISA and qPCR, and proved by Western Blot.

Conclusions: ICA can effectively promote the targeted differentiation of hBMSC-s, and the upregulation of VEGF and Runx2 may be the main factors involved in the induction of angiogenesis and osteogenesis of hBMSCs by ICA. It is speculated that the optimal concentration range of .1–1 μM can induce the simultaneous angiogenesis and osteogenesis of hBMSCs.

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70 | Influence of BMI and motion pattern in the assessment of muscle strength grade and spasticity using EMG and joint angle

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Objectives: Surface electromyography (EMG) is a promising alternative for the objective and highly sensitive assessment of muscle

strength grade and spasticity in patients with spinal cord injury. However, due to the lack of databases and standardized test protocols, it is difficult to compare recorded data with a reference range. Electrical conductivity varies with tissue type and thickness, especially fat tissue. It reduces EMG amplitude. This study was designed to investigate the influence of body mass index (BMI) and motion pattern on EMG.

Methods: A total of 20 neurologically intact individuals (19–28 years old, 13 male, and 7 female) were recruited with BMI ranging from 17.72 to 27.68. The test protocol was modified from functional neurophysiological assessment (FNPA) protocol, including active movement (AM), passive movement (PM), and maximum voluntary contraction (MVC). The EMG signal was recorded from 12 representative muscles (six in upper limbs and six in lower limbs), and the motion information was recorded synchronously by an optical motion capture system. Root mean square (RMS) values of EMG and joint angle were calculated for each muscle and joint per movement to analyze the muscle activation.

Results: The RMS values of both AM and MVC in healthy people were negatively correlated with BMI value ($p < .05$), which means fat tissues reduce the EMG amplitude. RMS values of upper limb muscles (.06–.17 mV in AM and .52–.72 mV in MVC) were significantly greater than lower limb muscles (.04–.18 mV in AM and .16–.35 mV in MVC). Those results could be the reference range of highest muscle strength grade. Using joint angle to determine the role transition of agonistic muscle and antagonistic muscle for each joint, we analyzed the multi-muscle activation patterns. The highest RMS of antagonistic muscle accounted for 24% of agonistic muscle, which could be the reference range which means no spasticity occurs.

Conclusions: BMI and motion pattern influence the RMS values and should be considered as control variables. More data of patients with different levels of muscle strength grade and spasticity will be collected in the following study to improve the database.

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71 | Performance improvement of medical blood handling for aphaeresis platelet usage

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Objectives: Medical-use Blood Handling ought to be considered as Supply Chain Management including Donation Centers, Hospitals, and blood consumers so that the Quick Response to the change of blood usages and JIT provision can be accomplished. Among others, Aphaeresis Platelet (AP) is vital few of medical blood areas due to increasing demands on higher quality from medical personnel and patients. It makes the SCM more complicated because of its short life-time and infection-sensitivity. The medical centers and hospitals may incline safety inventory and usage amount of pallets due to a speculation of possible wastes. Hence, a prediction model can contribute greatly to the balance of demand and supply of medical-use blood and avoid the wastes of vital resources such as Aphaeresis Platelet regarding its safety lifecycle.

Methods: In order to remedy the negative consequence on the performance of blood provision resulted from this speculation; we need to study the correlations between the characteristics of patients as well as hospitals and the usages of Platelet Concentrated, Aphaeresis Platelet, and Prestorage Leukocyte-reduced Aphaeresis Platelets where the rate of using platelet by patients with cancers play a crucial role in developing the model to estimate the demand quantity on Aphaeresis Platelets. Aiming at this, it is crucial to develop a prediction model based on the correlations between the characteristics of patients, healthcare institutions and of the utilization of various types of AP products. By means of previous knowledge and expert interviews, we have at first set up a research framework, which involves patient characteristics, type of hospitals, utilization (rate) and their relation to derive the forecasting model. After *priori-analysis* on the data of 6 years, we have at first test the data by means of regression, viz. ARIMA. Further studies by means of ANOVA can be conducted to search for the correlation between patient characteristics and utilization of AP, as well as the donation conditions and blood supply, where the characteristics of cancer. At last, we have done a cross-check on aforementioned data and interpretation of the result.

Results: The result of this research shows at first that there is no influence of seasons (time) to the consumption of Aphaeresis Platelet in Taiwan while unexpected incidences such as COVID-19 do influence. As the second, medical institutions of different size and level do have different consuming behaviors to AP and patients under chemical therapies consume the largest portion of platelets, that is, 36.5%. More detailed, 25.92 of the patients with cancer consume platelet concentrated, 45.80% of them takes AP and 63.07% takes Prestorage Leukocyte-reduced Aphaeresis Platelets. The effects of perceived issues and potential development of performance improvement are worthy of further investigation.

Conclusions: The result of this research shows at first that there is no influence of seasons (time) to the consumption of AP in Taiwan while unexpected incidences such as COVID-19 do influence. Medical institutions of different size and level do have different consuming behaviors to AP and patients under chemical therapies consume the largest portion of platelets.

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72 | Analysis of the influence of MRI on human blood rheology

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Objectives: MRI examination will have a certain impact on human organs and blood rheology. Through the analysis of nuclear magnetic

resonance examination, the size and scope of this influence can be clarified.

Methods: We assume that $\nabla u \in L^*(0,T_s,L'(R^2)), 2/s+3/t=2, t\geq 3/2$, $u\in L^{\alpha,\gamma} 2/\alpha+3/\gamma\leq 1, 3<\gamma\leq\infty$. By Serrin type regularity method:

$$\|f\|^r_{L^*(0,T,T)}=\left(\int_0^T \|f\|_{L^s}dt\right)^{\frac{1}{x}}, 1\leq s<\infty, \|u\|_2^2+2\int_0^T\|\nabla u\|_2^2\leq\|u_0\|_2^2$$

From Young's, Troisi's, and energy inequalities, we can get

$$E^2(T)=sup\left(\left\|u(\tau)\right\|_2^2+\int_0^{T_2}\left(\left\|\nabla u(\tau)\right\|_2^2+\left\|\nabla p(\tau)\right\|_2^2\right)d\tau\right)$$

Multiply the equation by $\partial_{33}u$ and $\partial_{33}p$, then integrate on $R^3\times(T_1,T_2)$, and apply Gronwall's inequality to get

$$\begin{aligned}
&\frac{1}{2}\partial_t u\,(T_2)_2^2+\int_{T_1}^{T_2}\nabla\partial_t u\,(\tau)_2^2\,d\tau\\
&\leq\frac{1}{2}\left\|\partial_t u\,(T_1)\right\|_2^2+\int_{T_1}^{T_2}\int(u\cdot\nabla)\,u\cdot\partial_{tt}u dx d\tau\\
&\leq\int_{T_1}^{T_2}\int(b\cdot\nabla)\,b\cdot\partial_{tt}u dx d\tau\\
&\leq\int_{T_1}^{T_2}(b\cdot\nabla)\,p\cdot\partial_{tt}p dx d\tau-\int_{T_1}^{T_2}(b\cdot\nabla)\,u\cdot\partial_{tt}p dx d\tau\\
&\leq\sum_{i,j=1}^{3}\int_{T_1}^{T_2}u_i\cdot\partial_i u_j\cdot\Delta_p u_j dx+\gamma\int_{T_1}^{T_2}\left|\nabla_p u_3\right|\left|\nabla_p u\right|^2 dx
\end{aligned}$$

Therefore, using the similarity estimation method, for any $\beta_1\in(2,+\infty)$, there exists $\alpha_1>t_1, 2/\alpha_1+3/\beta_1\leq 2$, such that

$$\begin{aligned}
&\left|\int_{T_1}^{T_2}(L_1+L_2+L_3)\,d\tau\right|\\
&\leq\sup_{T_1<\tau<T_2}\left(\left|\partial_t u\,(\tau)\right|_2^2\right)\left(\int_{T_1}^{T_2}\|\nabla u_t\|_{s_1}^{t_1}\,d\tau\right)^{1/t_1}\\
&\leq\left(\int_{T_1}^{T_2}\|\nabla u_t\|_{s_1}^{\alpha_1}\,d\tau\right)^{1/\alpha_1}L^2\,(T_2)\left(\int_{T_1}^{T_2}1 d\tau\right)^{1/t_1-1/\alpha_1}\\
&\leq\int_{T_1}^{T_2}(b\cdot\nabla)\,(b+u)\partial_{tt}(u+b)dx\\
&\quad+\int_{T_1}^{T_2}(b\cdot\nabla)\,b\cdot\partial_{tt}b+(b\cdot\nabla)u\cdot\partial_{tt}u dx\\
&\leq\lambda_1\int_{T_1}^{T_2}\|\partial_t u\|\,\|\nabla u_t\|\,\|\nabla_h u\|\,dx+C\int_{T_1}^{T_2}\|\nabla u_t\|\,\|\nabla_h u\|^2 dx\\
&\leq\lambda_4 E^{\frac{1}{4q_1}+\frac{1}{4q_2}}
\end{aligned}$$

Results: The result shows that if (u, B) is the global incidence corresponding to the initial condition $(u_0,B_0)\in H^i(R^3), i=1,2,3$, and satisfies the energy inequality. Then (u, B) is smooth on $(0, T)$.

Conclusions: Through the analysis of the influence of MRI on various parts of the human body, we can understand the effect of MRI on different parts of the human body more clearly, so as to play the role of MRI in human body examination and treatment.

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73 | A comparative study of CTA and MRI combined with MRA in the diagnosis of intracranial aneurysms with different diameters

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Objective: To explore the application value of CTA and MRI combined with MRA in the diagnosis of intracranial aneurysms with different diameters.

Methods: Total 100 patients diagnosed with intracranial aneurysms of different diameters in our hospital from February 2018 to 2020 were selected as the observation objects, and randomly divided into control group examined by CTA and experimental group examined by MRI combined with MRA. With the surgical results as the gold standard, the accuracy of the examination methods and the display of intracranial aneurysms were compared between the two groups.

Results: The diagnostic accuracy in the experimental group was higher than that in the control group ($p < .05$). The average diameter of aneurysms in the experimental group was larger than that in the control group, and the number of aneurysms (<10 mm) was greater than that in the control group, with statistically significant differences ($p < .05$).

Conclusion: MRI combined with MRA is more accurate than CTA in the diagnosis of intracranial aneurysms with different diameters. It can clearly determine the location of aneurysms and provide reliable diagnostic basis for subsequent treatment, which is worthy of clinical application and promotion.

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74 | Effect of decompression plastic surgery on the stress of the body after jaw bone defects treated with jaw cysts

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Jinchao Li and Yan Ma equally contributed to this work.

Objective: To investigate the effect of decompression plastic surgery on the stress of the body after the jaw defect after the treatment of jaw cyst.
Methods: A total of 165 patients with postoperative jaw defects from February 2015 to June 2020. They were divided into 100 cases in decompression forming group and 65 cases in control group. The control was treated with conventional surgical methods, and the decompression forming was treated with decompression forming methods.
Results: The control 14 days after surgery was significantly lower than that of the 1 day after surgery, and the serum cortisol content of the decompression forming was lower than that of the control. The bone mineral density of the defect area in the decompression forming group was significantly higher than that in the control group at 1 and 3 months after the operation. The total effective rate of the decompression forming was 99.0% 3 months after operation, which was significantly higher than 87.7% of the control. After 12 months of follow-up, the recurrence rate of the decompression forming was 2.0%, which was significantly lower than the 12.3% of the control.
Conclusion: Decompression plastic surgery for the treatment of jaw defect after jaw cyst can inhibit the body's stress, improve the short-term curative effect of treatment, promote bone growth in the defect area, and reduce the long-term recurrence rate of jaw cyst.

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75 | CT angiography under various phases in the diagnosis of small intestinal stromal tumor

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Objective: To investigate the diagnostic value of CT angiography under various phases in small intestinal stromal tumor (SIST).
Methods: From February 2014 to 2018, 30 patients with small intestinal lymphoma and 28 patients with SIST in our hospital were enrolled. The characteristics of plain CT scan, venous phase, arterial phase and delayed phase of all patients were observed, and the CT enhancement value was recorded and the diagnosis efficiency was judged.
Results: Ileum was the most common site of small intestinal lymphoma, and jejunum was the most common site of SIST, with significant difference in lesion sites between the two groups ($p < .05$). There was no significant difference in the characteristics of liquid necrosis, calcification, lymph node enlargement, and organ metastasis between SIST and small intestinal lymphoma ($p > .05$).
Conclusion: CT angiography in venous phase, arterial phase and delayed phase is helpful for the differential diagnosis of SIST and small intestinal lymphoma, which is valuable in clinical application.

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76 | Application of painless ultrasound-guided PICC catheterization in pediatric leukemia

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Objective: To explore the application effect of painless ultrasound-guided PICC catheterization in pediatric leukemia.
Methods: The data of 120 children with leukemia admitted to our hospital from February 2020 to 2021 were retrospectively analyzed, and they were divided into painless group ($n = 60$) and routine group ($n = 60$) according to the order of admission. The routine group underwent conventional ultrasound-guided PICC catheterization, while the painless group underwent general anesthesia under the supervision of anesthesiologists, followed by ultrasound-guided PICC catheterization when the children were painless. The success rate of

catheterization, mean bleeding volume (MBW), catheterization time and pain perception were compared between the two groups.

Results: Compared with the routine group, the painless group achieved obviously higher success rates of catheterization and disposable catheterization ($p < .05$), less MBW ($p < .05$), shorter catheterization time ($p < .05$), and lower pain perception ($p < .05$).

Conclusion: Painless ultrasound-guided PICC catheterization can increase the number of successful one-time catheterization in children with leukemia, and improve the efficiency and quality of catheterization, with mild pain in children, which should be popularized in practice.

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77 | Application of photoelectrochemical biosensor in quantitative detection of trypsin

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Objective: Trypsin is a very important serine protease. The detection of trypsin plays an important role in many physiological systems, such as coagulation, digestion, fibrinolysis, and supplementation. In this study, a new photoelectrochemical sensor was designed to detect protease in homogeneous solution.

Methods: A template synthesis strategy based on protein cage was developed to prepare ascorbic acid entrapment, and then the corresponding entrapment was hydrolyzed with specific enzyme to release ascorbic acid on site. In this system, the sensor relies on monitoring the photocurrent based on the catalytic hydrolysis of substrate by enzyme in homogeneous solution. Therefore, it is possible to obtain an indirect, sensitive and specific detection of enzyme activity, so as to expand the detection range of the sensor.

Results: Ascorbic acid could capture the photogenerated holes of CdTe quantum dots under light, resulting in enhanced photocurrent response. In this system, the sensor realizes the determination of trypsin by monitoring the photocurrent intensity generated by the hydrolysis of enzyme catalyzed substrate in homogeneous solution. Under the optimal conditions, trypsin was detected, and a linear range from 30 to 450 ng/ml and a low detection limit of 2.7 ng/ml were obtained. This photoelectrochemical biosensor can be used not only for the determination of trypsin activity, but also for the screening of corresponding inhibitors.

Conclusion: A novel signal enhanced photoelectrochemical biosensor has been developed, which can sensitively determine trypsin. Ascorbic acid released in situ by trypsin hydrolyzed apoaa is used as a sacrificial electron donor.

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78 | Application of high sensitivity photoelectrochemical detector in glucose detection

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Objective: The incidence rate of diabetes worldwide is increasing rapidly due to the improvement of living standard, the change of diet structure and unhealthy lifestyle. How to determine glucose in blood quickly, accurately and accurately is an important link in the diagnosis of diabetes. The purpose of this study is to establish a highly sensitive glucose responsive OPD fluorescent nano sensor and investigate its detection performance.

Methods: Fluorescent nanoparticles with good stability in aqueous system were prepared by coating OPD molecules with amphiphilic polymers and used in glucose recognition system. The feasibility of the method was verified by five steps: the synthesis of OPD molecule, the synthesis of oleamine grafted polysuccinimide functional polymer, the surface modification of fluorescent molecule, the establishment of H_2O_2 detection system and the detection of glucose content in serum.

Results: The experiment proved that the actual serum samples were analyzed by this method, and the measured values were basically consistent with the clinical test data, which proved that the fluorescent sensor constructed by this method had potential application value.

Conclusion: This experiment provides a more accurate method for the determination of blood glucose.

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79 | Morphological analysis and therapeutic effect of CT guided different types of posterior Pilon fracture

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Objective: To analyze the therapeutic effect of computed tomography (CT) guided different types of posterior Pilon fracture.
Methods: We enrolled 67 patients with posterior Pilon fracture up in our hospital from January 2018 to 2020. Surgical treatment was performed according to preoperative CT morphology classification. After 12-months followed-up, the therapeutic effect, joint injury, joint pain, joint function, joint motion Angle, and gait were recorded, and postoperative complications were counted.
Results: All groups had a similar degree of joint injury, joint pain, joint function, joint motion Angle, and gait. After 12-months followed-up, the above indicators were improved except step width, while no significant difference among the five groups.
Conclusion: CT morphology-guided treatment of posterior Pilon fracture could achieve good treatment results with different fracture types.

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80 | Analysis of the value of elastography in the differential diagnosis of axillary lymph nodes

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Objective: To explore the value analysis of elastography in judging the differential diagnosis of axillary lymph nodes.
Methods: Taking pathological examination results as the gold standard, the receiver operating characteristic curve was used to analyze the value of color Doppler ultrasound, ultrasound elastography, and combined examination in the differential diagnosis of benign and malignant axillary lymph nodes in breast cancer.
Results: Color Doppler ultrasound results showed that the L/S value of the benign group was significantly greater than that of the malignant group, while the blood flow resistance index was significantly lower than that of the malignant group. The CDFI blood flow characteristics were in the benign group and the patients in the malignant group were mainly portal type and mixed type. The results of ultrasound elastography showed that the benign group was divided into 1 to 2 in the elasticity score, and the malignant group was divided into 3 to 4 into the main, the difference was statistically significant. ROC curve shows that L/S value, blood flow resistance index, CDFI blood flow characteristics, and elasticity score have a certain differential diagnosis for benign and malignant axillary lymph nodes of breast cancer, and combined examination has higher differential diagnosis value.
Conclusion: Ultrasound elastography combined with color Doppler ultrasound examination can provide a reliable theoretical basis for the clinical diagnosis and treatment of breast cancer axillary lymph nodes.
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81 | Image quality and radiation dose assessment of dental CBCT

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Objectives: Medical equipment in poor condition may lead to misdiagnosis and missed diagnosis by doctors, thereby causing medical accidents. Given the differences in the imaging method, the performance determination method for the conventional CT (Computed Tomography) does not apply to dental CBCT (Cone-Beam Computed Tomography). Therefore, it is very important and urgent to develop a detection method that is more suitable for the characteristics of dental CBCT and more convenient for on-site operation in hospitals. Hence, the aim of this research is to design a robust and convenient detection method to control the quality of dental CBCT, to grasp the safety information of the equipment in a timely and effective manner, to discover and evaluate equipment risks, and to take reasonable and necessary countermeasures. Thereby reducing the risk of medical malpractice.
Methods: The experiment chose several key parameters for performance evaluation of CBCT, namely, DAP (dose-area product) or KAP (kerma area product), spatial resolution, CNRI (contrast-to-noise ratio index), and uniformity index. In dosimetry, KAP meter with higher efficiency is used to replace pencil ionization chamber. In image quality detection, the objective quantitative method is used to replace the subjective evaluation method, which makes the detection process more standardized and accurate. We also described the details of the analysis and processing of the DICOM (Digital Imaging and Communications in Medicine) images. Based on the qualified imaging machines, the experiment was conducted by the same group of experimenters in 10 stomatological hospitals.
Results: Except that the KAP parameter was not applicable to the Newtom VG equipped with automatic exposure, the determination results on all other equipment satisfied the requirements.
Conclusions: Our experimental results indicated that the proposed method accorded with the application situation of dental CBCT and satisfied the need for measurement traceability, and is more accurate and convenient than the original method. The research findings provide technical supports for relevant determination efforts.
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82 | Use 2D convolutional neural network to classify ECG arrhythmia

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Objectives: Severe arrhythmia can cause dizziness, fainting, difficulty breathing, or chest pain. Even though most conditions are benign, some arrhythmias can increase the risk of complications such as stroke or heart failure, and even lead to cardiac arrest, shock, and sudden death. Therefore, it is necessary to identify the types of arrhythmia. This study converted the 1D electrocardiogram (ECG) signal into 2D images to classify the types of arrhythmia.
Methods: The work converted 1D ECG signals into 2D ECG images. Those images were then proceeded with the normalization and integration method. Finally, the 10-fold cross-validation method was used to train and test the convolution neural network (CNN). This study defines a single ECG pulse image by centering the Q wave peak signal, and excludes the first and the last 20th ECG signals. As a result, 106,501 ECG beat types were obtained from the MIT-BIH arrhythmia database. In order to maintain a balanced distribution of data between categories, this study uses a data expansion method to enhance seven ECG arrhythmia beats.
Results: When the original data set is used to execute the 2D CNN model into two categories (normal and abnormal), the area under the ROC curve (AUC), accuracy, specificity, and sensitivity are .9896, .9904, .9960, and .9779, respectively. When the original data set is used to execute the 2D CNN model into eight categories, the AUC, accuracy, specificity, and sensitivity are .9434, .9441, .9525, and .9280, respectively. When the 2D CNN model is used to divided arrhythmia data into 8 categories using the extended data set, the AUC, accuracy, specificity, and sensitivity are .9583, .9453, .9504, and .9321, respectively.
Conclusions: The experimental results show that if the target is two categories, the ECG classification accuracy rate of this system can reach more than 99%. If the model is allowed to distinguish eight types of arrhythmia, using the extended data set in the 2D CNN model has better performance than using the original data set. Therefore, this research can assist clinicians to identify the types of arrhythmia in cardiovascular diseases.
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83 | VR model design of psychological decompression based on EEG

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Background: The combination of EEG and VR technology is widely used in psychological intervention, which can treat psychological diseases such as fear of heights and anxiety, relieve psychological pressure, and achieve the purpose of personalized and intelligent

treatment. There are two difficulties in the research of VR scene construction based on EEG: one is emotion recognition based on EEG; the other is emotion rating of VR scene content. At present, there are commercial-grade EEG emotion recognition products, but there is a lack of research on the relationship between VR scene content and emotions.

Methods: This paper conducts VR scene construction research work based on EEG signals. According to Affective Picture System (IAPS), emotional materials are selected to construct three themes, a total of nine emotional virtual reality scenes. Then, 11 subjects were used self-assessment Manikin (SAM) and the prefrontal lobe EEG signal to analyze the emotional relationship of the subjects under the stimulation of different virtual objects in the virtual reality scene. BP network and CNN are used to predict the emotions of the subjects, and the corresponding scenes are generated to stimulate the emotions of the subjects

Results: Through SAM data analysis, it is found that under the same positive stimulus in different scenarios, although individual differences are shown, the overall emotions of the subjects have positive changes. At the same time, the EEG signal data analysis results show that the EEG signal changes are consistent with the SAM results.

Conclusions: As a result, the corresponding relationship between part of the VR scene content and emotions can be established, which can provide an emotional reference for the adaptive generation of scene content in the adaptive VR scene system. Accurate stimulation of subjects' emotions can be used to reduce patients' psychological stress.

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84 | Breast microcalcification classification: From 2D mammography to 3D digital breast tomosynthesis

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Objectives: Breast cancer is known to be caused by tumors and microcalcifications. The most commonly used breast cancer detection method is mammography. Due to tissue overlap, it is difficult to identify microcalcifications on mammograms. Digital breast tomosynthesis (DBT) is a new breast cancer diagnostic technology that can be used to solve this problem. However, DBT will generate a large number of images, making the interpretation work of radiologists too cumbersome. Therefore, it is necessary to build a computer-aided diagnosis (CAD) system to analyze breast microcalcifications.

Methods: This study uses a multi-layer perceptron (MLP) neural network to build a microcalcification classification CAD system. The proposed system uses 2D mammograms to train the MLP, which is then used for the classification of the microcalcification of 3D DBT images. The image enhancement method uses Gamma conversion, mathematical morphology and top hat conversion methods. The proposed system is trained by 180 mammograms from the Digital Database for Screening Mammography (DDSM) dataset. The test dataset is from the Taichung Tzu Chi Hospital, Taichung City.

Results: The experimental results show that the mathematical morphology method has the best classification performance, and its accuracy, precision, recall and F-measure are 88.65%, 89.00%, 88.57%, and 88.66%, respectively. The accuracy, precision, recall and F measurement values of gamma conversion are 88.19%, 88.82%, 88.73%, and 88.18%, respectively. The top hat transform has the worst classification result, and its accuracy, precision, recall and F measure are 50.92%, 25.46%, 50.50%, and 33.73%, respectively. The reason may be related to the ambiguity of the microcalcification area. The ROC curves of different image processing methods show that the best curve is the mathematical morphology.

Conclusions: DBT can reduce interpretation difficulties caused by overlapping projections of tissue on mammograms. However, this technology will produce a large number of images, thereby increasing the workload of the radiologist. This study constructed a CAD system to classify microcalcifications in 3D DBT images using 2D mammograms. The experimental results show that the image processed by mathematical morphology has the best classification performance. The results can be used clinically to help radiologists classify breast microcalcifications.

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85 | Medical image segmentation method based on geometric active contour model

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Background: Medical images often have the characteristics of low definition, weak boundary, serious noise pollution and intensity inhomogeneity, which hinder accurate segmentation of the target tissue. As a geometric active contour model based on global area information, the Chan-Vese model is capable of effective segmentation of medical images with vague or discontinuous boundary, and is characterized by strong noise resistance. However, this model is incapable of correct segmentation of image with intensity inhomogeneity due to its assumption of even grayness distribution in various areas of image, and is faced the problem of low evolution speed.

Methods: First, the selected medical images were treated with top-hat transformation and bottom-hat transformation, and turned into linear combinations of top-hat transformation and bottom-hat transformation, so that the image background was smoother, the grayness distribution was more even and the image contrast was higher after reasonable selection of parameters. Second, a penalty term was added

to the Chan-Vese model in view of its problem of low evolution speed, to overcome its weakness of periodic initialization of the level set function, so that the evolution speed was higher. Finally, the resultant images were segmented with the improved Chan-Vese model.

Results: A total of five medical images were selected. Of these, Figures 1 and 2 are images with blood vessels, which are characterized by intensity inhomogeneity and weak edge; Figure 3 is a breast tumor image, whose background is characterized by uneven grayness distribution arising from the interweaving of the blood vessel; Figure 4 is a multicellular image, whose target tissue and background are both characterized by intensity inhomogeneity; and Figure 5 is an image with vascular slices, which is characterized by natural noise pollution and weak edge. In the case of Figure 1 to Figure 4, the improved model is capable of correct segmentation of the target tissue after no more than 80 iterations and within 1.52 s, while the original Chan-Vese model is incapable of correct detection of the tissue boundary regardless of the number of iterations; and in the case of Figure 5, the two models are both capable of correct segmentation of the target tissue, but the new model is faster, that is, 10 iterations and .68 s for the improved model, and 200 iterations and 12.77 s for the original model.

Conclusions: The improved model is capable of rapid and effective segmentation of some medical images, and is worth further and deeper research.

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86 | Research on multi-perspective feature extraction method for rapid classification of breast pathological images

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Background: Breast cancer is often called the "pink killer" and poses a great threat to women's health. Early screening and diagnosis of breast cancer can effectively improve the survival rate of patients; however, the tissue appearance of breast cancer pathological images has large variability. At present, the main feature extraction method is still convolutional neural network (CNN), lack of discussion on other efficient feature extraction methods.

Methods: This paper proposes a compound model that can feature extraction and rapid classification of breast pathological images, named H&E-IBL (Hematoxylin & Eosin-Incremental Broad Learning) model. First, utilizing the characteristics of the morphological and structural diversity of breast cancer benign and malignant cell nuclei in the H&E model, extract multi-perspective feature such as the morphology, graph and color-texture (complex wavelet, Gabor chromatic, OCLBP, etc.). Then, the extracted features are used as the input data of the IBL model for rapid classification analysis, view the effect of the multi-perspective feature extraction method through the classification results.

Results: The H&E-IBL model achieved a classification accuracy of 97.3% on the BreaKHis database, the area under the curve (AUC) is .98, and the analysis time was only 3.8 s. Compared with existing methods, this method has better feature extraction efficiency and shorter classification time.

Conclusions: The experimental results prove that the multi-perspective feature extraction method of breast pathological images proposed in this paper plays a positive role in the rapid classification of breast cancer benign and malignant tumors, and has important theoretical significance and reference value.

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87 | Intelligent medical imaging and disease diagnosis techniques based on CMOS image chips

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Objectives: We use multi-band cells to collect medical diagnosis images and form narrow-band images, including, which can help us get different medical characteristics for the same part of tissue (e.g., pathological sections of different cancer tissues) and provide diagnostic basis more precisely.

Methods: Four-band imaging cells can transmit four beams in different bands, whose central bandwidth are 735, 800, 865, and 930 nm. Since the light-wave with wavelength of 735 nm is able to show the signature of hemoglobin and indicate the feature of venous blood. Band of 800 nm is the characteristic band of total hemoglobin, 865 nm band is apt at oxyhemoglobin, and 930 nm band is apt at epirubicin liposome. In this way, four different band images are able to provide blood and liposome of a tissue for accurate judgment.

Results: Our intelligent medical image platform provides a medical AIDS for doctors. It includes: information gathering module (IGM), data center, diagnosis module, and treatment module. The IGM contains TCM (Traditional Chinese Medicine) detection module, western medicine testing (WMT) module and other information gathering modules. TCM module also has meridian acupoint information acquisition devices. WMT module carries on two items of routine detection and image detection, in which body temperature, blood pressure, blood sugar, and blood fat are measured in routine detection, and visible light image, infrared image, ultrasonic image, X-ray image and NMR image are tested in image detection. Other information gathering modules

are adopted to get some information such as geographic information and medical history, etc.

Conclusions: Based on CMOS imaging chips, we developed a kind of intelligent medical imaging platform, acquired multi-band images, used AI (Artificial Intelligent) to process image data, and provided aid for doctors' disease diagnosis.

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88 | Improvement of particle swarm optimization in artificial neural network with fully connected layers in the diagnosis of heart disease

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Objectives: According to the latest statistics by WHO, over 37% of world deaths are effects by cardiovascular disease. In the recent years, the study of the combination of the advanced metamorphic algorithms and data searching approaches for the detection of the syndrome is widespread. The machine learning techniques drawing on clinic data can help doctors to work more efficiently. Among others, Particle Swarm Optimization (PSO) in Artificial Neural Network (ANN) algorithm is one of the most promising methods for detecting the heart disease, for it utilize the extraordinary powerful optimization ability of PSO to improve the training of ANN. However, up-to-date experience reveals, there is still opportunity for PSO-ANN to improve its accuracy. We propose an enhanced Hybrid PSO in ANN with Fully Connected layers, which can improve the performance in the diagnosis of heart disease. With developing the model using new parameters, it is expected to increase around 12% for more accurate and reliable results of diagnosis of heart disease with less error.

Methods: In this study, we use University of California, Irvine (UCI) dataset to evaluate the proposed method. This dataset includes test results of 303 people with 76 common features for the detection of heart disease. This dataset comprises of two classes, one class for healthy people and the other class for people with heart disease. PSO is a global search and population-based intelligent algorithm accustomed to training neural networks, searching neural network architectures, adjust network learning parameters, and optimizing network weights. Without gradient information, PSO can avoid trapping in a local minimum. PSO-ANN combines PSO and ANN by using ANN's escaping mechanism to enhance the deficiency of PSO with slow convergence and possibility of falling into the local optimum. Finding the best set of weights is the major function of PSO in ANN where several particles are trying to move to get the optimal solution. The dimension of the search space is the sum number of weights and biases. This paper proposes an enhanced Hybrid PSO in ANN with Fully Connected layers, which organize the data obtained by previous layers to generate the final output. It can improve the accuracy and reliability of the diagnosis of heart disease.

Results: The experiment ran 12-fold of cross validation with the UCI dataset. With the enhanced Hybrid PSO-ANN, the average of accuracy is 72.45% for the heart disease diagnosis which is lower than that of the original PSO-ANN but the best accuracy obtained is at 83.82% which is higher than 77.41% of the original PSO-ANN. We found that by means of ANN with Fully Connected layers, the accuracy can be better than PSO around 12.20%.

Conclusions: The Hybrid PSO-ANN algorithm can find the best set of weights for adjusting network parameters per se to improve the accuracy of heart disease diagnosis. By learning form different datasets with either larger sample size or more features, we can have clearer picture of cardiovascular disease. For that, we plan to select cardio and heart_statlog_develand_hungary open datasets to further improve the Hybrid PSO- ANN.

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89 | Transcriptomic and network analysis during spermatogenesis provide insights into functional gene modules and hub regulators involved in human sperm development

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Objectives: Primordial germ cells are a group of founder cells that maintain pluripotent state and could eventually transform into sperms or eggs. In the process, pachytene spermatocytes and round spermatids are very important cell types implicated in germline development and meiosis. However, very little is known for the key driven factors and pathways corresponding to above-mentioned three cell types during human gametogenesis.

Methods: We collected transcriptomic sequencing data from cells at three different time points during human germline development. The specific gene modules, key driven factors and pathways corresponding to each cell types were identified by using weighted gene co-expression network analysis (WGCNA) and GO annotation. Combined with the STRING database and MCODE analysis, the protein-protein interaction (PPI) networks during human gametogenesis were further constructed.

Results: We identified the functional gene modules related to each cell type in human sperm development. The MEdarkorange module containing 417 genes is positively correlated with primordial germ cells, with a Pearson Correlation Coefficient (PCC) of .98 (p-value=2e-05), which enriched in BMP and canonical Wnt signaling pathways. Network analysis further showed that the hub driven regulators of

the module include BMP2, WNT2, and WNT4. The MElavenderblush3 module containing 316 core genes is positively correlated with the cell type of pachytene spermatocytes, with a PCC of .75 (p-value = .03), involving in the process of histone H3 acetylation and spermatogenesis. Network analysis presented that the hub driven factors of this module include AARD, CMPK2, KRT72, PLD6, and TFAP2E. The MEbrown2 module carrying 87 genes is positively correlated with the cell type of round spermatids, with a PCC of .95 (p-value = 2e-04). The genes in MEbrown2 module are highly enriched in spermatid development, meiosis, and chromosome condensation. Network analysis highlighted that the key drivers of this module are SYCP1, SYCP2, STRA8, and NANOS3.

Conclusions: Our results reveal the functional modules and pathways corresponding to three different cell types during human germline development, present the key driven factors in gametogenesis and shed light on treatment targets for infertility.

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90 | Isolation of lipase producing bacterium *Aeromonas veronni* LI.1 from fish waste using solid tween media with non-bacto agar

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Objective: Lipase is a valuable enzyme and a new source of lipase from this group of bacteria is preferable because bacteria have the advantage of being able to withstand various temperatures, pH, and organic solvents. However, the isolation of lipolytic bacteria tends to be tricky since the formation of a clear zone that is difficult to observe. The principle of forming a calcined zone with a tween substrate offers detection of bacterial lipolytic activity with clearer visualization. Meanwhile, the use of food-grade non-bacto agar has been reported as a substitute for better and more economical media, but it is rarely used. This study aimed to obtain lipase-producing bacteria isolated from fish waste samples using solid tween media with non-bacto agar and to identify the bacterial species based on the Gen16S rRNA sequence

Methods: In this study, Tween 80 combined with food-grade or non-bacto agar were used for screening lipolytic bacterium from fish waste. The selected lipolytic isolate was then molecularly identified based on the DNA sequence of its 16S rRNA gene fragment amplified by PCR (Polymerase Chain Reaction). Genomic DNA from lipase-producing bacterial cells was extracted using the Zymo-Spin TM Reagent Kit. Results were sequenced and analyzed using the BLAST program to reveal species identity.

Results: From fish waste sample, four culturable bacterial colonies could be obtained and coded as LI.1 to LI.4 (LI = "*Limbah Ikan*" or fish waste) with distinct morphology. Of the four culturable isolates, LI.1 isolate has the most significant lipolytic activity by producing a clear zone with a lipolytic index of 2.30 on solid tween media with Non-Bacto Agar medium. Isolate LI-1 was molecularly identified as *Aeromonas veronii* LI.1, since its 16S rRNA gene sequence has a 100% similarity level with that of *A. veronii* strain S2.

Conclusion: As conclusion, a lipase producing bacterium *Aeromonas veronii* LI.1could be isolated from fish waste supported by the use of solid tween media with Non-Bacto Agar as a selective media for lipolytic bacteria.

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91 | Application of machine learning algorithms in early prediction of diabetes dataset

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Background: With the continuous development of interdisciplinary, as an important part of disease prediction model, more and more machine learning and artificial intelligence algorithms are applied to medical data sets. At present, the relevant literature is only a single algorithm application, or only compared with a few commonly used algorithms, without a full comparative study of machine learning algorithms based on different ideas and different parameters. Therefore, based on the Weka platform, this paper applies various common algorithms in the field of machine learning to the diagnosis and prediction of early diabetes, and makes comparison and analysis, so as to strive for the universality of algorithm coverage to explore the operability and portability of machine learning algorithm for medical classification data.

Methods: The experimental data set selected in this paper is from the UCI machine learning database, which is provided by the National Institute of diabetic digestive and kidney disease of the United States. There are 768 pieces of data in total. The data set mainly takes the ordinary residents of Arizona as the research object. The algorithm selected covers six categories, including Bayesian theorem based algorithm, ensemble learning model, rule-based algorithm and tree based algorithm, with a total of 21 algorithms. The evaluation indexes of the model mainly include TPR, FPR, precision, recall, accuracy, and AUC value.

Results: In this paper, weka3.6.12 software is used to test the algorithm by the way of 10-fold cross validation. According to the experimental

results, the algorithm selected in this paper can achieve more than 65% accuracy in the classification and prediction of diabetes data, and the accuracy of the integrated learning model is relatively stable, and each algorithm is more than 74%. However, from the time of the algorithm, the integrated learning algorithm is generally better Compared with other algorithms, the running time is longer. In terms of machine learning evaluation index, the classification accuracy, F-measure and AUC value of LMT and logistic algorithms are the best among all algorithms, which more intuitively shows the application of these two algorithms in Pima The results of classification and prediction of urine disease data set are better.

Conclusions: There are six algorithms with good classification and prediction effect on the diabetes dataset, which are LMT, SMO, logistic, navie bays, rotation forest, and bagging. Machine learning algorithm has good application value in the diagnosis and prediction of diabetes, and can provide reference for disease diagnosis.

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92 | Key technology of individual respirable dust concentration detection for pneumoconiosis prevention in coal mine

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Background: Pneumoconiosis accounts for up to 90% of occupational disease cases, more than half of which come from coal miners. Detecting and controlling the concentration of respirable dust can reduce the occurrence of pneumoconiosis effectively. At present, the measurement of individual respirable dust concentration is still mainly by weighing the filter membrane after sampling, so that the dust exposure of the operator cannot be monitored without interruption. Therefore, it is necessary to develop a kind of respirable dust concentration monitoring instrument which is easy to wear.

Methods: The individual respirable dust concentration monitor in this paper is mainly composed of cyclone separator, sampling pump, optical detection unit and control circuit. A static chamber filled with monodisperse aerosol was used to test the cutting performance of cyclone separator. The flow rate of the sampling pump was measured by a miniature pressure difference sensor. An infrared light-emitting diode with a power of 5 mW and a wavelength of 670 nm was selected as the light source. The flow direction of the airflow intersects the optical path vertically, and the optical signal receiving and transmitting optical paths were arranged at 90°.

Results: The results show that the separation efficiency of cyclone meets the BMRC curve, and the maximum error is 3.84% at the cutting particle size. The sampling error of pump is less than 2%. The frequency value of the collected signal increases with the increase of dust concentration in a proportional relationship. When ambient dust concentration is less than 3000 $\mu g/m^3$, the slope of fitting between dust concentration and frequency value is 246. The detection sensitivity of the individual monitor is 10 ug/m^3. The detector can be used for no less than 8 hours without charging.

Conclusions: In this paper, an individual respirable dust monitor based on light scattering principle is designed, which can be easily carried on coal mine workers to help them obtain the respirable dust concentration in real time. In future studies, it is planned to predict respirable dust concentration based on the operating environment to provide early warning for coal miners.

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93 | Clinical application of neibagua acupoint in pediatric massage

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Qian Li and Duanliang Tian are co-first authors and contribute equally.

Objectives: This study expounds and summarizes the descriptions of Neibagua acupoint in pediatric massage literature from Ming and Qing Dynasties to the Republic of China, and preliminarily discusses its acupoint characteristics and clinical application rules.

Methods: The positioning, operation methods, and clinical application rules of Neibagua acupoint were sorted out through analysis of the relevant discussion in 11 ancient documents. In addition, the experience of the ancients in the application of prescriptions and acupoints was further summarized.

Results: The Neibagua acupoint in pediatric massage originated from the Houtian Bagua of King Wen of the Zhou Dynasty. The position of Neibagua is arranged according to south "Li," north "Kan," east "Zhen," west "Dui." In addition, "Qian" is located in the northwest. "Kun" is located in the southwest. "Xun" is located in the southeast, and "Gen" is located in the northeast. The properties of cold and heat vary with the running direction of Neibagua. Clockwise rotation of Neibagua tends to rationalize Qi. Counterclockwise rotation of Neibagua tends to reduce heat. When running clockwise, the property of Neibagua is hot, which can replenish Qi. When running counterclockwise, the property of Neibagua is cold, which can purge intense heat.

Conclusions: Neibagua acupoint is one of the most commonly used specific acupoints for pediatric massage. Its operation method is divided into clockwise operation and counterclockwise operation. The clinical application of Neibagua acupoint is mostly for common diseases of the five internal organs, focusing on regulating Qi.

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94 | Study on the active charge theory and characteristics of human pathogenic respiratory dust particles

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Background: Although scholars at home and abroad have put forward the classic theory of dust charging and have made certain breakthroughs, they are all analyzed for individual dust particles. In actual production, dust appears in the form of particle groups, resulting in a certain amount of classical theory of active dust charging. The limitations for this reason, based on the classical theoretical model of active charging of a single dust particle, the article derives the mathematical model of active charging of dust particle group, and finds the main influencing factors.
Methods: Based on the classic theoretical model of active charging of dust particles, the influencing factors and trends of active charging are analyzed, and a theory of active charging of dust particles is proposed. Based on the theory of dust particles, combined with the physical characteristics of dust, comprehensive comparison of dust based on the charging method, the dust charging method was selected, and the corresponding test plan was designed, the test instruments and equipment were developed and selected, and the dust active charging test system was finally built. The self-developed dust active charging test system was used to carry out the experimental research on the influence of electric field strength, environmental parameters, and physical properties on the active charging of four types of dust. The test results are consistent with the results of the dust particle active charging theoretical model. Through multiple regression analysis, a mathematical model was established between the dust charge-to-mass ratio and the charge voltage, wind speed, temperature, humidity, mass median diameter, and dust concentration.
Results: After experimentation, it is found that the monitoring error of the charge-inductive dust concentration in a low-concentration environment is reduced by (1–5)% compared with the previous one. This shows that the dust particle group theory based on active charging improves the pick-up strength of the inductive dust concentration monitoring signal and enlarges the dust concentration test range.
Conclusions: It greatly improves the accuracy of inductive dust concentration monitoring, laying a technical and theoretical foundation for the precise monitoring of dust occupational hazards.

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95 | Application research on the construction of biomedical models based on color 3D printing

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Background: With the rapid development of science and technology, 3D printing (3DP) technology has been paid much attention and is widely used in biomedicine, aerospace, architecture and other fields. In terms of biomedical applications, compared to other 3DP technologies, paper-based full-color 3D printing has higher resolution and real color, which can restore the real state of biological organs accurately when constructing biomedical models. In addition, it has the advantages of low cost, convenient access to raw materials, and no pollution in the printing process, which meets the requirements of biomedical model construction.
Methods: The 3D digital and visual images of embryos and human organs were obtained by 3D-Color Doppler Ultrasound, and the basic models were reconstructed with 3Ds-MAX software. According to different needs, support objects such as bases were selectively added to the basic models, and different colors, textures and real pictures were applied to map each part; Finally, the biomedical-related paper-based full-color organ models and derivative ornaments were printing with Mcor Arke paper-based full-color 3D printer and removing the waste materials.
Results: We reconstructed five different basic models of embryo, heart, kidney, lung and aorta, and found that all models need to be sealed and structurally thickened in order to avoid printing failure. We also found that the internal vasculature of complex organ models is numerous, and limited by the precision of ultrasound equipment, resulting in the phenomenon of capillary fragmentation in the basic models, which brings lots of inconvenience to experiment. In response to this, we optimized the models by referring to the specialized information on the structure of biological organs, and retained the more important key blood vessels. Without affecting the application and reducing the printing time, we achieved excellent printing effect.
Conclusions: The paper-based biomedical models and their derivatives give full play to the advantages of paper-based full-color 3D printing, such as real color, low cost, eco-friendly, etc., which can be used as medical teaching tools, decorations and souvenirs, and will certainly have a broader space for development in the future.
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96 | Location characters of onion epidermis and edible oils in interference spectrometer and its application in biomedicine

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Background: Aiming at the spectral characteristics of biomedical samples in the visible band, taking onion and edible oil as the research objects, an intelligent spectral analysis theoretical model in the interference spectral system is established.

Methods: Mercury source was used in LSPF-1 Visible Michelson Interference Spectrometer. Place the outer skin of the onion on the front of the detector, the front of the light source and the light path of the movable mirror. The interference spectrum is theoretically analyzed by ray tracing method, and its experimental characteristics are compared. For peanut oil and colza oil, a clamping device composed of double-layer slides with a spacing of .0615 mm is placed at three positions, and then the spectra of the two edible oils are compared and identified according to the CNN model in deep learning.

Results: Under dark room and natural light, the relative error ranges of the four characteristic spectral lines in the visible band of mercury light source are (.16%, .24%) and (.22%, .50%), respectively. Using mercury as the light source, the characteristic spectral line $\lambda = 632.7$ nm of onion epidermis in visible light band was analyzed. The samples were placed in front of the detector, and the light path of the light source and the active mirror were used as the light source, respectively. The relative light intensity of the characteristic spectrum was 100%, 25.7%, and 18.6%, respectively. These experimental results were verified by the analysis of the Double Beam interferogram modulation and the Fourier Transform. The spectral curves of peanut oil and colza oil are very similar, and the common characteristic spectrum is $\lambda = 630.0$nm. The spectral recognition rate of DenseNet model in deep learning is 94.1% in front of detector, which is much higher than 80% in front of light source.

Conclusions: The dark room should be the first choice for the analysis of biomedical samples by interference spectrometer. Ray tracing method and deep learning method provide the best scheme for the spectral analysis of sample placement. This paper provides a new way for intelligent bio-spectral analysis, and also provides a reference method for medical image analysis.

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97 | Performance analysis on integrated GPUs for medical image computing

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Background: Recently, as medical image computing data has grown exponentially, the use of GPU that can compute large amounts of data in parallel has increased. In addition to dedicated GPUs, integrated GPUs are widely used. Some of integrated GPUs are designed so that CPU and GPU share main memory and Last Level Cache (LLC) via ring-bus interconnection. Unlike dedicated GPUs, integrated GPUs do not have device memory, so they access main memory frequently. Due to this structural issue, if CPU workload and GPU workload execute at the same time, severe ring-bus contention may occur, resulting in unexpected performance of them.

Method: In order to analyze the performance change of medical image computing workloads under various ring-bus contention, I develop a page-coloring based cache-partitioning method and apply it to kernel. Through this method, the frequency of access of the main memory, that is, ring-bus contention, can be adjusted by controlling the size of the allocated LLC capacity given to each workload.

Results: I measured the execution time of CPU and GPU workloads for medical image computing by increasing the LLC capacity allocated to the CPU one compared to the GPU one on Intel Haswell Processor. Even though the CPU workload utilized more LLC capacity, the execution time of CPU one as well as the GPU one increased. When the ratio of the capacity of LLC allocated to the CPU workload and GPU workload changed to 1:3 to 3:1, the execution time of the GPU one and CPU one increased by 1.3 times and 1.2 times, respectively. As the LLC capacity available for GPU workload becomes smaller, it accesses main memory more frequently, which worsens ring-bus contention. I measured the memory bandwidth during execution of workloads, the memory bandwidth was significantly increased as the LLC capacity for GPU workload became smaller. So, the CPU workload became difficult to even access the ring-bus interconnection to use LLC, increasing the execution time despite having more LLC capacity. Because of the ring-bus contention, both workloads showed low performance.

Conclusions: With integrated GPUs which share LLC and main memory with CPUs via ring-bus interconnection, ring-bus contention occurs. Through the analysis, I found that ring-bus contention increased as the LLC capacity for GPU workloads decreased. And the more severe ring-bus contention, the unexpectedly low performance CPU and GPU workloads experienced.

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98 | Primary Study on the Effect of Puerarin on Skin Healing Through TGF-beta Signalling Pathway

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Objective: Serious skin wound such as the extensive full-thickness wounds usually leads to pain, infections and even amputation severely affects people's life and health. Wound healing is a complex process generally consisting of early inflammation, cellular proliferation, and tissue remodeling requires the efforts of cells, growth factors and extracellular signals. An excellent wound dressing to heal severe wounds is critical to accelerate the recovery of skin integrity and functional state. Owing to the existence of PDA NPs, the hydrogel could deliver PUE and maintain the drug in the hydrogel network for a long period. The aim of this study is to evaluate the therapeutic efficacy of the PEG-DA/PDA/PUE hydrogel on skin wound healing and to explore the mechanism of wound healing.

Methods: The PEG-DA/PDA/PUE hydrogels were fabricated by the incorporation of PDA/PUE NPs and the photo-polymerization of PEG-DA in an aqueous solution with an initiator. For morphological characterization, the composite hydrogels after swelling in water were freeze-dried using a freeze drier. And then, the hydrogels were observed by scanning electron microscope (SEM, Q25, FEI) to study the pores and network of the hydrogels. The swelling rate and the degradation rate of hydrogels were measured by the gravimetric method. At prearranged time periods the swollen hydrogel was weighed, and the mass loss of hydrogels was measured. The water vapor transmission rate (WVTR) was measured in accordance with the ASTM E96–95 standard, which was measured by the weight loss of water. And, the mechanical properties of these samples were performed on Instron tensile strength tester (INSTRON, Model 5944) with a speed of 10 mm/min. The stress-strain curve was then obtained. In vitro drug release of hydrogel samples was carried out at 37°C. The concentration of PUE solutions was analyzed at 250 nm by UV-Vis spectrophotometer. The antioxidant capacity of hydrogels was measured by measuring hydroxyl radical scavenging capacity. All experiments were performed in triplicates and the average values were calculated.

The biocompatibility of hydrogels was studied using MTT assay. After sterilized via UV radiation, the hydrogels were immersed in the medium for 24 hours at the extraction ratio of 5 mg/mL. After being filtered, the medium was incubated with PDLSCs and DPSCs cells for 7 days. After MTT solution treatment, the absorbance was detected at 490 nm by a plate reader. Meanwhile, the live/dead cell staining kit was used to stain cells. Finally, the images of cells were get via fluorescence microscopy.

Results: In this study, PDA NPs and PDA/PUE NPs were prepared and their FT-IR spectra. And, the morphology of PDA NPs and PDA/PUE NPs was characterized by TEM. The particles were approximately spherical with average diameters of 108±11.32, and 204±26.21 nm, respectively. And, the drug loading ratio of PUE on PDA NPs was 8.01±2.08%, which was determined at 250 nm by the UV spectra.

The water evaporated due to the porous structure of these hydrogels. The WVTR data of three hydrogels were 2364.67±97.67, 2344.51±106.39, 2561.23±157.71 g/m^2/day, respectively. An ideal wound dressing should keep the skin evaporation and water loss rates at an optimum level. It was reported that the WVTR of normal skin ranges from 240 to 1920 g/m^2/day at 37°C. Moreover, the damaged skin had a high rate of water vapor transmission, which could lead to rapid drying of wounds and create new wounds on the skin. Therefore, it was inferred that the prepared hydrogels could be suitable for treatment of skin wound as dressing.

The compressive strength was one of the key factors affecting the application of hydrogels. In compression tests, the stress-strain curves of hydrogels. The compressive modulus of hydrogels was changed with the addition of PDA/PUE NPs. The Young's modulus of three hydrogels was 0.37±0.06, 0.50±0.13, and 0.54±0.07 MPa, respectively. In comparison to the PEG-DA hydrogels, PEG-DA/PDA/PUE hydrogels improved the mechanical performance.

Further, the antioxidative capacity of PEG-DA/PDA/PUE hydrogels was evaluated. Under the excessive ROS production, cellular biomolecules were seriously oxidative damage, resulting in the destruction of cellular oxidation/antioxidant balance. In this study, the expression of SOD, GPx, and MDA as the oxidative stress indicators was investigated to elucidate the cellular antioxidant mechanism. SOD plays a key role in oxidation/antioxidant balance, which can remove superoxide anions and free radical, and repair damaged cells timely. The SOD activity was measured by WST-8 method. After the DPSCs cells treated with hydrogel for 24 hours, the values of SOD activity were 0.47±0.02, 0.50±0.04, 0.54±0.01 and 0.57±0.02 U/mg protein, corresponding to control, PEG-DA, PEGDA/PDA/PUE(L), and PEG-DA/PDA/PUE(H), respectively. And, the values of SOD activity were also detected to be improved in the DPSCs cells after hydrogel treatment. The increased of cellular SOD activity was attributed to the antioxidant properties of PEGDA/PDA/PUE hydrogels.And, GPx is one of the most important enzymes in oxidative and antioxidant system.34 The results of GPx activity were significant. After the PDLSCs cells treated with hydrogel for 24 hours, the values of GPx activities in each group were 1.89±0.02, 1.92±0.01, 2.07±0.01 and 2.11±0.01 mU/mg protein, respectively. The activities of GPx treated with PEGDA/PDA/PUE(H) hydrogel was obviously higher than that treated with PEG-DA hydrogel. The similar results were observed in DPSCs cells after hydrogel treatment for 24 hours. In addition, after PEG-DA/PDA/PUE(L) hydrogel treated PDLSCs and DPSCs cells for 48 hours, the activities of GPx were significantly higher than that treated with other groups. In test groups, the increase of GPx activity was attributed to the antioxidative hydrogels protecting cells. The PEG-DA/PDA/PUE hydrogels could scavenge free radicals and protect cells, which was consistent with the results of cellular SOD activity.

Conclusions: In this study, the antioxidant hydrogel as wound dressing had been developed. Owing to the existence of PDA NPs as antioxidant drug carriers, the hydrogel could load puerarin and maintain the drug in the three dimensional network for a long period. The hydrogels possessed the excellent swelling capacity, and showed the favorable mechanical property as wound dressing. And, In vitro study supported that the PEG-DA/PDA/PUE hydrogels were conducive to cell growth.Thus, the investigation of PEG-DA/PDA/PUE(H) hydrogels could be used as a candidate material for wound skin healing and regeneration.

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99 | Diagnostic markers of preeclampsia-related genes based on enhanced Raman spectroscopy

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Objective: Preeclampsia is a pregnancy-specific disorder that affects up to 15% of all pregnancies. The specific conditions of the disease can basically be defined as hypertension (≥140/90 mmHg) and proteinuria. These conditions occur after the 20–22th week of pregnancy. We analyzed the measured spectra with band component analysis and applied principal component analysis-linear discriminant Analysis (PCA-LDA) after a sensitive preprocess step to find the differences between preeclamptic and healthy women.

Methods: Informed consent for the study was obtained from all the women concerned, and approval was given by the Ethics Committee of Shanxi Medical University. The sample population consisted of ten normotensive women who had no underlying medical conditions and nine otherwise healthy preeclamptic women who were diagnosed at the first affiliated Hospital of Shanxi Medical University. The normal pregnancies were followed until their completion, and no preeclampsia occurred. Blood samples taken in 10 mL gel tubes were centrifuged during a 10-minute period with 3000 rpm to obtain serum samples. Each serum sample was prepared in two aliquots which were measured on two different days to validate the stability of the experimental conditions. The samples were kept at -20°C until the observation day and were measured maximum in seven days. Frozen serum samples in eppendorf tubes were defrosted by hand warmth before the Raman measurements were taken.

The Raman spectra of 38 serum samples (nine preeclamptic and ten healthy; two from each patient) were taken with a 30 s exposure time, 20 successive scans over a 10-minute period. The laser power on the sample was about 50 mW. After cosmic-ray removal, the 20 scans were averaged for each sample. The wavenumber calibration of the spectrograph was performed with reference bands of toluene. A toluene Raman spectrum was taken for one second after each Raman spectrum of serum sample to apply a developed iterative calibration technique which minimizes the effects of possible spectral shifts during the measurement day(s). These shifts may arise from some reasons such as temperature, pressure, humidity which may affect the diode laser, spectrograph, and all optical components. The mean Raman spectrum of all serum samples for control and preeclamptic groups and the Raman spectrum of water are shown in Figure 1(a). The baseline corrected, vector normalized mean Raman spectrum of control samples is given in Figure 1(b).

Results: The preeclamptic and normotensive groups were well matched. There was no significant difference for age, parity, and gestational age at blood sampling between the groups ($P > 0.05$). The Raman spectra of 38 serum samples (18 preeclamptic and 20 healthy) were obtained.

PC 2 and PC 3 loadings are presented in Figures 2(b) and 2(c) superposed with control mean Raman spectrum. Two sharp Raman bands at

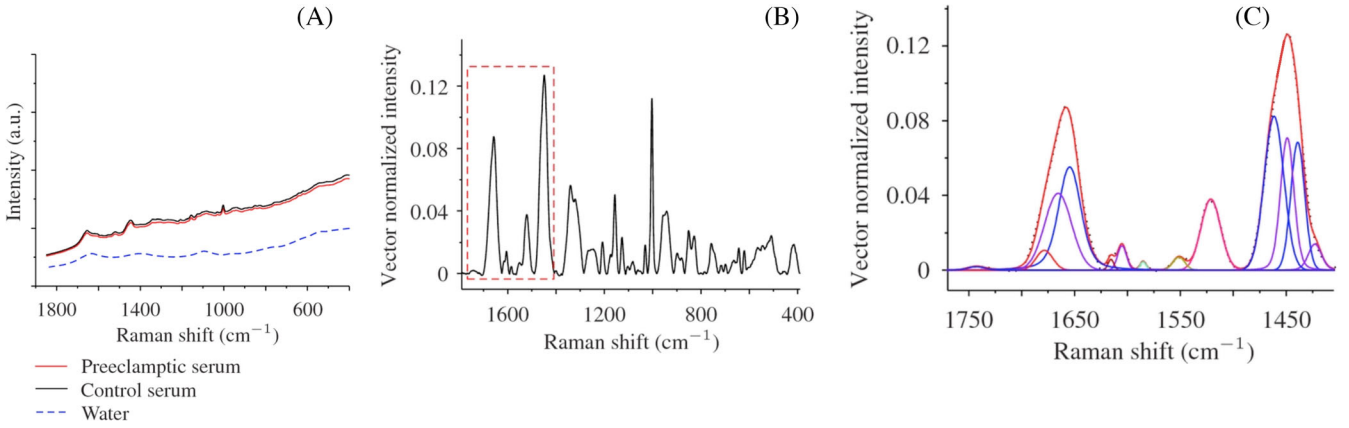

FIGURE 1 (a) The raw mean Raman spectra of all serum samples for healthy and preeclamptic groups and the Raman spectrum of water, (b) Raman spectrum of a serum sample taken from a healthy pregnant after water background is subtracted, baseline corrected, and vector normalized and (c) Raman spectrum (dotted) of a spectral part of (b) (marked with dotted rectangle) with fit curve (solid line) and 13 band components (other colored lines) [Colour figure can be viewed at wileyonlinelibrary.com]

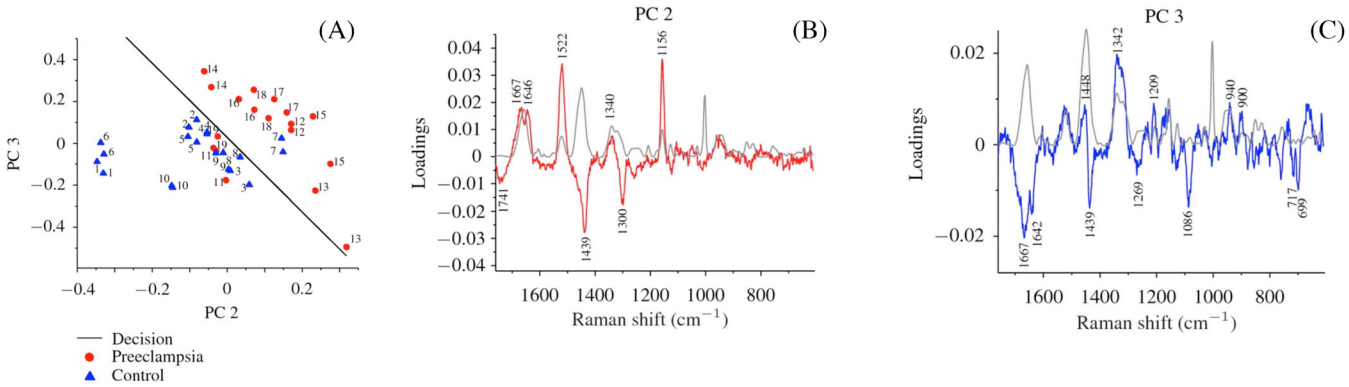

FIGURE 2 (a) The scatter plot of the scores PC 2 versus PC 3, corresponding loadings (b) PC 2 and (c) PC 3. The numbers in (a) represent control (1–10) and preeclamptic (11–19) samples [Colour figure can be viewed at wileyonlinelibrary.com]

1156 cm^{-1} and at 1522 cm^{-1} belong to betacarotene Raman bands appear in Figure 2(b) since they scattered strongly in intensity especially for the preeclamptic patients. Although PC 3 shows more noisy contributions than PC 2, it exhibits the same trend like in PC 2 for protein and lipid bands except amide I band given in Figure 2(c). Protein bands at 1642, 1667 (amide I), and 699 cm^{-1} show negative variations, and the ones at 900, 940, 1209, 1342, and 1448 cm^{-1} show positive variations.

Conclusion: This study is the first Raman spectroscopic study on preeclampsia. When the control and preeclamptic groups were compared, alterations at some Raman bands of serum samples were observed. The contributions of some biomarkers that may lead to these changes were determined by using Raman spectroscopic measurements. These alterations on lipid bands and also on protein bands assigned to main contributions from particular amino acids may be investigated in further studies in respect of lipid bands and protein bands that focus on explaining the pathophysiology of the disease. They may also be tested in studies trying to predict the existence of preeclampsia. Although studies that use more samples may be required in order to confirm our results, our preliminary findings may offer a pioneering basis for further studies.

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100 | Study of Protein and Chitosan Blending Biological Scaffold and Cell Complex Promoting Tissue Regeneration

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Objective: The normal anatomical structure of articular cartilage determines its abilities for regeneration, although repair is very limited once damage occurs. Current clinical treatments for cartilage damage include non-steroidal anti-inflammatory drugs, platelet-rich plasma, microfractures, autologous chondrocyte implantation, and osteochondral transplantation techniques, but in most cases, the results are unsatisfactory. The in vivo findings of our study of repair should serve as a valuable reference in the development of tissue engineering for the treatment of articular cartilage defect.

Methods: GCS powder was dissolved with stirring in deionized water to a concentration of 1.5% (mass/vol) and sterilized using a 0.22-μm filter. Dialdehyde-functionalized PEG powder was dissolved in deionized water, with stirring, and sterilized using a 0.22-μm filter. GCS solution was mixed with an equal volume of sterile dialdehyde-functionalized PEG solution and shaped in a 96-well plate to obtain a GCS/DF-PEG hydrogel, as described.

The hydrogel sample prepared above was dehydrated using a vacuum freeze dryer for 24 h, a cross-section was collected, and the sample was cut into 0.5-1.0 mm flakes. The sheet was placed in a vacuum chamber, uniformly coated with a thin layer of gold, and then loaded into a field-emission scanning electron microscope for topographical imaging.

Using the methods described above, we prepared a 1.5% GCS (mass/vol) solution and dialdehyde-functionalized PEG solutions with mass fractions of 2%, 4%, and 8%. Then, 80 μL of GCS solution was mixed with each of the three dialdehyde-functionalized PEG solutions in equal volumes to obtain three different dialdehyde-functionalized PEG-crosslinked GCS/DF-PEG hydrogels.

The 1.5% GCS solution (mass/vol) was mixed with equal volumes of 2%, 4%, or 8% dialdehyde-functionalized PEG solution, followed by shaping into cylindrical hydrogel blocks. Subsequently, each hydrogel was cut into three pieces and then each set of hydrogel blocks was placed flat on a measuring table.

The subcutaneous adipose tissue in the bilateral inguinal region was excised, visible blood vessels in the tissues were removed, and the tissue was washed two or three times with PBS. The tissue was transferred to a sterile penicillin vial, cut into a paste, 0.1% type-II collagenase and magnetic beads were added, and the tissue was digested by stirring. After 30 min, the digestion was terminated by adding low-sugar DMEM containing 10% FBS. A filter was used to remove large undigested tissue blocks, the filtrate was centrifuged at 1700 r/min for 5 min, the supernatant was discarded, and the cells were resuspended in low-glucose DMEM supplemented with 10% fetal bovine serum. The cells were transferred to a culture flask and incubated at 37°C with 5% CO2; after 24 h, the culture medium was replaced for the first time, and then the culture medium was changed every other day. The cells were subcultured 1:3 when they reached 80%–90% confluency.

Results: Gel formation was observed 3–5 min after mixing the GCS solution with the dialdehyde-functionalized PEG solution at room temperature (Fig. 1). As shown in Fig. 2(in supplementary file), the rubber block could be easily passed through a 2-ml syringe, with hydrogels prepared with lower PEG concentrations being easier to push out.

In vitro degradation-rate curves for three groups of GCS/DF-PEG hydrogels with different mass fractions of dialdehyde-functionalized PEG cross-linking are shown in Fig. 2. The degradation rate of the gels increased over time, and the degradation rates of the 2%, 4%, and 8% aldehyde-functionalized PEG hydrogels were 50.67%, 23.32%, and 18.3% after four weeks, respectively. the degradation rate of a hydrogel in the 2%-mass fraction.

In the experimental group, hydrogel-ADSCs were used to repair cartilage defects of the knee joint. After eight weeks, HE staining showed that the defect area had thicker new tissue regeneration, and the boundary between the regeneration/repair area and the surrounding cartilage was not obvious. Toluidine blue staining showed that the repaired area was filled with a large amount of neonatal cartilage and cartilage-like tissue. Neonatal chondrocytes are similar in structure to normal hyaline chondrocytes, and numerous cartilage lacunae are present in the regenerative area. Improved safranin-O bright-green staining showed a significant amount of repair, based on proteoglycans in the area.

Conclusion: In this study, we explored the use of GCS/DF-PEG hydrogel to transplant ADSCs in cartilage regeneration and repair experiments. Although satisfactory results were obtained in vivo, there are still some shortcomings. A repair time of eight weeks in the body is somewhat short, and the long-term effects of the repair method are uncertain. It is hoped that the long-term effect of repair can be detected by prolonging the repair time. Secondly, the mechanism of repairing cartilage damage using this kind of stem cell transplantation method is not clear. It may be that the differentiation of ADSCs into chondrocytes will enable the regeneration of cartilage or promote the cartilage-regeneration ability of host cells. This topic will be the subject of our next experimental study.

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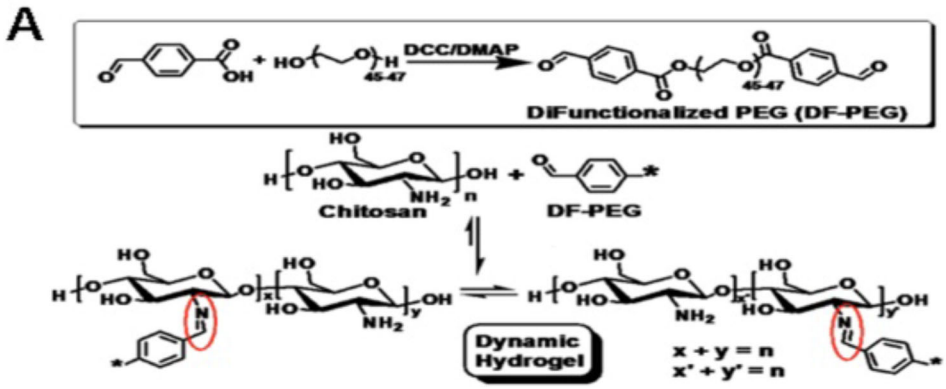

FIGURE 1 Hydrogel gelation principle and morphology before and after gelation [Colour figure can be viewed at wileyonlinelibrary.com]

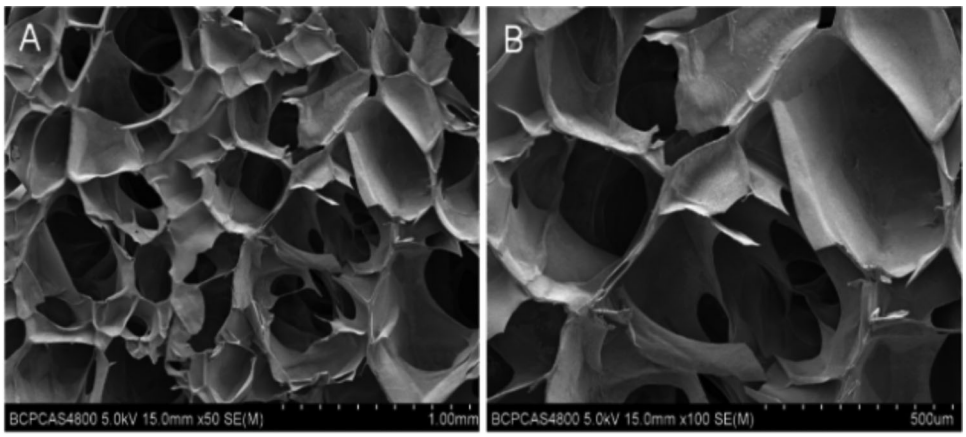

FIGURE 2 Electron microscopic view of hydrogel

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101 | Dysfunctional classification of cyberspace based on socio-psychological factors

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Objectives: In cyberspace, there are rules that reflect social phenomena according to the development of the times. However, various problems caused by not following these rules are the dysfunction of cyberspace. This study intends to standardize and organize the dysfunctional classification system of cyberspace, which has not been systematized so far.

Methods: This study considered that the dysfunction of cyberspace is intertwined with social problems across society. In addition, dysfunction was classified based on criteria that could affect the psychological

analysis of dysfunction. Media analysis through media and literature analysis through literature data were divided. For media analysis, newspapers (15 cases), broadcasting (15 cases), and websites (15 cases) were used to collect adverse functions by case. In literature analysis, the dysfunctional classification system was reinforced through papers (7 cases), reports (4 cases), and books (4 cases). Through this, a dysfunctional classification system that can comprehensively accommodate new social phenomena was constructed.

Results: As a result of the study, dysfunction was classified into the following six categories. Media addiction refers the dysfunction of a state which daily life is impossible due to a strong obsession with media use. Harmful content literally means content that can deliver inappropriate content. Cyber violence refers to the dysfunction of acts that infringe upon the interests of others, such as personally attacking problems occurring in cyberspace. Infringement of rights is a dysfunction that indicates infringement related to privacy or important information about individuals or groups. Cyber-terrorism refers to a dysfunctional act that relation with the realm of the law as a dysfunctional act that refers illegal activities in cyberspace. Judgment disorder is a dysfunctional form of distorting facts or inciting or public opinion in an unsound direction in determining an opinion or policy.

Conclusions: This researcher presented a systematic model of the dysfunctional classification of cyberspace. It is hoped that, through this study, educational programs and psychological research programs that can prevent or prevent the dysfunction of cyberspace in advance can be continuously developed. Furthermore, it will become a future-oriented dysfunctional standardization model that can comprehensively accommodate even the dysfunction that may occur in future society.

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102 | Effects of negative pressure suction of ozone water perfusion on inflammatory mediator response and MAPK signal transduction pathway in rats with chronic osteomyelitis

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Abulaitijiang Yibulayinmu and Tayierjiang Yasheng contributed equally to this work.

Objective: To observe the effects of negative pressure suction of ozone water perfusion on inflammatory mediator response and MAPK signal transduction pathway in rats with chronic osteomyelitis.

Methods: The rats model of chronic osteomyelitis were established and divided into blank group, model group, control group, and experimental group. The histopathological changes, MAPK (ERK2, p38, JNK) signaling pathway and expression of inflammatory mediators TNF-α, IL-1, IL-6 were detected by immunohistochemical staining and EIISA technique.

Results: 1. After 1 and 2 week of treatment , TNF-α , IL-1, and IL-6 in the control group and experimental group were significantly decreased ($p < .05$), The comparison of TNF-α , IL-1, and IL-6 in each group was blank group < experimental group < control group < model group , the difference between any two groups was significant ($p < .05$).

2. After 2 weeks of treatment, ERK , p38MAPK, and JNK in the blank group were lower than those in the other three groups ($p < .05$).

Conclusion: The possible molecular mechanism of ozone water perfusion negative pressure suction treatment is to down-regulate the expression of ERK , p38MAPK, and JNK , and reduce the levels of inflammatory factors TNF-α, IL-1, and IL-6.

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103 | Effects of Nrf2 signaling pathway on osteogenic differentiation of periodontal ligament stem cells under inflammatory microenvironment

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Objective: To investigate the effects of Nrf2 signaling pathway on osteogenic differentiation of periodontal ligament stem cells under inflammatory microenvironment.

Methods: The gingival tissues of patients with periodontitis and healthy individuals were collected. Total 10 ng/ml TNF-α was used

to stimulate PDLSCs to simulate the inflammatory microenvironment, and qRT-PCR was used to detect the expression of Nrf2 and the effect of Nrf2 on the secretion of TNF-α-induced PDLSCs inflammatory factors IL-6 and IL-1β. qRT-PCR and alkaline phosphatase (ALP) staining were used to detect the regulatory role of Nrf2 in the osteogenic differentiation of PDLSCs.

Results: The expression of Nrf2 in PDLSCs gradually decreased after TNF-α stimulation ($p < .01$). After overexpression of Nrf2, the expression of IL-6 and IL-1β in PDLSCs decreased, and knocking down Nrf2 promoted the expression of IL-6 and IL-1β ($p < .05$). During the osteogenic induction of PDLSCs, the expression of Nrf2 increased significantly ($p < .01$). After overexpression of Nrf2, the expression of osteogenesis-related genes RUNX2 and OCN was up-regulated, and ALP staining was enhanced ($p < .01$); after knocking down Nrf2, it's the other way around ($p < .05$). Under the stimulation of TNF-α, the osteogenic ability of PDLSCs was weakened ($p < .05$).

Conclusion: Nrf2 inhibits the expression of PDLSCs inflammatory factors induced by TNF-α, and may promote the osteogenic differentiation of periodontal ligament stem cells in the inflammatory microenvironment.

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104 | Ultrasound Diagnosis and Chemotherapy for Early Child Nephroblastoma with Distal Metastasis

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Objective: Nephroblastoma or Wilms tumor, a common cause of abdominal mass, is the most common kidney malignancy of the child. It is also the most common pediatric abdominal cancer and the fourth most common pediatric cancer overall. The cause of Wilms tumor is not precisely known, but it is believed to be due to genetic alterations that deal with the normal embryological development of the genitourinary tract. Some of the genetic markers that have been associated with Wilms tumor include WT1, CTNNB1, and WTX gene alterations that have been found in about 1/3 of all Wilms tumors. Other genes associated with Wilms tumor include TP53 and MYNC. A poorer prognosis has been linked to TP53 and with the loss of heterozygosity at chromosomes 1p, 1q, 11p15 and 16q. Only about 1% of Wilms patients have a relative with the disease who is typically not a parent.

Wilms is thought to develop from persistent metanephric tissue or nephrogenic rests. These may occur in 1% of infantile kidneys but typically regress during childhood. These abnormal metanephric cells are found in up to 100% of cases of bilateral Wilms but only 35% of unilateral tumors. Hemihypertrophy and aniridia as well as a variety of urological disorders like cryptorchidism, horseshoe kidney, and hypospadias, are associated with the malignancy although it is unlikely they play any role in actual carcinogenesis. Bilateral disease represents only about 5% of all patients with Wilms tumor and is more commonly found in girls.

Wilms tumor is associated with a number of specific syndromes including WAGR syndrome. WAGR syndrome refers to the presence of Wilms tumor, aniridia, genitourinary anomalies, and mental retardation. Children with WAGR syndrome have a 50/50 chance of developing Wilms tumor. Children with this syndrome have a specific chromosomal abnormality in the WT1 gene which is involved in both renal and gonadal development.

We report the case of a large abdominal-pelvic mass that occurred in a three-year-old girl in whom CT enabled the diagnosis of Wilms tumor with liver metastases. Our aim is to describe nephroblastoma semiology at the CT scan and discuss other causes of abdominal-pelvic mass of the child.

Results: A 3-year-old girl was admitted to the Department of Pediatric Surgery, Gansu Provincial Maternal and Child Health Care Hospital for afebrile abdominal bulging. On clinical examination she presented a discrete alteration of the general condition, a minor pallor of the conjunctiva and a large abdominal pelvic mass lateralized to the left. There was no lumbar contact. An ultrasound was required and brought out a large abdominal pelvic tumor of heterogeneous tissue structure with no visualization of the left kidney and a significant repression of the spleen, liver and right kidney. The ovaries and uterus were not visualized. An abdominal pelvic CT was requested to clarify the diagnosis. The apparatus used was a multi-cut scanner TOSHIBA. It was performed before and after injection of iodinated contrast medium according to the following protocol: an abdominal-pelvic volume acquisition in spontaneous contrast. 3 acquisitions after injection of iodinated contrast medium (at a dose of 2 ml/kg) at the arterial times (30 seconds), portal (70 seconds) and late (3 minutes). The mass was of tissue density (55 UH) and moderately heightened after injection of iodinated contrast medium. It measured 132 mm in diameter and was very well limited. Its scan was heterogeneous without image of internal calcifications. The left kidney was visualized after injection of iodinated contrast medium as a small renal portion laminated and stretched, located at the upper pole of the mass. The mass repressed the spleen and adrenal gland up without affecting their density. The

stomach was distended and contained a water and food stasis. The contralateral kidney was in normal lumbar situation. Its size and density were normal. The liver was hypertrophic and multi nodular with nodules of variable size, hypodense with peripheral enhancement. The median vascular structures (aorta, inferior vena cava) were repressed and not invaded by this mass that discreetly crossed the median line. There was no thrombosis of the left renal vein but there was hypodensity in the inferior vena cava. The bony structures were undamaged and there was no disco-vertebral anomaly associated. CT concluded that it was left nephroblastoma with liver metastases. Chest X-ray showed no lung metastasis. The patient was transferred in pediatric surgery for better management. She had a laparotomy with left total nephrectomy. Pathological examination of the surgical specimen confirmed the diagnosis of Wilms tumor.

Conclusion: Nephroblastoma or Wilms tumor, a common malignancy of children, is a typical example of malignancy whose diagnosis at the non-metastatic stages is hoped fervently. Indeed it is a malignant tumor whose cure on treatment is obtained 100% provided it is discovered early. Medical imaging, especially CT, is essential for positive diagnosis, pre therapeutic staging and monitoring of treatment. Hence the need to know the semiological elements of the positive and distinctive diagnosis of Wilms tumor compared to its main differential diagnosis is neuroblastoma. Some dogma such as the non crossing of the median line, the presence of coarse calcifications and lung metastases primarily pulmonary are to be reconsidered.

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105 | The process improvement of manufacturing active pharmaceutical ingredients

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Objectives: A batch of product A containing impurities was found in a pharmaceutical factory when producing API (active pharmaceutical ingredients). This process improvement would attempt to completely rule out the recurrence of this problem.

Methods: This process improvement begins with an abnormal-situation analysis to find out why mixed impurities occur in the final products. It was found that the shaft seal of the agitator of the crystallization tank was damaged, resulting in the foreign matter in the shaft seal falling into the products-in-process. At the proposed filter outlet, a sampling point will be designed to detect whether there are still remaining foreign matter residuals. The process improvement details are as follows and a total of five operating procedures are added to eliminate the above-mentioned foreign matter mixing in final products. Procedure 1: Add a reaction tank, put all the products containing impurities in packages, and add an equal amount of solvent to heat up in order to dissolve products with impurities. Procedure 2: Add the reaction tank through the filter's own circulation pipeline. Procedure 3: Self-circulation lines and filters are insulated with steam tracing to ensure that the product is dissolved. Procedure 4: Self-circulation until the filter outlet sample is clear and there is no foreign matter. Procedure 5: The nitrogen pressure of the product is transferred to the crystallization tank to cool the crystallization.

Results: The approach proposed in this case has completely resolved the abnormal situation that originally occurred. If the original product output is contaminated or mixed, the excess reactor can be used to increase the filtration route to reprocess without using the original process pipeline. Therefore, the original process pipeline can continue to carry out the next batch of production without delaying a scheduled production process.

Conclusions: In the case of down time of the company's current small pilot plant, it is a loss of US$600 per hour. The current pharmaceutical plant has complied with the international regulations of cGMP (current good manufacturing practices), but the management of semi-finished and finished products still needs to pay more attention to the practice of hygiene and health habits of staff to prevent pollution. When necessary, semi-finished products and finished products should be tested for compliance with specifications, and should be clearly marked and properly stored.

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106 | Stability control of the distribution of antiviral drugs in human organs based on fractal theory

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Objectives: Using the theory and methods of fluid dynamics to study the distribution of antiviral drugs in human organs and maintain their stability is currently a hot research topic. The purpose is to figure out the distribution of a certain antiviral drug in various organs of the human body and maintain the effectiveness of this drug.

Methods: A compression mapping is used Function to map the initial point to each triangle. The result of interpolation will establish a self-similar relationship between the part and the whole. The commonly used mapping function is of the form:

$$U_i(x,y,z)=\begin{cases}(P,Q,R)_i(x)=x_{i-1}+\dfrac{(x_i-x_{i-1})}{(X_N-X_0)}S_i\\ F_{ij}(x,y,z)=a_{ij}x+b_{ij}y+c_{ij}z\end{cases}$$

where X_N, Y_M, X_0, Y_0 are the coordinates of the endpoints; a_{ij}, b_{ij}, c_{ij} are the interpolation coefficient; Sis the fractal parameter.

Results: For any $\varepsilon \in (0,1)$, there exist some positive constant r_0 depending on n, M and ε, such that if $N_M(x_0,r_0) > C_0$, then $u=\{u; R\to R^m;\ u,u(t)\le U\times t\}$, one can take $x(t_0)=x_0$, let $S=\{(x_1,x_2): -\infty<x_1<\infty, -1\le x_2\le 1\}(x_1,iz_2) = v + u = (1-x_2^2+u_1,w_2)$ for any $\rho < r_0$. Moreover, if $r < r_0$, and for any $\rho\in(r,r_0)$, it holds that $N(x_0,\rho) > C_0$, then $U = \{((w_1,w_2):\sqrt{w_1^2+w_2^2}\le M\}(\dot{x}_1,\dot{x}_2) \in F(x_1,x_2) = \{(y_1,y_2): \sqrt{(y_1-1+x_2^2)^2+y_2^2}\le M\}$. $x_1(t) - y + et + \int_0^t (t-s)u(s)da_1$, $x_2(t)=\bar{v}+\int_0^t u(s)ds$.

$$\min\int_{x(..)}\int_0^T L(t,x,\dot{x})dt, x(T)=\bar{x}\infty x$$

$$x(t)=f(t,x,u), x(T)=x\le x$$

Conclusions: There are several feedback controls which accomplish this task. The multifunction and the trajectories of the corresponding equation

$$u(x_1,x_2)=-1\ x_2<0, x_1\ge -x_2^2/2x_2\le 0, x_1<x_2^2/2$$

$$\Delta x(t)=f(x)(t),u(t)), u(x_1,x_2)=-x_1-x_2$$

Then we define the frequency function of u centered at x_0 with radius r as

$$N_M(x_0,r)=r\frac{D_M(x_0,r)}{H_M(x_0,r)}, r\le\bar{R}, v=\Delta_M u,\quad \Delta M\le M(u,x_0,r)$$

$$N(x_0,\rho)\le(1+\varepsilon)N(x_0,r_0)$$

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107 | Physicochemical properties and antioxidant activities of compound polysaccharides from Chinese herbal medicines by factional precipitation

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Objectives: The physicochemical properties and antioxidation of three compound polysaccharides (CPs-50, CPs-70, and CPs-80) fractionated from Chinese herbal medicines (CHMs) by 50%, 70%,0 and 80% (v/v) ethanol were explored in this study.

Methods: The CHMs were composed of hawthorn, lotus leaf, tartary buckwheat, cassia seed, lycium barbarum, and poria cocos in a mass ratio of 4:2:2:1.5:1:1. The chemical composition, monosaccharide composition, molecular weight distribution, intrinsic viscosity, particle size, ζ-potential, FT-IR spectrum, congo red test, SEM, CD spectrum and AFM of three CPs were comparatively investigated. Besides, the radical scavenging capacities for DPPH, ABTS, hydroxyl, and superoxide-anion of three CPs were determined.

Results: The total sugar, protein and uronic acid contents of three fractions were 49.76%, 59.65%, and 68.80%; 15.65%, 12.98%, and 9.36%; and 6.57%, 4.62%, and 5.64%, respectively. Moreover, CPs-50, CPs-70, and CPs-80 were comprised of rhamnose, arabinose, xylose, mannose, glucose, and galactose with molar ratios of 1.12: 1.22: 1.40:

1.00: 1.72: 1.02, 1.08: 1.12: 1.23: 1.00: 1.24: 1.02 and 1.39: 1.32: 1.15: 1.08: 1.14: 1.00, separately. CPs-50 showed three main peaks with Mw of 1129.8 kDa (32.48%), 567.1 kDa (17.35%), and 1.54 kDa (40.90%); CPs-70 had three primary peaks with Mw of 391.4 kDa (33.33%), 7.39 kDa (10.72%), and 1.62k Da (47.28%); CPs-80 presented three peaks with Mw of 273.6 kDa (65.07%), 6.18 kDa (23.01%), and 1.58 kDa (11.92%). All fractions also exhibited different physical characteristics, such as intrinsic viscosity, particle size, triple-helix and microstructure. Furthermore, CPs-80 demonstrated stronger antioxidant activity than the other two polysaccharides, of which the scavenging abilities against DPPH, ABTS, hydroxyl, and superoxide-anion radical were 90.66 ± 2.05%, 93.05 ± 2.14%, 88.53 ± 1.89% and 39.14±1.93% at a concentration of 5.0 mg/ml.

Conclusions: CPs could be developed as a potential natural antioxidant in the fields of medicine and health food.

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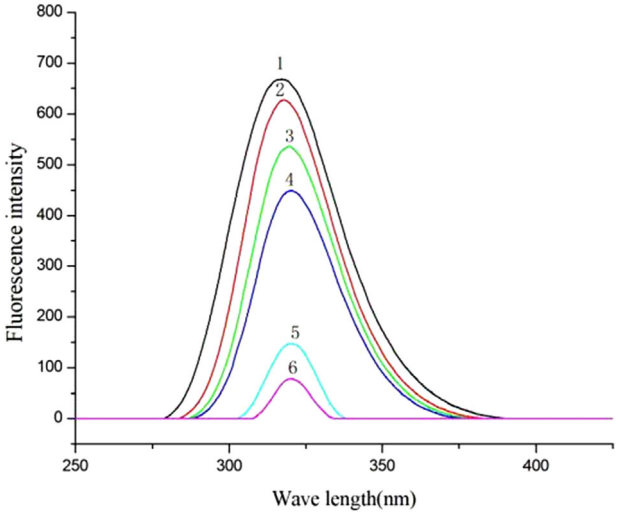

FIGURE 1 Fluorescence spectra. Bovine serum albumin concentration for 2.0×10^{-6} mol/L; 1–6: the concentrations of procyanidins were respectively 0, 1, 2, 3, 4, 5 ($\times 10^{-6}$ mol/L) [Colour figure can be viewed at wileyonlinelibrary.com]

108 | Pharmacological mechanism of interaction between procyanidins and bovine serum albumin

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HaiYang liu and WenPeng Li are co-lead authors.

Objectives: Proanthocyanidins are a kind of polyphenol compounds widely existing in plants. Their common characteristic is that anthocyanidins can be produced by heating in acidic medium, so they are called proanthocyanidins. Proanthocyanidins are pigment components in plants and widely exist in various plants. This study is of certain significance to elucidate the transport process of procyanidins in vivo and explore the interaction between procyanidins and bovine serum albumin, providing basic data for drug synthesis and clinical use.

Methods: The synthetic materials were characterized by UV-vis spectrophotometer, fluorescence spectrophotometer and Fourier transform infrared spectrometer. Procyanid in solution was prepared with a concentration of 1–8 mg/ml, and bovine serum albumin solution was prepared with a concentration of 1 mg/ml. Add 3 ml Bovine serum albumin (BSA) solution to .5 ml proanthocyanidin solution and volume to 5 ml. The proantho-cyanidin-bovine serum albumin complex was formed by water bath at 40°C. Centrifuged at 5000 r/min for 30 min, 1 ml of the centrifuged supernatant was taken and the content of procyanidins in the supernatant was determined to obtain the complexation rate.Fluorescence quenching is divided into static quenching and dynamic quenching. Static quenching refers to the formation of a new complex between the quenching agent molecule and the fluorescent substance molecule. Dynamic quenching is the fluorescence quenching caused by the collision between quenching agent molecules and excited molecules of fluorescence molecules. Dynamic quenching and static quenching can be distinguished according to the results under different temperature conditions. For dynamic quenching, the increase of temperature will increase the effective collision between molecules and intensify the electron transfer process, so that the fluorescence quenching constant increases with the increase of temperature. In the case of static quenching, the increase of temperature will decrease the stability of the complex and the quenching constant will decrease.

Results: Tris-HCl buffer solution with pH 7.4 was used as the solvent to prepare 4.0×10^{-4} mol/L BSA reserve solution and 1.0×10^{-3} mol/L proanthocyanidins standard solution with anhydrous ethanol. The solution was stored in the refrigerator at 4°C for later use. Add 50 μl of BSA solution to a series of 10 mL volumetric bottles to make the final concentration of BSA 2.0×10^{-6} mol/L, add 400 μl NaCl with a concentration of 2.4 mol/L to make the final concentration of NaCl 0.1 mol/L to maintain the ionic strength of the solution. Then different volumes of procyanidins were successively added to make the concentration of procyanidins 0, 1, 2, 3, 4 and 5($\times 10^{-6}$mol/L), respectively. Dilute to 10 ml trIS-HCl buffer solution (pH7.4) and mix well. At constant temperature (25°C, 37°C) in water bath for 2 h. The excitation wavelength was set at 280 nm, the excitation and emission slits were set at 5 nm, and the fluorescence emission spectra of 300–500 nm were scanned. The results showed that the quenching of Bovine serum albumin (BSA) by procyanidins was a static quenching caused by the formation of compounds.

Conclusions: Procyanidins can be regarded as polymers of anthocyanins, which are a kind of polyphenols widely existing in the plant kingdom. At present, procyanidins, as nutritional fortifier, natural

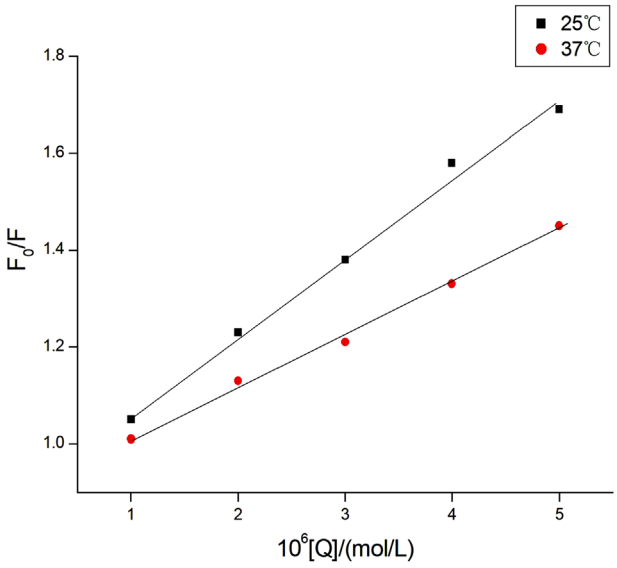

FIGURE 2 Fluorescence quenching diagram [Colour figure can be viewed at wileyonlinelibrary.com]

preservative, natural antioxidant, DNA protective agent, are widely used in food, medicine, cosmetics, and other fields. Proanthocyanin has been studied more and more deeply all over the world. In this paper, the complexation ability of proanthocyanidins and bovine serum albumin was investigated, and the optimal complexation condition was obtained by single factor test. According to the stern-Volmer equation, if the slope of high temperature is greater than that of low temperature, it is dynamic quenching. According to the variable temperature experiment results of the combination of procyanidins and Bovine serum albumin, it can be seen that the slope of high temperature is greater than that of low temperature, so it is static quenching. Therefore, it is of certain significance to explore the interaction between procyanidins and bovine serum albumin.

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109 | A Bibliometric research on hot papers of pharmacology & toxicology based on ESI

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Objectives: In order to provide useful reference information for researchers in the field of pharmacology and toxicology, this paper studies the current research hot spots in this field, as well as the correlation closeness between research topics.

Methods: This paper studies on the hot papers of pharmacology and toxicology field based on ESI (Essential Scientific Indicators) database, and the time span of the data is from January 1, 2010 to December 31, 2020. The data about these 110 hot papers are analyzed by the authors from the aspects of published time, country/territory, institution, journal, citation, and so on. The methods of multi-dimension analysis, cluster analysis, Vosviewer visualization are used to analyze these papers.

Results: The results shows that United States is in the first place in the ranking of published papers, England is in the second place, and China is in the third place. The research hotspots are COVID-19, anxiety, depression, and mental health.

Conclusions: The cluster of hot papers show the correlativity of the topic in the pharmacology and toxicology field. This research provides researchers in the field of pharmacology and toxicology with the current international hot research direction, and helps China researchers to improve their research in the field.

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110 | Efficacy and safety of oxiracetam combined with butylphthalide in elderly patients with hypertensive cerebral hemorrhage and effects on patients' cognitive function and daily living ability

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Objective: To explore the efficacy and safety of oxiracetam combined with butylphthalide in elderly patients with hypertensive cerebral hemorrhage and effects on their cognitive function and daily living abilities.

Methods: Total 136 patients with hypertensive cerebral hemorrhage admitted to our hospital from January 2019 to December 2021 were randomly divided into the control group (oxiracetam) and the experimental group (oxiracetam combined with butylphthalide). The clinical effect of the two treatment regimes was scientifically evaluated by comparing the differences between the two groups.

Results: After treatment, the NIHSS and ADL scores of the two groups were better than those before treatment, and those of the experimental group were significantly better than those of the control group; the clinical efficacy and adverse reaction incidence of the experimental group were significantly better than those of the control group, with statistical difference.

Conclusion: Compared with only using the oxiracetam, oxiracetam combined with butylphthalide in treating the elderly patients with hypertensive cerebral hemorrhage is more effective and safer, and can

significantly improve the daily living ability and cognitive function of patients.

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111 | Application of different infusion schemes of high-dose methotrexate in the treatment of osteosarcoma patients and its effect on quality of life

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Objective: The purpose was to study the application of different infusion schemes of high-dose methotrexate in the treatment of osteosarcoma patients and its effect on quality of life.

Methods: Ninety cases of osteosarcoma patients admitted to our hospital from July 2018 to September 2021 were selected as the research objects, and divided into observation group with the infusion dose of 8 g/m^2 and control group with the infusion dose of 10 g/m^2 according to the infusion schemes of high-dose methotrexate, with 45 cases in each group. The quality of life was compared between the two groups.

Results: The quality of life in the observation group was significantly better than that in the control group ($p < .05$).

Conclusion: The application of high-dose methotrexate in the treatment of osteosarcoma patients can appropriately reduce the dosage and prolong the infusion time, which is conducive to ensuring safety and improving the therapeutic effect.

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112 | Effect of ambroxol hydrochloride aerosol inhalation combined with cardiopulmonary rehabilitation training on immune function of patients with chronic obstructive pulmonary disease

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Objective: To investigate the effect of ambroxol hydrochloride aerosol inhalation combined with cardiopulmonary rehabilitation training on the immune function of patients with chronic obstructive pulmonary (COPD).

Methods: A total of 126 COPD patients diagnosed and treated in the hospital from April 2016 to April 2018 were selected as the research objects and randomly divided into observation group and control group, with 63 cases in each group. The control group was given ambroxol hydrochloride aerosol inhalation, and the observation group was given ambroxol hydrochloride aerosol inhalation combined with cardiopulmonary rehabilitation training treatment.

Results: There was no significant difference in clinical symptoms between the two groups before treatment ($p > .05$). After treatment, the clinical symptoms of cough, sputum volume, sputum viscosity, shortness of breath, and lung rales in the observation group were significantly lower than those in the control group ($p < .05$). Before treatment, there was no significant difference in pulmonary function FEV1, FVC, FEV1/FVC between the two groups ($p > .05$). After treatment, the pulmonary function FEV1, FVC, FEV1/FVC of the observation group were higher than those of the control group ($p < .05$).

Conclusion: Ambroxol hydrochloride aerosol inhalation combined with cardiopulmonary rehabilitation training for COPD patients can effectively relieve the clinical symptoms of patients, improve ventilation function, improve immunity, and achieve good therapeutic effects. It is worthy of clinical promotion.

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113 | Effect of Irbesartan on AMPK/mTOR signal transduction pathway in renal tubular cells of rats with diabetic nephropathy

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Objective: The purpose of this study was to explore the effect of irbesartan on AMPK/mTOR signaling pathway in renal tubular cells of rats with diabetic nephropathy.

Methods: Sixty adult male Wistar rats were injected intraperitoneally with streptozotocin to replicate diabetic nephropathy (DN) rat models, and were randomly divided into control group, model group and experimental group. HE staining was used to detect renal pathological changes, and TUNEL was used to detect renal tubular cell apoptosis. Western blot was used to detect the protein expressions.

Results: Compared with the model group, the experimental group irbesartan can reduce the physical and biochemical indexes of diabetic nephropathy rats ($p < .05$). The mRNA and protein levels of p-mTOR in the test group was increased, and the mRNA and protein levels of p-AMPK ($p < .05$) and LC-II ($p < .05$) were decreased compared with model group. Compared with the model group, cell apoptosis of renal tubular epithelial cells in the test group was reduced ($p < .05$).

Conclusion: Irbesartan has a renal protective effect, which may be related to the regulation of AMPK/mTOR signaling pathway related to autophagy in renal tubular epithelial cells.

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114 | Study on the penetration rate of drug concentration in targeted organs

Shuxian Deng, Hongen Li

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Objectives: This paper studies the penetration rate of drug concentration in targeted organs, and uses nonlinear local fractional heat conduction theory to provide a basis for the application of targeted drugs.

$$\Delta x = \Delta g(t, x, s) + f(t, x)$$

$$p = -\frac{\partial H}{\partial x}(t, q, p, S) - p\frac{\partial H}{\partial t}(t, q, p, S), q = \frac{\partial H}{\partial p}(t, q, p, s)$$

$$n_{x_1} = \frac{1}{2}E_{x_1}\left[\left|P_{f_y} - P_{f_{xy}}\right|\right] = \frac{1}{2}\int_{-\infty}^{+\infty} \left|P_{-\infty}^{+\infty}\right| P_{y_1} |f_{\{}x_1$$

Methods: There are two methods for calculating the fractal dimension: the correlation dimension of the time series and the power spectrum dimension. s(f) is a power function, then its fractal dimension is: D=(3-β)/4.

Then, according to the DGJM, we obtain:

$$U_0(X, T) = \Phi(X), U_1(X, T) = \int_0^T \left[d(X, T)\frac{\partial^2 U_0}{\partial X^2} + N_0\right] dT$$

$$U_{p+1}(X, T) = \int_0^T \left[d(X, T)\frac{\partial^2 U}{\partial X^2} + N_p\right] dT, (p = 1, 2, \ldots)$$

Results: In the process of reconstructing the phase space from the time series, the embedding theorem for the dimension of the embedded phase space is as follows: if the original attractor is in the d-dimensional space, then embedding space dimension must be 1+d/2.

$$\begin{aligned} f(t, u, v, z) &= \frac{u}{16}\left(2\left(uv^2 - u^3 + 4vz\right)\sin 2t - 4\left(u^2 v + 2uz\right)\cos 2t\right) \\ &\le \frac{H}{16}\left(\left(v^3 - 3u^2 v\right)\cos 4t + \left(3uv^2 - u^3\right)\sin 4t\right) + \frac{1}{2}\sin 2t \\ &\le \frac{1}{4}v\sin 2t - \frac{1}{4}u\cos 2t + \frac{u}{64}\left(-u^4 + 6u^2 v^2 - v^4\right)\cos 4t \\ &\le \frac{u}{16}\left(u^3 v - u^3\right)\sin 3x + \frac{1}{2\pi}\int_0^{2\pi} f_i(t, u, v, z)dt \end{aligned}$$

Notice that $(u_\varepsilon(t), v_\varepsilon(t), Z_\varepsilon(t)$ and $(u_\varepsilon(0), v_\varepsilon(0), Z_\varepsilon(0)) \to (u_1, v_1, Z_1)$, for sufficiently small $|\varepsilon| > 0$, such that

$$q_\varepsilon(0) \to v_1, p_\varepsilon(0) \to u_1, S_\varepsilon(0) \to Z_1 + \frac{u_1 v_1}{2}, \text{as } \varepsilon \to 0$$

Conclusions: Obviously, the penetration rate of the drug is related to many factors that target the organ. under such requirements, enough vector points must be established when the value of N is large, which is a necessary condition for obtaining the correct value of D. But if we focus on studying the change of penetration rate of drug concentration, the same kind of the penetration rate of drug concentration by the same method can be compared.

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115 | Exploring the mechanism of action of Si Miao Yong An Tang with addition and subtraction treatment of diabetic foot ulcer based on network pharmacology and molecular docking

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Background: To explore the mechanism of the modified formula of Simiao Yongan decoction in the treatment of diabetic foot ulcers (DFU) with damp-heat toxins by network pharmacology and molecular docking technology, and provide theoretical basis for clinical application.

Methods: The active ingredients and action targets of Simiao Yongan decoction were searched by TCMSP, and the disease-related targets were collected from GeneCards, OMIM, TTD, PharmGkb and DrugBank databases. Cytoscape 3.6.1 software was used to construct the "compound - target" network, and STRING platform was used to construct the intersection target protein interaction network, and Cytoscape was used to conduct topological analysis of the network to obtain the core genes. GO enrichment analysis and KEGG pathway enrichment analysis were performed by R language. Finally, molecular docking validation was performed between the core genes and the main active components.

Results: It shows that 141 active components and 257 corresponding targets of Simiao Yongan decoction were predicted in the treatment of DFU. Topological analysis revealed five core genes, AKT1, TNF, CASP3, VEGF, and EGF. A total of 3057 biological processes (BP), 32 cell components (CC), and 16 molecular functions (MF) were involved in GO enrichment analysis. 180 DFU-related pathways were screened by KEGG pathway enrichment analysis. It mainly involves AGE-RAGE signaling pathway, Lipid and atherosclerosis pathway, MAPK signaling pathway, etc. The analysis shows that the active ingredients of this prescription can participate in the glycosylation process of DFU, regulate the expression and release of pro-inflammatory factors and vascular endothelial growth factor, and affect chronic cell activation and sustained cell damage. Molecular docking results showed that the main active compounds could bind to the core targets respectively and showed good affinity.

Conclusions: In this study, the multi-component, multi-target and multi-pathway effects and mechanisms of Simiao Yongan decoction in the treatment of DFU were preliminatively discussed.

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116 | Kinetic analysis of the inhibitory effect of a kind of cold medicine on the human respiratory system

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Objectives: Cold medicines have certain therapeutic and inhibitory effects on the human respiratory system. This thesis aims to analyze the kinetic mechanism of the inhibitory effect of cold drugs on the human respiratory system.

Methods: We use forced and controlled growth conditions to study the global attractors of this type of medicine. In order to obtain relevant conclusions, we use the Hodge decomposition theorem to construct an appropriate test function, and combine the estimation methods to obtain innovative conclusions.

Results: We study the following model: div $A(x, \nabla u) = f(x, t)$. Ω is a Bounded regular area in $\mathbf{R}^n (n \geq 2)$, $A(x, \zeta) : \Omega \times \mathbf{R}^n \mapsto \mathbf{R}^n, \zeta \in \mathbf{R}^n, x \in \Omega$, $\{S(t)\}_{t\geq 0}$ satisfies the condition $\|S(t)\|_{L(X)} \leq e^{\varkappa t} (\forall t \geq 0)$, It satisfies the following two conditions: $\rho(A) \supseteq (\varkappa, \infty)$, $\|R(\lambda, A)\|_{L(X)} \leq \frac{1}{\lambda - \varkappa}$, for all $\lambda > \varkappa$.

$$\|S(t)x\|_X \leq M\|x\|_X, \quad \forall t \geq 0.$$

$$\|x\|'_X = \sup_{t\geq 0} \|S(t)x\|_X, \quad \forall x \in X$$

$$\|x\|_X \leq \|x\|'_X \leq M\|x\|_X, \sup_{s\geq 0} \|S(s)S(t)x\|_X \leq \sup_{s\geq 0} \|S(s)x\|_X$$

$v(t) = \int_0^{t_0} S(t-\tau)f(\tau)\mathrm{d}\tau + \int_{t_0}^{t} S(t-\tau)f(\tau)\mathrm{d}\tau$. For any $T > t_0$, when $t \in [t_0, T]$

$$\lim_{t\to t_0^+} S(t-\tau)f(\tau) = S(t_0-\tau)f(\tau), \quad \forall \tau \in [0, t_0]$$

$$\|S(t-\tau)f(\tau)\|_X \leq Me^{\varkappa T}\|f(\tau)\|_X, \quad \forall \tau \in [0, t_0]$$

From the convergence theorem controlled by Lebesgue

$$\lim_{t\to t_0^+} \int_0^{t_0} S(t-\tau)f(\tau)\mathrm{d}\tau = \int_0^{t_0} S(t_0-\tau)f(\tau)\mathrm{d}\tau$$

$$\left\| \int_{t_0}^{t} S(t-\tau)f(\tau)\mathrm{d}t \right\|_X \leq Me^{\varkappa T} \int_{t_0}^{t} \|f(\tau)\|_X \mathrm{d}\tau \to 0, \quad t \to t_0^+$$

$$\int_t^{t_0} S(t_0-\tau)f(\tau)\mathrm{d}\tau \leq \int_t^{t_0} \chi_{[0,t]}(\tau)\left[S(t_0-\tau) - S(t-\tau)\right] f(\tau)\mathrm{d}\tau$$

$$\leq S(t)f(0) + \int_0^t S(t-\tau)f'(\tau)\mathrm{d}\tau, \quad t \geq 0$$

$$\leq \frac{1}{\varepsilon}\int_t^{t+\varepsilon} S(t+\varepsilon-\tau)f(\tau)\mathrm{d}\tau, \quad \forall t \geq 0, \quad \forall \varepsilon > 0$$

$$\leq Me^{kT}\|f_n - f\|_{L^1([0,T],X)} \leq Ce^{\varkappa T}, \quad n = 1, 2, \ldots$$

Conclusions: Through simulation experiments and analysis of drugs, we have figured out the mechanism and scope of action of drugs on human lungs. The simulation results also show that the drug has

certain side effects on the human body, which provides effective analysis data for further improving the curative effect and reducing side effects.

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117 | Effect of dexmedetomidine combined with ropivacaine epidural anesthesia on hemodynamics and neonatal outcomes of parturients with cesarean section

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Objective: The purpose was to explore the effect of dexmedetomidine combined with ropivacaine epidural anesthesia on hemodynamics and neonatal outcomes of parturients with cesarean section.

Methods: A total of 126 parturients who received cesarean section in our hospital from March 2019 to January 2021 were selected as the research subjects, and divided into control group ($n = 60$) and experimental group ($n = 66$) according to the anesthesia methods. All the patients received epidural anesthesia. The control group was only anesthetized with ropivacaine while the experimental group was anesthetized with dexmedetomidine and ropivacaine to compare the effect of the two anesthesia methods on hemodynamics and other indicators.

Results: There were no significant differences in MAP, HR, and SaO_2 between the two groups ($p > .05$), with significant differences at T1, T2, and T3 ($p < .05$); There were no significant differences in Apgar scores between the two groups ($p > .05$).

Conclusion: Compared with ropivacaine alone, dexmedetomidine combined with ropivacaine epidural anesthesia has a better clinical application effect on parturients undergoing cesarean section, especially for the stability of maternal hemodynamics, which can ensure better neonatal outcomes.

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118 | Efficacy and safety of nimotuzumab combined with chemoradiotherapy in the treatment of advanced nasopharyngeal carcinoma and its effect on the incidence of adverse reactions in patients

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Objective: The purpose was to study the therapeutic effect and safety of nimotuzumab combined with chemoradiotherapy in patients with advanced nasopharyngeal carcinoma (NPC).

Methods: A total of 100 patients with advanced NPC admitted to our hospital from April 2019 to July 2020 were randomly selected, and divided into control group and experimental group by drawing lots, with 50 cases in each group. Patients in the control group received routine chemoradiotherapy, while those in the experimental group received nimotuzumab combined with chemoradiotherapy to compare the treatment efficiency, incidence of adverse reactions, survival rate of patients at 1, 3, and 6 months after treatment, and the CRP, IL-6, and IL-8 expression levels between the two groups.

Results: Compared with the control group, the experimental group had higher treatment efficiency and a higher survival rate at 6 months after treatment but a lower incidence of adverse reactions, lower survival rates at 1 and 3 months after treatment, and lower CRP, IL-6, and IL-8 expression levels ($p < .05$).

Conclusion: Nimotuzumab combined with chemoradiotherapy has obvious clinical efficacy and high safety in the treatment of advanced NPC, which can significantly reduce the adverse reactions of patients in the treatment process.

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119 | Analysis of the effect and value of phloroglucinol combined with diclofenac sodium in the treatment of patients with acute renal colic

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Liqin Wei and Jian Chen contributed equally to this work.

Objective: To explore the effect and value of phloroglucinol combined with diclofenac sodium in the treatment of patients with acute renal colic.

Methods: A total of 108 patients diagnosed with acute renal colic in the hospital were randomly divided into phloroglucinol group, diclofenac sodium group, and combination group; phloroglucinol group, phloroglucinol 120 mg; diclofenac sodium group, diclofenac sodium 75 mg; combined group, phloroglucinol 120 mg plus diclofenac sodium 75 mg, all injected intramuscularly, 1 needle/time, 1 to 2 times/d. The pain relief and adverse reactions of the three groups of patients were observed 30 min after the medication.

Results: The VAS score of the diclofenac sodium group was lower than that of the phloroglucinol group, but the difference was not statistically significant ($t = 1.007$). The VAS score of the combination group was lower than that of the phloroglucinol group and the diclofenac sodium group, and the differences were statistically significant ($t = 6.86, 5.40$). The effective rate of diclofenac sodium group was slightly higher than that of phloroglucinol group, but the difference was not statistically significant ($\chi^2 = .63$);

Conclusion: Phloroglucinol combined with diclofenac sodium can effectively relieve the pain of patients with acute renal colic, with advantages of significant curative effect, high safety and low incidence of adverse events. It is worthy of clinical application.

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120 | Efficacy of Xuebijing injection combined with noninvasive positive pressure ventilation in the treatment of severe pneumonia complicated with respiratory failure and its effect on blood gas analysis indexes and mortality of patients

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Objective: To explore the clinical efficacy of Xuebijing injection combined with noninvasive positive pressure ventilation (NIPPV) in the treatment of severe pneumonia complicated with respiratory failure and its effect on blood gas analysis indexes and mortality.

Methods: The clinical data of 84 patients with severe pneumonia complicated with respiratory failure admitted to the Respiratory Department of our hospital from November 2018 to 2019 were retrospectively analyzed. According to the odd and even hospitalization numbers, they were equally divided into experimental group and control group. Both groups received basic clinical treatment, while the experimental group was additionally treated with Xuebijing injection combined with NIPPV to evaluate the therapeutic effect of the two groups.

Results: The 28-day mortality, hospitalization time and OI recovery time in the experimental group were significantly lower than those in the control group ($p < .05$). After treatment, the experimental group achieved significantly higher PaO_2 and pH, notably lower $PaCO_2$, and obvious lower serum inflammatory factor levels and the incidence of adverse reactions compared with the control group (all $p < .001$).

Conclusion: Xuebijing injection combined with NIPPV is effective and safe for patients with severe pneumonia complicated with respiratory failure.

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121 | Clinical effect of meropenem combined with norepinephrine in patients with severe sepsis and its influence on immune level

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Objective: To investigate the clinical effect of meropenem combined with norepinephrine in patients with severe sepsis and its influence on immune level.

Methods: A total of 88 patients with severe sepsis were randomly divided into two groups. The two groups were given conventional treatment, control group was treated with norepinephrine, the observation group was combined with meropenem. Three days after medication, the inflammatory factors, immune level, drug safety and mortality of the two groups were compared.

Results: The levels of sIL-2R, IL-6, and IL-10 in the observation group were lower than those in the control group; IL-4 and TNF-α levels in the

treatment group were higher than that in the control group. The levels of total T lymphocytes, total B lymphocytes, CD3 + CD4 +, NK cells, and TS cells in the observation group were higher than those in the control group 3 days after treatment. There was no significant difference in the incidence of nausea and vomiting, blood pressure fluctuation, liver and kidney abnormalities and rash allergy between the two groups. The mortality of the observation group was lower than that of the control group.

Conclusion: Meropenem combined with norepinephrine in patients with severe sepsis can reduce the level of inflammatory factors, improve the immune levels, and has high drug safety, which is helpful to reduce the mortality and worthy of popularization.

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122 | Efficacy observation of butylphthalide in the treatment of cerebral hemorrhage based on comprehensive nursing intervention and its effect on the satisfaction

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Objective: To explore the efficacy of butylphthalide in the treatment of cerebral hemorrhage based on comprehensive nursing intervention and its effect on the satisfaction.

Methods: The data of 120 patients with cerebral hemorrhage admitted to our hospital from February 2020 to 2021 were retrospectively analyzed, and they were divided into experimental group ($n = 60$) and control group ($n = 60$) according to the order of admission. All patients were treated with butylphthalide. The control group received routine nursing while the experimental group received comprehensive nursing to compare the motor function (FMA) score, National Institutes of Health Neurological Deficiency (NIHSS) score, activities of daily living (ADL) score and nursing satisfaction between the two groups.

Results: The FMA, NIHSS and ADL scores in the experimental group after nursing were significantly better than those in the control group ($p < .001$). The nursing satisfaction in the experimental group was significantly higher than that in the control group ($p < .05$).

Conclusion: The application of butylphthalide based on comprehensive nursing intervention can improve the overall curative effect of patients with cerebral hemorrhage and improve their treatment satisfaction, which should be popularized and applied in practice.

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123 | Clinical observation of Mailuo Shutong Pills combinated with PFNA in elderly patients with closed intertrochanteric femur fracture

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Objectives: To investigate the clinical effect of Mailuo Shutong Pills in the treatment of elderly patients with closed intertrochanteric femur fracture (IFF).

Methods: Forty four elderly patients with closed IFF were randomly divided into observation group ($n = 22$) and control group ($n = 22$). The control group was treated with closed reduction of PFNA and conventional western medicine after operation. The experimental group was treated with Mailuo Shutong Pills on the basis of the control group. After treatment, HGB, HCT, hidden bleed loss, the swelling elimination time, postoperative bedridden time, bone healing time, weight-bearing time, Harris score, and short-term complications were compared between the two groups.

Results: Mailuo Shutong Pills can increase the levels of HB and HCT, and reduce the hidden blood loss. The swelling improvement in the experimental group was more obvious than in control group. Moreover, the fracture healing time, postoperative bedridden time and weight-bearing time in the experimental group were significantly shorter than those in the control group. Harris score in experimental group was significantly higher than that in control

group. Besides, the incidence of postoperative complications in the experimental group was significantly lower than that in the control group.

Conclusions: Mailuo Shutong Pills can reduce the amount of hidden blood loss, accelerate the fracture healing, effectively improve the hip function, and promoted recovery of elderly patients with IFF.

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124 | The application effect of sufentanil combined with sevoflurane anesthesia in patients undergoing hysteromyomectomy and its effect on serum tumor markers

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Objectives: To investigate the anesthesia effect of sufentanil combined with sevoflurane on patients undergoing hysteromyomectomy and its influence on serum tumor markers.

Methods: The control group was anesthetized with sevoflurane, and observation group was anesthetized with sufentanil on the basis of the control group. The effects of anesthesia, recovery indicators, stress response, and gastrointestinal motility changes were detected. CEA, CA199, and CA724 levels were determined by electrochemiluminescence method.

Results: The anesthesia effect of observation group was better than that of control group. Postoperative consciousness, spontaneous breathing, recovery of bowel sounds, and anal first exhaust time were earlier than those in control group. Compared with control group, HR and SBP levels in observation group were decreased after 30 min anesthesia and at the end of the operation. In addition, there was no significant difference in the expression levels of serum tumor markers CEA, CA199, and CA724 between the two groups.

Conclusions: Sufentanil combined with sevoflurane anesthesia during hysteromyomectomy can improve the anesthesia effect and is safer. Moreover, it has no significant effect on the level of tumor markers in patients undergoing hysteromyomectomy.

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125 | Comparison of the efficacy of meropenem and linezolid in patients with severe pneumonia and their effects on ventilation quality and PSI score

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Objectives: To compare the efficacy of meropenem and linezolid in patients with severe pneumonia and explore their influence on the ventilation quality, prognosis and the severity of pneumonia (PSI) score.

Methods: Total 126 patients with severe pneumonia were divided into two groups by using random number table method. The control group was treated with linezolid, and the observation group was treated with meropenem. The patient's efficacy was evaluated after 7 days of treatment. The two groups were compared with ventilation quality, symptom disappearance time, PSI score, inflammatory factors, occurrence of adverse reactions, and mortality.

Results: After 7 days of treatment, the ventilation quality score in observation group was higher than that of the control group. The PSI scores, the patient's ventilator standby, ICU admission and antibiotic use time in observation group were lower than those of the control group. The levels of TNF-α, CRP, and PCT in the observation group were lower than those in the control group after 7 days of treatment. However, there was no significant difference in gastrointestinal discomfort, phlebitis, pain at the injection site and skin rash allergy between the two groups. The mortality of the observation group was lower than that of the control group.

Conclusions: Compared with linezolid, meropenem used in patients with severe pneumonia can improve ventilation quality, reduce PSI and inflammatory factor levels and shorten the time of symptom

disappearance. Meropenem does not increase the incidence of drug adverse reactions.

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126 | Application of polyether polyol as defoamer in artificial cardiopulmonary resuscitation machine

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Objective: Polyether polyol is used to prepare synthetic detergent with low foam and high detergents, and used as defoaming agent in papermaking or fermentation industry. It has the characteristics of non-toxic, safe, and antistatic. The possibility of using polyether polyol as defoamer for circulatory system in artificial CARDIopulmonary resuscitation machine was discussed in this paper.

Methods: In order to explore the toxicological safety of polyether polyol defoamer, the toxicity of polyether polyol defoamer to mice was studied and evaluated by acute toxicity test and subacute toxicity test in mice according to the Chinese toxicological test standard.

Results: In acute toxicity test, polyether polyol defoamed agent 10,000 mg/kg (BW) was orally administered to mice in three times within 24 h. No death phenomenon occurred, belongs to the actual non-toxic level. The serum alanine aminotransferase and liver coefficient of subacute toxicity test mice were significantly different from those of control group. No abnormal changes with toxicological significance were observed in other test indexes. It will not cause secondary pollution to the environment during use.

Conclusion: Polyether polyol can be used as defoamer for circulatory system in artificial CARDIopulmonary resuscitation machine.

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127 | Comparison of effects of vaginal progesterone sustained-release gel and cervical cerclage on the prevention and treatment of premature delivery in patients with cervical shortening

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Objective: To compare the effects of vaginal progesterone sustained-release gel and cervical cerclage on the prevention and treatment of premature delivery in patients with cervical shortening.

Methods: Eighty pregnant women in the hospital between January 2019 and 2021 were selected as the research subjects. Progesterone group ($n = 36$) and cervical cerclage group ($n = 44$). The effects of prevention and treatment of premature delivery were compared between the two groups.

Results: There was no significant difference in prolonged gestational time between the two groups, and the hospital stay in progesterone group was shorter than that in cervical cerclage group. The delivered at <34 weeks in progesterone group was more than in cervical cerclage group, and the delivered at 34–37 weeks and the delivered at >37 weeks were less than those in cervical cerclage. The cases with spontaneous premature delivery and the number of neonatology admission in progesterone group were significantly more than those in cervical cerclage group. The neonatal weight and Apgar score were significantly lower in progesterone group than those in cervical cerclage group, and there was no significant difference in neonatal asphyxia or death between the two groups. The incidence rate of complication was 8.33% in progesterone group and was 27.27% in cervical cerclage group, and the incidence rate in progesterone group was significantly lower than that in cervical cerclage group.

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128 | Study on the clinical effect of Gukangling fluid in patients with femoral intertrochanteric fractures and its influence on limb function

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Objective: To investigate the clinical efficacy of Gukangling Fluid in patients with femoral intertrochanteric fractures and its influence on limb function.

Methods: A total of 138 patients with femoral intertrochanteric fractures from . was divided into two groups, with 69 cases in each group. The control group was treated with proximal femoral anti-rotation intramedullary nail internal fixation, and the observation group was treated with Gukangling Fluid. The patient's effect was evaluated after 2 weeks of medication, and the patient's limb function was evaluated at 1, 3, and 6 months after treatment. Group limb function, bone metabolism, inflammatory factor levels and postoperative complications.

Results: After 1, 3, and 6 months of treatment, Harris scores of the two groups were higher than before treatment ($p < .05$); the observation group's Harris scores were higher than that of the control group after 1, 3, and 6 months of treatment ($p < .05$); After 2 weeks of treatment, the levels of IL-4, IL-6, and β-CTX were lower than those of the control group ($p < .05$); the level of PINP was higher than that of the control group ($p < .05$); the two groups were postoperative respiratory infections, incision infections, and pressure sores The incidence of wound liquefaction and abnormal healing was not statistically significant ($p > .05$).

Conclusion: The use of Gukangling Fluid in patients with femoral intertrochanteric fractures can help improve the patient's limb function, improve the level of bone metabolism, and can also reduce the level of inflammatory factors without increasing the incidence of postoperative complications. It is worthy of popularization and application.

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129 | Analysis of percolation of nano-ionic drugs in the kidney organs based on submanifold interface curvature

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Objectives: In this paper, we study the percolation behavior of nano-ionic drugs in the organs of the kidney. Using Tensor Analysis of the Completeness of the Submanifold Interface Curvature and non-fluid hydrodynamic analysis methods, the transport behavior of nano-ionic drugs was analyzed, and the percolation mode and percolation velocity of nano-ionic drugs in kidney organs were studied.

Methods: Suppose $\omega_1, \ldots, \omega_{n+p}$ are Dual frame field, $1 \le i, j, k, \ldots \le n; n+1 \le \alpha, \beta, \gamma, \ldots \le n+p$. Then, from Cartan's lemma $\omega_{\alpha i} = \sum_j h_{ij}^{\alpha} \omega_j, h_{ij}^{\alpha} = h_{ji}^{\alpha}$

$$\mathrm{d}\omega_i = -\sum_j \omega_{ij} \wedge \omega_j, \omega_{ji} + \omega_{ji} = 0, \mathrm{d}\omega_i = -\sum_k \omega_{ik} \wedge \omega_{kj} + \frac{1}{2} \sum_{k,l} R_{ijkl} \omega_k \wedge \omega_l$$

$R_{ijkl} = \sum_{\alpha} (h_{ik}^{\alpha} h_{jl}^{\alpha} - h_{il}^{\alpha} h_{jk}^{\alpha}) - \sum_{\beta} h_{ijk}^{\beta} \omega_{\beta\alpha}$, R_{ijkl} is The components of the curvature tensor. Defined $h_{ijk}^{\alpha}, h_{ijkl}^{\alpha}$ as follows

$$\sum_k h_{ijk}^{\alpha} \omega_k \cong \mathrm{d}h_{ij}^{\alpha} - \sum_k h_{ik}^{\alpha} \omega_{kj} - \sum_k h_{jk}^{\alpha} \omega_{ki} + \sum_{\beta} h_{ij}^{\beta} \omega_{\beta\alpha}$$

The Laplacian Δh_{ij}^{α} of h_{ij}^{α} is defined $\Delta h_{ij}^{\alpha} = \sum_k h_{ijkk}^{\alpha}$. From the Codazzi equation and the Ricci formula $h_{ijk}^{\alpha} = h_{ikj}^{\alpha} = h_{jik}^{\alpha}$. For $\alpha, n, 1 \le \alpha \le n+p$,

$$\Delta h_{ij}^{\alpha} \le \sum_k h_{kkij}^{\alpha} + \sum_{k,m} h_{km}^{\alpha} R_{mijk} + \sum_{k,m} h_{mi}^{\alpha} R_{mkjk} + \sum_{k,\beta} h_{ki}^{\beta} R_{\beta\alpha jk}$$

From the generalized maximum principle, if F is an upper bounded C^2-culvert on M, then for any $\epsilon > 0$, there exists x∈M such that $\|\nabla F\|(x) < \epsilon$, $\Delta F(x) < \epsilon$.

Results: Let H≠0. We know that $e_{n+1} = \xi / H$ is the normal vector on M Field. We define S_1 and S_2 as follows

$$S_1 = \sum_{i,j} \left(h_{ij}^{n+1} - H\delta_{ij} \right)^2, \quad S_2 = \sum_{\alpha \ge n+2} \sum_{i,j} \left(h_{ij}^{\alpha} \right)^2$$

S_1 and S_2 are the global functions, And does not depend on the choice of orthogonal frame $\{e_1, \ldots, e_n\}$. We consider the differential operator defined as follows

$$f = \sum\nolimits_{i,j=1} \left(nH\delta_{ij} - h_{ij}^{n+1} \right) f_{ij}, \Delta \left(n^2 H^2 \right) = \Delta S = \Delta \left(\mathrm{tr} H_{n+1}^2 \right) + \Delta S_2$$

$$\frac{1}{2}\Delta\left(\mathrm{tr}H_{n+1}^2\right)=\sum\left(h_{ijk}^{n+1}\right)^2+\sum h_{ij}^{n+1}\Delta h_{ij}^{n+1}$$

Conclusions: We choose orthogonal pricing $\{e_1,\ldots,e_n\}$, such that $h_{ij}^{n+1}=\lambda_i\delta_{ij}$,

$$(nH)=\sum_{i,j}\left(nH\delta_{ij}-h_{ij}^{n+1}\right)\le\sum_i nH(nH)_{ii}$$
$$-\sum_i\lambda_i^{n+1}(nH)_{ii}\le(n|H|_{\max}-C)\Delta(nH)$$

$|H|_{\max}$ is the maximum of H, C is the minimum for $\lambda_i^{n+1}, i=1,\ldots,n$. Direct calculation can be obtained $F\Delta F=3\,\|\mathrm{d}F\|^2-\frac{1}{2}F^4\Delta f^2$

$$\frac{1}{2}F^4(x)\,\Delta f^2(x)=3\,\|\mathrm{d}F|^2(x)-F(x)\,\Delta F(x)\;<\;3\varepsilon^2-\varepsilon F(x)$$

In this way, we extend the theorem to the case of n-dimensional submanifolds with high codimension p in Ek+p, we get $S=n^2H^2$, $S=\frac{n(n-1)r}{n-k-1}(1\le k<n-1)$.

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130 | Research on the diffusion behavior of nano-ionic drugs in human stomach based on diffusion equation

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Objectives: Nano-ionic drugs have better diffusion and absorption behaviors in the human body due to their own particularities. Based on the reaction-diffusion equation, this paper studies the diffusion behavior of nano-ions in the stomach, and analyzes the equilibrium state of the drug concentration in the human stomach.

$$\frac{\partial u}{\partial t}=D(x,u)Au+f(x,u,gradu)\quad\left((x,t)\in\Omega\times R^+\right),\Omega\in R^n$$

Methods: we integrate by parts, since there is no contribution from the ends of the interval of integration, we have $S=\frac{-2\pi}{2(2\pi i)^3}\int_{-1}^{1}[\log^{(2)}(rp+t)-\log(rp-t)dp]$.

Here, let $\log^{(n)}$ is the n-th derivative of the log function, in the sense of distributions. Obviously, $V^n(x,t;\alpha)=\frac{1}{2}[\log^{(n-1)}(t+x\cdot\alpha)-\log^{(n-1)}(-t+x\cdot\alpha)]$.

$S^{(n)}(x,t)=\frac{-1}{2(2\pi i)^n}\int_{\alpha-1}[\log^{(n-1)}(t+x,\chi)d\alpha$, this Formula implies that if $n\ge 2/3$,

$$S^{(n)}(x,t)=\frac{-\omega_{n-1}}{2(2\pi i)^n}\int_{-1}^{1}\log^{(n-1)}(t+rp)\,\mathrm{d}p$$
$$\le\int_{-1}^{1}\log^{(n-3)}(-t+rp)(1-p^2)^{(n-3)/2}dp.$$

where $\omega_{n-1}=2\pi^{(n-1)/2}/\Gamma((n-1)/2)$ and $r=|x|$. Changing notations slightly, we consider $S^{(n)}$ as a function of r and t. Differentiating, we have

$$\frac{\partial S^{(n)}}{\partial r}=\frac{-\omega_{n-1}}{2(2\pi i)^n}\int_{-1}^{1}\left[\log^{(n)}(t+rp)\le\int_{-1}^{1}\log^{(n)}(-t+rp)p(1-p^2)^{(n-3)/2}dp\right.$$

Results: Let T(t) be a C_0semigroup, B is its infinitesimal generator, then B is a closed dense linear operator. Obviously B is linear. For any x∈X, let $x_t=\frac{1}{t}\int_0^t T(s)x\;\mathrm{d}s,\;t>0$, Therefore, $x_t\in D(B)$. When $t\to 0^+$, $x_t\to x$. Therefore $\overline{D(B)}=X$. Let $x_n\in D(B)$ again, when $n\to\infty$, $x_n\to x$, and $Bx_n\to y$, so $T(t)x_n-x_n=\int_0^t T(s)Bx_n\,\mathrm{d}s$

Suppose X_0 is the linear subspace of X. If for any $x\in X_0$, there is a function $u:[0,\infty)\to D(A)$, then the initial value of the neck pair A is moderately posed with respect to X_0. In fact, let T(t) be a C_0 semigroup, and B ⊇ A as the infinitesimal generator. u = T(t)x, obviously u satisfies the condition.

$$w(t,s)=T(t-s)v(s),\frac{\partial w(t,s)}{\partial s}=T(t-s)Av(s)-T(t-s)Av(s)$$
$$=0,\;0<s<t.$$

And $w(t,s)$ is continuous at $0\leqslant s\leqslant t$, so $v(t)=w(t,t)=w(t,0)=T(t)v(0)=T(t)x$.

From $u(t;x)=T(t)x$, for $\|u(t;x)-u(t;y)\|\le\|T(t)\|\cdot\|x-y\|\le Me^{\omega t}\|x-y\|$.

Let the above problem be well-posed for A with respect to D(A). For any x ∈ D(A), the unique solution u(t; x) is determined. Obviously, for any x ∈ D(A), we have $\hat{T}(0)x=x,\;\hat{T}(t+s)x=\hat{T}(t)\hat{T}(s)x,\;\forall t,s\geqslant 0$.

Conclusions: Here we analyze diffusion and balance of nano-ionic drugs in the human stomach using maximum principle, which provides a basis for the correct use of drugs.

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131 | Long-term behavior of anti-inflammatory drugs distributed in human joints based on nonlinear analysis

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Objectives: In this paper, we investigate the large time behavior of anti-inflammatory drugs distributed in human joints, we consider the following K-h Diffusion model:

$$\begin{cases}u_t-div\left(\nabla u^{p(x)-2}\nabla u\right)+f(x,u)=g, & \Omega\times R^+\\ u(x,r)=u_r^0\quad\partial_{tu(x,r)}=u_r^1 & \Omega\\ u=0, & \partial\Omega\times R^+\end{cases}$$

for any constant $K>0$ there exists a function $b_k(x)\in\mathcal{L}^2f\Omega)$ such that $|f(x,u)|\le b_k(x)$, for $|u|\le K$, on $L^2(\Omega)$ with Dirichlet boundary conditions.

Methods: The existence of the global attractor for the p-Laplacian equation $u_i-diu(|\nabla u|^{p-2}\nabla\omega)+f(x,u)=g$. Let (X,ρ) be a metric

space. We shall use the following definitions: for all $A, B \subset X$ we set $\operatorname{dist}(A,B) = \sup_{x\in A}\inf_{y\in B}\rho(x,y)$, $\operatorname{dist}_H(A,B) = \mathrm{m}\{\operatorname{dist}(A,B), \operatorname{dist}(B,A)\}$, $B_r = \{x \in X \mid \rho(x,0) \le r\}$, $O_\delta(A) = \{x \in X \mid \operatorname{dist}(x,A) < \delta\}$, Also, let 2^X be the set of all (possibly empty) subsets of X and $P(X) = \{A \subset X \mid A \text{ is non-empty }\}$.

Set $A \subset D$ is called $(X;D)$ -attracting for the set $B \in \beta(X)$ if for an arbitrary neighborhood $N(A)$ of A in D there exists $T = T(N(A),B) \in \mathfrak{T}_+$such that $G(t,B)\cap D \neq \emptyset, \forall t \ge T$, and $G(t,B)\cap D \subset N(A), \forall t \ge T$, $G(t,B)\cap D \to A$, as $t \to +\infty$, in D.

Then $\omega(B) \neq \emptyset, \omega(B) \subset A(B)$ and $G(t,B)\cap D \to \omega(B)$, as $t \to +\infty$, in D.

Results: The function $u = u(t,x) \in L^2(0,T;H_0^1(\Omega)) \cap L^p(0,T;L^p(\Omega))$ is a solution of (3.1) on $(0,T)$, if for arbitrary $v \in H_0^1(\Omega) \cap L^p(\Omega)$,

$$\frac{d}{dt}(u,v) + a((u,v)) + (f(t,u),v) - (h,v) = 0$$

$$-\int_0^T (u,v)\eta_t dt + \int_0^T (a((u,v)) + (f(t,u),v) - (h,v))\eta dt = 0$$

As it will be shown below, it follows from this definition that

$$\frac{du}{dt} \in L^2\left(0,T;H^{-1}(\Omega)\right) + L^q(0,T;L^q(\Omega)).\ \int_0^T \left\langle \frac{du}{dt}, \xi \right\rangle dt$$

$$+ a\int_0^T ((u,\xi))\,dt + \int_0^T (f(t,u),\xi)\,dt = \int_0^T (h,\xi)\,dt,$$

$$\|u(t)\|^2 + a\int_s^t \|u(\tau)\|_{H_0^1}^2 d\tau \le \|u(s)\|^2 + C_3\int_s^t \left(\|h(\tau)\|^2 + 1\right)d\tau$$

$$\|u(t)\|^2 \le \|u(s)\|^2 e^{-\delta(t-s)} + C_4\int_s^t \left(\|h(\tau)\|^2 + 1\right)e^{-\delta(t-\tau)}d\tau$$

for all $t \ge s, t, s \in [0,T]$. C_3, C_4, δ depend only on the parameters of the above problem.

Conclusions: Let $\{w_j\}_{j=1}^\infty \subset H^2(\Omega)\cap H_0^1(\Omega)$ be an orthonormal basis in $L^2(\Omega)$, $-\Delta$ in $H_0^1(\Omega)$. We denote by $[w_1,\dots,w_N]$ the space spanned and unknown $\{c_j^N(\cdot)\}_{j=1}^N$ satisfy the distribution law.

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132 | Kinetic analysis of the diffusion of anti-inflammatory and analgesic drugs in human capillaries

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Objectives: In this paper, we study the dynamic behavior of anti-inflammatory and analgesic drugs in human capillaries, analyze the dynamic mechanism of their diffusion in human capillaries, provide a basis for the research and application of new drugs, and provide methods for improving the efficacy of drugs. The model is as follows:

$$\begin{cases} -\varepsilon^2\Delta u + V(x)u = K(x)|u|^{2^*-2}u + H_u(u,v), x\epsilon\mathbb{R}^N, \\ u(x), v(x) \to 0, |x| \to \infty \end{cases}$$

where $2^* = 2N/(N-2)(N \ge 3)$, $H_u(u,v), H_v(u,v)$, $H \in C^1(\mathbb{R}^+\times\mathbb{R}^+,\mathbb{R})$, $\rho = \sqrt{s^2+t^2}, \rho \to 0, H_s(s,t) = o(\rho), H_t(s,t) = o(\rho)$.

Methods: Let E be the Banach space, the Wang letter $I: E \to \mathbb{R}, u_0 \in E$, $u_n \in E, u_n \to u_0$, $I(u_0) \le \inf_{n\to\infty} I(u_n), I \in C^1(E,\mathbb{R})$, if $u, v \in E$ satisfys, $\|v\| \le 2\|I'(u)\|\langle I'(u), v\rangle \ge \|I'(u)\|^2, I \in C^1(E,\mathbb{R}), c \in \mathbb{R}$. $k \to \infty$, $\{u_k\} \subset E$. $I(u_k) \to c$, $I'(u_k) \to 0$, If there is a convergent subsequence, E is Banach space, $I \in C^1(E,\mathbb{R})$. $I'(u) = 0$. $I'(u) = 0$, that is $\langle I'(u), \varphi\rangle = 0, \forall\varphi \in E. I(u_0) \le \inf_{n\to\infty} I(u_n)\|v\| \le 2\|I'(u)\|\langle I'(u), v\rangle \ge \|I'(u)\|^2$, $I(u_k) \to c$ and $I'(u_k) \to 0$, $u \in V, a(u,v) = l(v), \forall v \in V$. There is a unique solution $u \in V, \lim_{n\to\infty}(|u_n|_p^p - |u_n-u|_p^p) = |u|_p^p$. $\exists 2 < q < 2^*$ and $c_0 > 0$ such that $|H_s(s,t)|, |H_t(s,t)| \le c(1+|s|^{q-1}+|t|^{q-1})$, and $2 < \theta < 2^*, \forall s > 0$, $t > 0$, there holds. $\exists a_0 > 0, \alpha, \beta > 2$, $H(s,t) \ge a_0(|s|^\alpha + |t|^\beta), 0 < \theta H(s,t) \le sH_s$

For $V \in C(\mathbb{R}^N,\mathbb{R}), V(0) = \inf_{x\in\mathbb{R}^N} V(x) = 0$, and $\forall b > 0 \nu^b := \{x \in \mathbb{R}^N : V(x) < b\}$, its Measure is limited.$(2K_{01})K(x) \in C(\mathbb{R}^N,\mathbb{R}), 0 < iK \le sK < \infty$.

Results: Because of $u_\lambda \in S_r$, $\exists U_\lambda \in S_r$, and $v_\lambda \in H^1(\mathbb{R}^3)$, such that $\|v_\lambda\| \le d$, $u_\lambda = U_\lambda + v_\lambda$. Since S_r is compact, then for the sub-columns, there are $U_0 \in S_r$ and $v_0 \in H^1(\mathbb{R}^3)$ so that U_0, U_λ strongly converges to U_0, in $H^1(R^3)$, and U_λ in $H^1(R^3)$ weakly converges to v_0, $\|v_0\| \le d$. Let $u_0 = U_0 + v_0$, then $u_0 \in S^d$ and u_λ weakly converges to u_0 in $H^1(R^3)$. From $\lim_{i\to\infty}\Gamma_\lambda(u_\lambda) = 0$ to get $I'(u_0) = 0. u_0 \neq 0$. $\|U_0\| = \|v_0\| \le d$. From this, $\|\nabla U_0\| < \sqrt{3m/a}$. By $U_0 \in S_r$ and Pohozăev's inequality, $\|\nabla U_0\| = \sqrt{3m/a}$, we have $I(u_\lambda - u_0) \le o(1)$.

Then there is a constant c such that for all t, there have $F(t) \le \frac{ab}{4}t^2 + c|t|^s + |t|^4$.

$$\frac{a}{2}\int_{\mathbb{R}^3} |\nabla(u_\lambda - u_0)|^2 + b|u_\lambda - u_0|^2$$

$$\le \frac{4ab}{3}\int_{\mathbb{R}^3} |u_\lambda - u_0|^2 + S^{-3}\|\nabla(u_\lambda - u_0)\|_2^4$$

Hence $\frac{3ab}{4}\|u_\lambda - u_0\|_2^4 \le S^{-3}\|\nabla(u_\lambda - u_0)\|_2^4$. $\liminf_{\lambda\to 0}\|\nabla(u_\lambda - u_0)\|_2 \le (\frac{aS^3}{4})^{\frac{4}{3}}$.

Conclusions: Assuming that u_λ weakly closes to u in $H_r^1(R^3)$, then $I'(u) = 0$. Then when $\lambda\to 0$, $D_\lambda \to m$ and $m \in (0, 1/3(aS)^{3/2})$. Therefore, I(u) = m, that is, u is the minimum energy value in capillaries.

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133 | The effects of different doses alfentanil and esketamine on prevention of emergency agitation in pediatric adenotonsillectomy surgery

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Bin Tang and Yinghui Wei contributed equally to this work.

Objectives: This study aims to compare the effectiveness of esketamine alone and with Alfentanil in preventing EA in children under adenotonsillectomy with sevoflurane anesthesia.

Methods: In a double-blind trial, 80 children (ASA I or II, 3–7 years old) undergoing adenotonsillectomy with sevoflurane anesthesia were randomly assigned into four groups: control group; esketamine (esKET) group; esketamine plus 10 μg/kg alfentanil group (esKET+Alf1); esketamine plus 20 μg/kg alfentanil group (esKET+ALf2). The incidence of EA was assessed with the Aono's scale and the severity of EA was evaluated with the pediatric anesthesia emergence delirium (PAED) scale. Time of tracheal extubation and awake were recorded. Postoperative pain and complication were recorded.

Results: The incidence of EA was 50% in the control group, 21% in the esKET group, 7% in the esKET+Alf1 group. And it never happened in the esKET+Alf2 group. The Aono's scale, the PAED scale and the FLACC scale in the control group were significantly more than those in the esKET group, esKET+Alf1 group and the esKET+Alf2 group after the tracheal extubation. And those in the esKET group were significantly more than those in the esKET+Alf1 group and the esKET+Alf2 group after the tracheal extubation ($p < .05$). The time of tracheal extubation of the control group, the esKET group and the esKET+Alf1 group were significantly shorter than those in the esKET+Alf2 group ($p < .05$). The awakening time of the esKET+Alf2 group is significantly longer than those in other groups ($p < .05$). And the case of cough and laryngospasm and bronchospasm in the esKET group, the esKET+Alf1 group and the esKET+Alf2 group were significantly less than those in the control group after the tracheal extubation ($p < .05$).

Conclusions: The combined administration of alfentanil and esketamine can reduce EA in children undergoing adenotonsillectomy with sevoflurane anesthesia. Esketamine plus 10 μg/kg alfentanil seems to be more appropriate than other dose combinations as it reduced EA but did not prolong the time to awake.

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134 | The effect of remidazolam combined with alfentanil in hysteroscopic surgery

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Ying Lin and Guodong Wang are joint first authors.

Objectives: In this study, we aim to explore the effect of remidazolam combined with alfentanil in hysteroscopic surgery.

Methods: Ninety patients with ASA I or II undergoing hysteroscopic surgery were randomly divided into three groups: remidazolam and alfentanil (RA) group, propofol and alfentanil (PA) group and propofol and sufentanil (PS) group. After entering the operating room, Electrocardiogram, blood pressure, pulse oximetry, $P_{ET}CO_2$, and BIS were monitored. The RA group was given .2 mg/kg remidazolam intravenously, and then continued infused .2–.5 mg/kg/h remidazolam, 2 min later administered 10 ug/kg Alfentanil intravenously. In the PA group, TCI infusion of 1–2 ug/kg propofol and combined with 10 ug/kg Alfentanil intravenously, the PS group TCI infusion of 1–2 ug/kg propofol and combined with 5 ug sufentanil intravenously. All patients began surgery after the eyelash reflex disappeared. If there are reactions such as body movement, frowning, swallowing, etc., or the BIS more than 60, remidazolam 2.5 mg, or propofol .3 to .5 mg/kg was administered intravenously until the body movement disappears. The medication was stopped 5 min before the end of the operation. The Vital sign and the state of sleep and wake up were recorded.

Results: The time to fall asleep, wake up, and leave the theatre in the RA group was significantly shorter than those in the PA group and the PS group ($p < .05$); the time of wake up and leave the theatre in the PA group was significantly shorter than those in the PS group ($p < .05$); there was no significant difference of patients' anesthesia effect scores among the three groups ($p > .05$). There was no significant difference about the MAP, HR, RR, SpO_2, $P_{ET}CO_2$, BIS, norepinephrine, and cortisol concentrations in the three groups. There were no significant differences of the postoperative adverse reactions among the three groups.

Conclusions: Remidazolam combined with alfentanil is safe and feasible for hysteroscopic anesthesia. It has the effect of rapid onset and recovery with little effect on respiration and circulation system.

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135 | Study on extraction optimization of compound flavonoids from Chinese herbal medicines by orthogonal design and quantitative theory and its antioxidant activities in vitro

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Objectives: The orthogonal design and quantitative theory were utilized to optimize the extraction process of compound flavonoids (CFs) from Chinese herbal medicines (CHMs), and determined its antioxidant activities in vitro.

Methods: The CHMs were comprised of hawthorn, lotus leaf, fagopyrum tataricum, semen cassiae, lycium barbarum, and poria cocos with the mass ratio of 4:2:2:1.5:1:1. The influences of ratio of liquid to raw material, extraction temperature, extraction time, and extraction mode on the yield of CFs from CHMs were surveyed. The scavenging abilities for DPPH, ABTS, hydroxyl radical, superoxide-anion radical, and reducing power were performed to evaluate the antioxidant activities in vitro of CFs.

Results: The impacts of ratio of liquid to raw material, extraction temperature, time and mode on the yield of CFs were extremely significant

($p < .01$) via range and variance analysis, where the sequence was the ratio of liquid to raw material > extraction temperature > extraction time > extraction mode. It was revealed that the CFs yield was predicted accurately using quantitative theory ($R = .95$). The maximum CFs yield of 37.62% was acquired under the following optimal extraction conditions: ratio of water to raw material 35mL/g, extraction temperature 75°C, extraction time 75 min, and extraction mode enzymic-assistant extraction. The scavenging capacities of CFs for hydroxyl radical, DPPH, ABTS, superoxide-anion radical and reducing power were 89.78 ± 1.66%, 81.82 ± 1.75%, 49.35 ± 1.86%, 11.24 ± .65%, and .232 ± .005 at a concentration of .4 mg/ml.

Conclusions: CFs could be employed as a potential natural antioxidant in pharmaceutical or functional food fields.

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136 | Study on the mechanism of indigo naturalis in the treatment of herpes zoster based on network pharmacology

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Objectives: Herpes zoster is an acute infectious skin disease caused by varicella-zoster virus infection. Many clinical studies have shown that indigo naturalis was particularly effective in treating Herpes zoster. The research on indigo naturalis's treatment of herpes zoster was mainly clinical, and very few researches on indigo naturalis's pharmacology were reported. So in this study, the network pharmacology was used to analyze the mechanism and molecular targets of indigo naturalis in the treatment of Herpes zoster.

Methods: The main compounds and targets of indigo naturalis were screened through data mining of multiple databases (e.g., TCMSP, Swiss Target Prediction, etc.) and the herpes zoster related intersection target genes were obtained. The target protein interaction network diagram and indigo naturalis herpes zoster target pathway network diagram were constructed by using Cytoscape 3.7.2 software.

Results: A total of 27 candidate active ingredients were selected by the network pharmacology analysis, including bisindigotin, indican, 10h-indolo,[3,2-b],quinoline, Isoindigo, Indigo, indirubin, beta-sitosterol, isovitexin, Neophytadiene, Octadecane, (E)-Squalene, 6-(3-oxoindolin-2-ylidene)indolo[2,1-b]quinazolin-12-one, Phytol, Eicosane, Fucosterol, 6,10,14-trimethyl-2-Pentadecanone, Lupenone, Taraxasterol, Stigmast-4-en-3-one, Tridentochinon, laccerol, nonadecane, N-phenyl-2-naphthylamine, Tryptanthrin, Isatin and qingdainone.

Conclusions: The study based on the network pharmacology provides a new research method for studying the mechanism of indigo naturalis in the treatment of herpes zoster.

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137 | Deciphering potential difference between yang/non-yang deficiency syndrome in traditional Chinese medicine based on network biomarker: An example of COPD

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Background: Over the past several years, Western medicine has shown considerable progress in healing illnesses and prolonging life. At the same time, chronic and functional illnesses, such as COPD, have become a greater problem in health care, and the concept of integrative medicine (IM) has emerging that drastically changes the approach toward illness. Here, Traditional Chinese Medicine (TCM), as the supplementary method of Western Integrative Medicine (WIM), proved to be effective in preventing the acute exacerbations of COPD. The critical point lies in that to differentiate COPD with Yang deficiency syndrome (COPD-YDS) and Non-Yang deficiency syndrome (COPD-NDS), so as to prescribe the right medicine respectively. However, WIM strictly requires its complementary and alternative medicine (CAM) methods must be supported by scientific evidence. Due to that the curative effect of TCM has not been systematically evaluated by modern epidemiological theory, it's difficult for TCM, as an important medical theory, to prove its scientific nature, which leads to the big separation between TCM and WIM.

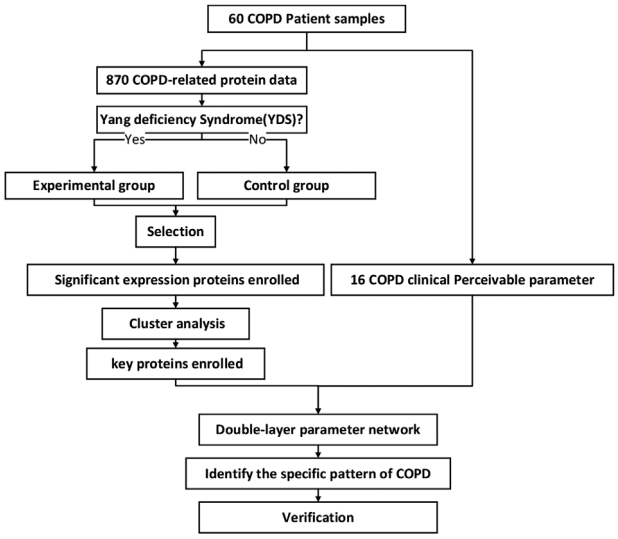

FIGURE 1 The flow chart of the experiment design

Methods: We collect 60 patient samples diagnosed as COPD in the Affiliated Hospital of Kunming Medical University between October 22, 2019 and January 2020, 14. Inclusion criteria: 1) 44–75 years old; 2) patients with severe liver and kidney disease are excluded. Then, we test the blood samples of patients (including COPD-YDS samples and COPD-NDS samples) by TMT-labeled quantitative proteomics technology. We screen out several key protein molecules as candidate markers of COPD-YDS. Then, we combine those detectable parameters (the abundance of key proteins) with the perceivable parameters of COPD (parameters for clinical diagnose of COPD) to form a double-layer parameter network by calculating the Pearson Correlation Coefficient of them, and the specific pattern of network could be used to identify COPD. In verification analysis, we choose *I* value of dynamical network biomarker (DNB) to prove the validity of our parameter network.

Result: We find that inter-layer edges in network pattern of COPD-YDS are 35% more than that of COPD-NDS, and the degree distribution of 13 nodes are different in these two network patterns, which means that the network pattern of COPD-YDS and COPD-NDS have a great many of differences. It can be used as network marker to provide a new way for identifying COPD with different syndrome.

In verification analysis, the *I* value of pattern corresponding to COPD-YDS is 1.783, which is 5.808 times of the average value that correspond to randomly selected network pattern. Then, we analyze the interaction of proteins, and the results show that HBB and ENO3 may be important proteins that related to COPD.

Conclusion: We find the differences on network pattern between COPD-YDS and COPD-NDS. It can be used as network marker to provide a new way for identifying COPD with different syndrome.

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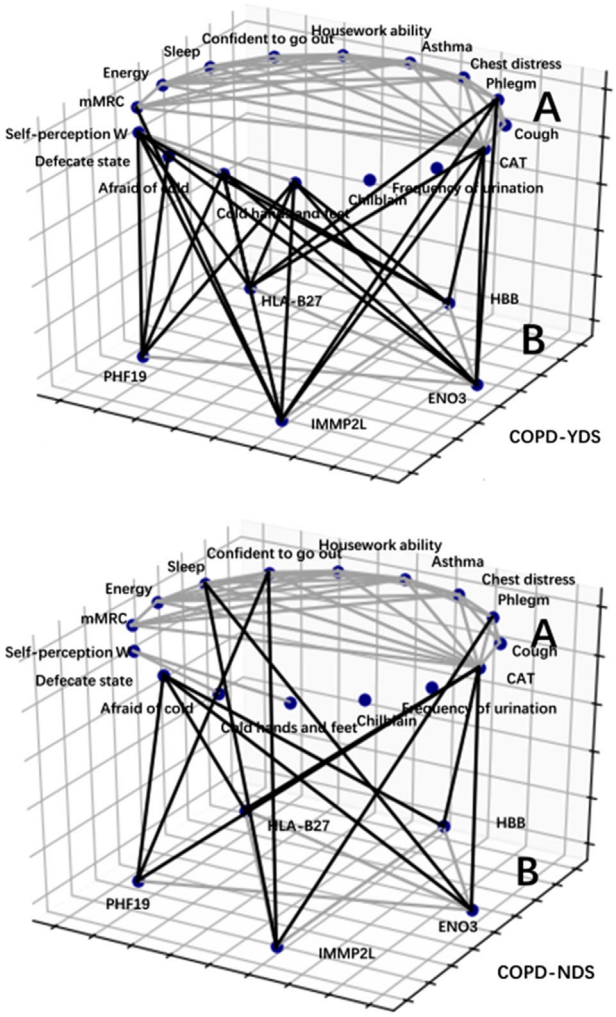

FIGURE 2 Network pattern of COPD-YDS and COPD-NDS [Colour figure can be viewed at wileyonlinelibrary.com]

Kun Chen, Chun Zhang and Xue Cao are joint first authors.

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138 | The clinical application of self-made traditional Chinese medicine prescription for continuation of tendons and bones in the treatment of delayed union after fracture operation

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Jinrong Zhao and Jun Xu are co-first authors

Objective: In the treatment of delayed union after fracture, different treatment plans are used to summarize the effect of self-made Chinese herbal medicine for continuation of tendons and bones.

Methods: From August 2018 to 2020, a survey of patients with delayed union after fracture was conducted. A total of 120 patients were enrolled this time. They were grouped according to the treatment plan. The single group performed routine treatment on 60 patients, and the combined group was in a single group. Based on the treatment of the group, self-made Chinese medicine prescriptions for continuation of tendons and bones were used for treatment. Summarize and explore the implementation effects of two treatment programs.

Results: (1) Before treatment, there was no significant difference between the BGP content and ALP content of the single group and the combined group ($p > .05$); (2) The single group and the combined group before the treatment had no significant difference in the BGP content and ALP content ($p > .05$). After treatment, the BGP content and ALP content of the single group and the combination group have been improved, but the BGP content of the single group is lower than the combination group, and the ALP content is lower than the combination group. There is a significant difference between the two groups ($p < .05$).

Conclusion: In the treatment of delayed union after fracture surgery, the self-made traditional Chinese medicine formula for continuation of tendons and bones is more effective. This program is worthy of clinical popularization and application.

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139 | Predictive value of adiponectin and ALT and other biomarkers in elderly type 2 diabetes

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Tian Tian and Guifang Shao equally contributed to this work.

Objective: To investigate the predictive value of adiponectin and ALT and other biomarkers in elderly patients with type 2 diabetes (T2DM).

Methods: A total of 98 patients who were first diagnosed with type 2 diabetes in the Second People's Hospital of Kunshan were selected as the observation group, and 50 healthy patients were selected as the control group. The HDL-C, LDL-C, TG, hs-CRP, ALT, adiponectin, serum retinol-binding protein-4 (RBP-4), serum fetuin-a (Fetuin-A), ferritin, and glycosylated hemoglobin (HbA1c) levels in venous blood were detected.

Results: The levels of TG, LDL-C, TG/HDL-C, ferritin, ALT, Fetuin-A, RBP4, and HbA1c were significantly higher, while the level of HDL-C and adiponectin were significantly lower in patients of T2DM than those of the health people. hs-CRP, ALT, TG/HDL-C, Fetuin-A, ferritin, RBP4, and adiponectin were all independent correlation factors of T2DM. These indicators (TG/HDL-C, ALT, serum iron, and adiponectin) have a higher ability to predict T2DM in the elderly.

Conclusions: The combination of TG/HDL-C, ALT, serum iron, and adiponectin has a good predictive value for elderly T2DM.

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140 | Establishment and evaluation of ELISA for detection of *E. coli* host residual protein and droplet digital PCR for detection of *E. coli* host residual DNA in biological preparations

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Background: Biological medicine is the fastest growing field in the pharmaceutical industry. Most of these biological agents are gene recombination and expression. There are very strict standards for the limit of proteins and nucleic acids from recombinant expressed host cells in drugs. *E. coli* is a common gene recombinant expression host strain. Different recombinant proteins have different purification processes, therefore the residual *E. coli* protein is also different. It is necessary to establish detection methods for process specific residual protein and nucleic acids.

Methods: Taking the purification process of scFv expressed by *E. coli* as the specific process model, the same process is used to intercept the residual protein of empty *E. coli*. The obtained residual protein was used as immunogen for immunizing mice and rabbits, then a sandwich ELISA for the quantification of *E. coli* residual protein was established. Taking v region of 16S gene of *E. coli* as the target, ddPCR was used as the residual DNA detection method to amplify the target gene from the purified biological agent samples, and the absolute copy number of residual DNA in the samples was obtained.

Results: The sensitivity of the sandwich ELISA for the detection of process specific residual protein was 10 ng; The copy numbers of residual DNA in three samples of multiple dilution were 798, 472, and 261 respectively by ddPCR, while qPCR could not distinguish these three dilutions.

Conclusions: The sandwich ELISA established can fully meet the detection requirements that the residual protein is lower than .01%–.1% in biological preparations. As an absolute quantitative method, the accuracy and sensitivity of ddPCR is much higher than that of qPCR. ddPCR can fully meet the detection standard of residual yeast and *E. coli* expressing biological agents no more than 100 pg/dose. ddPCR might be widely used in quantification of residual DNA.

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141 | Study on time-hepatotoxicity of *Gardenia jasminoides* and its toxic mechanisms

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Objectives: Study the time-hepatotoxicity relationship of Gardenia jasminoides and its toxic mechanisms to provide some basis for the safe use of gardenia jasminoides.

Methods: The experimental rats were given 10 g/kg water extract of Gardenia jasminoides by continuous gavage. Liver index, serum aspartate aminotransferase (AST), alanine aminotransferase (ALT), alkaline phosphatase (ALP) and hepatic pathology were used to characterize the degree of liver injury. The pathological results of liver tissue in each group were also used as an important evaluation index. The experimental rats, divided into D5 group (gavaged for 5 days), D12 group (gavaged for 12 days), D19 group (gavaged for 19 days), and D26 group (gavaged for 19 days and then drug withdrawal for 7 days), were compared with the blank group to study time-toxicity relationship. Metabonomics based on UPLC-Q-TOF-MS technology was used to explore potential biomarkers for toxicity.

Results: From day 5, the liver index and ALP showed an increasing trend and began to decline by day 26, but there was still significant difference between D26 group and blank group. There was no significant difference in AST index among groups, while ALT index increased significantly on day 5. The results of semi-quantitative score of hepatic pathology showed that the liver damage was obvious from the 5th day, and there was significant difference between the administration groups and blank group. But the damage was recovered after 7 days of drug withdrawal. Besides, five potential biomarkers were identified as biomarkers associated with hepatotoxicity.

Conclusions: A large dose of Gardenia jasminoides could induce liver injury, and the degree continued to worsen with the extension of time. Fortunately, the liver injury caused by Gardenia jasminoides may be reversible to some extent after stopping. This hepatotoxicity mechanism may be related to theβ-oxidation process in mitochondria and the biosynthesis pathway of fatty acids.

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142 | Successful strategy of clinical information system for non-pharmacological treatment in patients with intestinal metaplasia

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Objectives: Gastric cancer has the highest incidence and mortality rate in Korea. The incidence of gastric cancer increases by 2–4 times compared to normal people in cases of intestinalj metaplastia. Long-lasting inflammatory reactions in the stomach destroy the structures of the gastric mucous membrane. We need to manage our daily lives so that the intestinal metaplasia does not develop into stomach cancer. Therefore, this study is to implement a successful strategy of clinical information systems for non-pharmacological treatment in patients with intestinal metaplasia.

Methods: The survey was conducted with 124 subjects who visited internal medicine of **a general hospital located in C area from** May 7 through July 12, 2020. General characteristics were carried out with the X^2-test. The physical condition of the intestinal patients before and after the experiment was analyzed by *t*-test. After applying two groups, the physical immunity was measured over time: 11, 22, and 33 days.

Results: The results of the paper are as follows. Firstly, about the family history of cancer, 64.5% of the experimental group with a family history of cancer was significantly higher than 27.4% of the control group ($X^2 = 3.15$, $p < .05$). Secondly, abdominal swelling significantly decreased by an average of 23.51 points after application compared to the average of 38.50 points before clinical information system application ($t = .52$, $p = .037$). Thirdly, drinking dandelion tea was significantly higher than the average of 9.15 points before the health system was applied by an average of 29.06 points after the system was applied ($t = -1.63$, $p = .000$). Fourthly, physical immunity was significantly improved 11 days after the system was applied compared to clinical information system.

Conclusions: The derived research results showed that the patients' symptoms have decreased significantly after clinical information system application. Therefore, this clinical information system has been

confirmed to be effective in treating non-drugs in patients with intestinal metaplasia. We believe that clinical information systems can be applied to non-pharmacological treatment of other cancer diseases. This study will also contribute to the academy and non-pharmacological treatment based on experimental results.

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143 | Current status of alginate lyase from bacteria associated with marine brown algae as a combat agent against biofilm-related infection

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Infection diseases are still the leading cause of death in lower and middle-income countries in the last decades. This as we know today is worsen by COVID-19, placing infectious disease as the global leading cause of death today. On the other hand, the morbidity and mortality of infection diseases on children around the world is still alarming. In children, infectious disease is also the leading cause of death where lower respiratory infections are the more common, followed by Diarrhea and HIV/AIDS. The lower respiratory infections are often caused by biofilm forming bacteria such as *Streptococcus pneumoniae*, *Pseudomonas aeruginosa*, and *Acinetobacter baumannii*. Bacteria in biofilms are inherently more tolerant to antimicrobial treatment when compared directly to planktonic cells of the same strain. Many studies have shown that bacteria growing in biofilms are often thousands of times more tolerant to antimicrobial treatment than their planktonic counterparts. Therefore, degradation of biofilm produced by pathogenic bacteria is very important for lower respiratory infection treatment. It urges development of alginate lyase enzyme from bacteria associated with brown algae as antibiofilm agent.

In the world, costs to eradicate bacterial biofilm are continuously increased while the market for products required in biofilm treatment is steadily growing. The large share of this segment in various areas of the world attributed to microbial products to remove, prevent, and manage biofilm. Current strategies in Combating bacterial biofilm infection includes quorum sensing inhibition, drug delivery system, photothermal therapy, photodynamic therapy, catalytic therapy, nano-agent, theranostics, and matrix destruction. A natural antibiofilm agent is alginate lyase (an enzyme), which can destroy the main part of biofilm. Marine brown algae are a source of bacteria producing natural depolymerization agent of antibiofilm. This is due to the high alginate content of brown algae compared to red or green algae. Alginate is the substrate of alginate lyase produced by marine bacteria. Administration of alginate lyase can disrupt or destroy biofilm, when traced using electron micrograph before and after treatment. Most studies on application of alginate lyase as antibiofilm agent in the world is focused on cystic fibrosis case of infection caused by *Pseudomonas aeruginosa*. Unspecified brown algae, followed by *Sargassum* sp. and *Laminaria* sp. have been mostly studied as source of bacterial alginate lyase without regards to their alginate contents. Hopefully the use of alginate lyase from bacteria associated with broader range of marine brown algae as antibiofilm agent could be expanded. The application should be enhanced to broader cases of biofilm-related infections in the world, not only limited to cystic fibrosis cases.

144 | Observation on the clinical efficacy of SOX chemotherapy combined with Cinobufotalin and Aidi injection in the treatment of advanced gastric cancer

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Objectives: To investigate the efficacy and toxicity of SOX chemotherapy combined with Cinobufotalin and Aidi injection in patients with advanced gastric cancer (GC).

Methods: Sixty patients were randomly divided into study group and control group, 30 patients in each group. The treatment group was treated with traditional Chinese medicine plus SOX chemotherapy, while the control group was treated with SOX chemotherapy only. The efficacy and adverse reactions of the two groups in the treatment of advanced GC were observed and compared. Serum tumor marker levels were detected by automatic chemical immunoassay. $CD3^+$, $CD4^+$, and $CD8^+$ levels were detected by flow cytometry.

Results: The total effective rate in study group was higher than that in control group. Incidence of adverse reactions was decreased in study group versus control group. After treatment, CA125, CA199, CEA, CA242, and $CD8^+$ levels were decreased, and the levels of $CD3^+$ and $CD4^+$ were increased in study group compared with control group.

Conclusions: SOX chemotherapy combined with Cinobufotalin and Aidi injection in the treatment of advanced GC patients can improve the therapeutic effect, improve the immune function of patients, and reduce the level of serum tumor markers and the incidence of adverse reactions.

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145 | Intelligent design and research of drug packaging

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Objectives: With the development of science and technology brought by the change of people's production and life style, the traditional packaging is quietly changing. On the premise of satisfying the basic functions of packaging, the intelligent packaging which fully reflects the personalized consumer demand, highlights the humanistic care and expands the product function is gradually rising. This kind of packaging is built on the basis of comprehensive use of modern intelligent materials, intelligent technology, intelligent structure, and other advanced design elements, enhance the protection function of packaging and maximize the special needs of consumers and convenience.

Methods: Based on the general situation and background of the development of intelligent packaging, this paper reconstructs the concept of intelligent packaging, analyzes the relevant factors that affect the design of intelligent packaging. 1) The progress of science and technology promotes the generation and development of intelligent packaging. 2) The use of new materials enriched the content of intelligent packaging design. 3) Structure design determines the level and degree of packaging intelligence. Summarizes and refines some laws in the design of intelligent packaging, and extracts several key steps according to the characteristics of intelligent packaging.

Results: By integrating these methods and steps, it is summarized into five aspects, that is, analysis, solution, group, borrowing, and creation. We should accelerate the pace of research, build the knowledge theory system of intelligent packaging, further optimize and update the teaching content of packaging design, at the same time, establish their own industry standards, and deepen the sound development of intelligent packaging design, including only speech packaging. With the rapid development of science and technology and the trend of commercial diversification, intelligent packaging design will not only be universally valued by people, but also into different stages of its development.

Conclusions: Intelligent packaging which is a new concept and new material, new technology in the packaging field, there are many advantages and characteristics of human nature, but there are still questions about technology development, cost, standards, and audience acceptance. In order to promote the sound and healthy development of intelligent packaging, efforts should be made in the aspects of talent, platform and discipline construction and benign advocacy.

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146 | The effect of Gukangling fluid on the expression of VEGF in patients with extremity fractures and its repair mechanism

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Qirui Yang and Cheng Li equally contributed to this work.

Objective: To investigate the effect of Gukangling Fluid on vascular endothelial growth factor (VEGF) in patients with limb fractures.

Methods: Total 134 patients with limb fractures from January 2018 to June 2020 were selected. Random number table method was divided into two groups. The control group was treated with a minimally invasive percutaneous locking nail plate, and the observation group was treated with Gukangling Fluid. After 3 months, the patient's effect was evaluated, the two groups were compared with the symptom score, Fugl-Meyer score, dysfunction index, and visual simulation Pain score, VEGF level and complication rate.

Results: After 3 months, the scores of waist and knee soreness, weakness, difficulty walking, pain in the affected limb and swelling of the affected limb were lower than those of the control group; the Fugl-Meyer score of the observation group after 3 months of treatment, ODI, VAS scores and VEGF levels were higher than those of the control group; the incidence of postoperative venous embolism, joint stiffness, incision infection, nonunion and bedsores in the two groups was not statistically significant.

Conclusion: Gukangling Fluid used in patients with limb fractures can reduce the symptom score, improve the limb function of the patients, reduce the pain of the patients. It is worthy of popularization and application.

Acknowledgements: Project No. 2017FE467 (-165)

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147 | Effect of Ping chuan fang acupoint application combined with western medicine on plasma inflammatory factors and lung function in patients with COPD

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Objective: To observe the effect of Ping Chuan Fang acupoint application combined with western medicine on plasma inflammatory factors and lung function in patients with chronic obstructive pulmonary disease (COPD)

Methods: Total 108 patients with chronic obstructive pulmonary disease were randomly divided into observation group and control group by random number table method. The control group was given western medicine routine treatment, observation group on the basis of control group treatment to give Ping Chuan Fang acupoint application. Both groups were treated for 10 days as a course of treatment, with a total of two courses of treatment.

Results: 1) The difference of curative effect between the two groups was statistically significant ($p < .05$). 2) The improvement of symptoms in both groups was lower than those before treatment ($p < .01$). 3) The pulmonary function indexs of the two groups were improved significantly after treatment ($p < .05$), and the improvement of observation group was more obvious ($p < .05$). 4) The plasma levels of IL-1, IL-6, and TNF-α decreased significantly in both groups, and the decrease of observation group was more significant ($p < .05$).

Conclusion: Pingchuan Fang acupoint application combined with western medicine can significantly improve the clinical symptoms of patients with (COPD), reduce inflammatory indicators, enhance lung function, and have a good clinical effect.

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148 | Isolation of lactic acid bacteria with antibacterial effect from Fresh Kimchi

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Objectives: Kimchi is a kind of pickled vegetable that has been fermented for a long time and profuse probiotics.[1] It is mainly pickled with a small amount of salt and then fermented by lactic acid bacteria to make a pickling product with sour taste. The microorganisms involved in pickle fermentation include enterobacteriaceae, pseudomonas, mold, and lactic acid bacteria. Kimchi has the advantages of unique flavor, various raw materials, convenient consumption, good sensory quality, and suitable taste. The main purpose of this paper is to isolate lactic acid bacteria with antibacterial effect from naturally fermented pickles.

Methods: Five pathogenic bacteria such as *Escherichia coli*, *Staphylococcus aureus*, *Salmonella typhi*, *Shigella flexneri*, and *Bacillus cereus* were used as indicator bacteria to screen lactic acid bacteria with strong antibacterial activity.[2] The antioxidant activity of lactic acid bacteria was detected by DPPH radical and hydroxyl radical scavenging rate,[3] and the viability of lactic acid bacteria was investigated by the survival rate in artificial gastrointestinal fluid.[4]

Results: Lactic acid bacteria with good acid and bile salt resistance were isolated from naturally fermented pickles, and were identified as Lactobacillus plantarum in morphology, physiology and biochemistry, and named PC-4. The DPPH radical scavenging rate and hydroxyl radical scavenging rate of PC-4 were 22.31% and 23.73%, respectively. The survival rate in artificial gastric juice and artificial intestinal juice was 65.56% and 66.31%, respectively. The inhibitory effect on *E. coli*, *B. cereus*, and *S. flexneri* is relatively strong, and the tolerance of bile salt is high.

Conclusion: *Lactobacillus plantarum* PC-4 could be used as potential bacteriostatic probiotic.

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149 | Screening for protential new probiotic based on probiotic proper ties and cholesterol degradation activity from Douchi

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Objective: Douchi is a seasoning for fermented bean products with Chinese characteristics. Douchi takes black soybean or soybean as the main raw material, and decomposes soybean protein by the action of mucor, Aspergillus, or cytoprotease.[1] Douchi is also a traditional Chinese medicine, cold cold, afraid of cold and fever, cold, and hot headache, sneezing nasal congestion, abdominal pain and diarrhea are suitable for food. There are many studies on the chemical constituents of Douchi, but there are few reports on the lactic acid bacteria. The main purpose of this paper is to explore lactic acid bacteria with cholesterol-lowering effect from Douchi. The aim of the present study was to investigate cholesterol-lowering lactic acid bacteria from Douchi.
Method: This test method with colorimetric determination of Lactobacillus plantarum for artificial gastric acid, 3% bile salt and other environmental tolerance as a measure of survival ability in vivo.[2] For the determination of in vitro probiotic effect, the cholesterol degradation ability of lactic acid bacteria was determined by o-phthalaldehyde method,[3] the inhibitory effect of *Lactobacillus plantarum* was determined by Oxford cup method, and the antibiotic sensitivity of *L. plantarum* was determined by test paper method.[4]
Reslut: Four *L. plantarum* strains were evaluated for their cholesterol-lowing and probiotic profiles by in vitro assays. The results indicated that some strains have high cholesterol removal ability and bile salt hydrolase activity. None of these strains showed undesirable hemolytic activity, while proving susceptible resistant to some clinically relevant antibiotics. Among the isolates, *L. plantarum* DC2 displayed above 40% cholesterol removal rate, *L. plantarum* DC4 and DC2 exhibited better survival rate in simulated gastrointestinal fluids. Over all, *L. plantarum* DC2 indicated the best survival rate in simulated gastrointestinal fluids and highest cholesterol-reducing rate (45.3%).
Conclusion: *L. plantarum* DC2 could be used as potential hypolipidemic probiotic.
Acknowledgement: This work was supported by the 2022 year University Entrepreneurship Training Program Project of Jiangxi Science and Technology Normal University (No. 202211318008) and the 2021 year University Entrepreneurship Training Program Project of Jiangxi Science and Technology Normal University (No. 20211504115).
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150 | Isolation, identification, and biological characteristics analysis of lactic acid bacteria from fermented bean

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Objective: Different lactic acid bacteria exist in different pickles. Some lactic acid bacteria of pickles have significant effects of lowering blood fat and uric acid.[1] It is expected to become a new raw material for health care products such as lowering blood fat and uric acid.[2] Based on the characteristics of economy, safety and taste, as well as the advantages of lowering blood fat and uric acid, the extraction of fine lactobacillus with health care function from pickles has attracted extensive attention. Studies have shown that lactic acid bacteria in pickles can reduce blood fat and cholesterol, degrade heavy metals and inhibit microorganisms.[3] However, the role of lactic acid bacteria in sour bean, one of the pickles, has not been reported. Therefore, the purpose of this study is to explore the biological characteristics and health care effects of lactic acid bacteria in homemade sour beans.
Methods: The strains were obtained and preserved by means of plate line method and glycerol tube storage method. Lactic acid bacteria were identified by bacterial colony morphology observation, cell morphology observation under microscope, gram staining, and 16SrDNA molecular identification. Through the growth curve, acid and alkali tolerance, salt tolerance, acid production capacity, drug resistance, and other biological characteristics screening lactic acid bacteria.
Results: Results show that five strains (FB1-5) isolated in high acid producing strains were identified as lactobacillus, among them, 9%, 12%, under the salt concentration of stress in the growth of five strains were hardly changes, under the stress of 6% of the salt concentration, the

strain growth for 12 h before the change is slow, 12 h after the fastest growth quickly and FB5 strain of growth change. Finally, FB5 strain had the highest biomass. At pH 4.7, the growth of strains was not affected and the final biomass of FB4 strain was the highest. Under the condition of pH 8.7, the biomass of these strains did not change, and the final biomass of FB3 strain was the highest.

Conclusion: Among these strains, FB4 strain has the strongest stress resistance, FB5 strain has the strongest acid resistance, and FB3 strain has the strongest alkali resistance. In the process of sour bean fermentation, the number of lactic acid bacteria showed an increasing trend, and pH gradually decreased, while FB4 strain had the lowest pH of fermentation broth.All these strains may be potential probiotics.

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151 | Fragrance creation with some sedative aroma materials

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Objectives: Many essential oils, as the main ingredients for compounding fragrances, have been widely used in the treatment of numerous mental disorders and improvement of physical health. However, the overall odors of these current fragrances are rough. They generally present the smell of medicinal herbs. This kind of odor is monotonous and the odor quality is low. It is not suitable for the applications in large public spaces. There is an urgent need to develop high-quality fragrances with elegant aroma and sedative effects. The fragrance can be used in personal homes or public spaces. While people enjoy the aroma during work or rest, they also have certain healing effects. The development of this high-quality fragrance has an important practical significance.

Methods: Some aroma ingredients with sedative effect were selected to make people feel peaceful and happy. Based on the aroma synergistic mechanism, the raw materials with fruity and floral notes were selected to provide the main odor characteristics of the fragrance. The fragrance was blended and then evaluated by smell with smelling strips. After numerous modification and adjustment based on evaluation, a desired fragrance was obtained.

Results: The obtained fragrance was made up of floral note (40.37%), fruity note (31.05%), animal note (7.48%), woody note (6.97%), beany note (6.15%), herbal note (3.48%), green note (3.18%), and fresh air note (1.33%). The floral note was a combination of lavender, daffodil, orange blossom, chrysanthemum, rose, gardenia, jasmine, violet, and lily of the valley. The fruity note was mainly a combination of lemon and apple fruit aroma, and also contains a small amount of coconut, peach, pineapple and almond nut aroma. Sandalwood imparted the woody note in the formula. Animal note is mainly composed of ambergris and musk. Valerian oil, iso-amyl salicylate, and borneol salicylate were used to provide herbal note. Floralozone and watermelon ketone were used to impart fresh air note.

Conclusions: The fragrance with some sedative aroma materials was successfully prepared. The odor of the fragrance blended is delicate, harmonious, soft, and fresh.

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152 | Highly efficient separation of caffeine in coffee samples by column tandem technology

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Objectives: Caffeine is a polar compound and it is difficult to be separated with other polar components in real samples. High performance liquid chromatography (HPLC) method by using column tandem technology was employed to separate caffeine in coffee samples.

Methods: Neither the C18 column nor the hydrophilic interaction liquid chromatography (HILIC) column could effective separate caffeine from coffee samples. The HPLC method of column tandem strategy by using the C18 column coupled with the HILIC column for caffeine separation was proposed.

Results: Caffeine could be well separated with the solvent peaks and other components by the column tandem HPLC method. Under the optimal conditions, caffeine in the four types of coffee samples could be separated and detected. The content of caffeine was 10.36–29.46 mg/L. The RSD was below 2.90%.

Conclusions: The proposed method can be used for caffeine analysis in coffee samples. The developed column tandem strategy will provide a new way for the accurate separation and analysis of trace analytes in complex samples.

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153 | Separation investigation of vitamin B_3 on three different columns and tandem columns

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Objectives: Vitamins are important substances to maintain the normal function of biological organisms. Vitamin B_3, also called niacin, is a water-soluble vitamin. If the body is severely deficient in vitamin B_3, it will affect the skin, gastrointestinal and nervous system functions. To establish an effective separation method for vitamin B_3 is important.
Methods: Three single liquid chromatographic columns, such as the C18 column, the hydrophilic interaction liquid chromatography (HILIC) column, and the cyano column, were used for the separation of vitamin B_3. Three tandem column modes, such as the C18 column coupled with the HILIC column, the C18 column coupled with the cyano column, and the cyano column coupled with the HILIC column, were also used for the separation of vitamin B_3.
Results: Vitamin B_3 could not be well separated by each single column and the C18 column coupled with the cyano column. The best separation effect could be obtained under the mode of the C18 column coupled with the HILIC column.
Conclusions: The proposed column tandem method was suitable for the separation of polar compound of vitamin B_3. The method could be successfully used for vitamin B_3 analysis in three fruit samples.
Acknowledgements: This work was supported by College Students Science and Technology Innovation Project of Kunming University of Science and Technology (Grand No. 202010674079).

154 | Anthocyanin biosynthesis and its negative regulation by R2R3 MYB transcription factor AaMYB1 in *Actinidia Arguta*

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Xueying Wang, Bei Niu, and Jihai Gao contributed equally to the work.

Objectives: Anthocyanins as a branch of flavonoid metabolites, have the biological functions of antioxidation and free radical scavenging, also potentially benefit human health such as protection against cancer, inflammation, coronary heart diseases and other age-related diseases. They are also involved in a wide range of functions in plant life, such as attraction of pollinators, protection against UV light damage and pathogen. Anthocyanins are water-soluble pigments that belong to the flavonoid family of compounds giving red, blue and purple colors in plant tissues. The fruit of kiwifruit (*Actinidia arguta* var. purpurea) is oval shaped, has a smooth skin, a slight green or mauve outer pericarp and a purple -flesh inner pericarp with rows of tiny, black, edible seeds. This fruit accumulate a range of anthocyanin compounds.
Methods: A transcriptome analysis was designed to screen transcription factors for Anthocyanin biosynthesis. Sequence alignment, phylogenetic analysis and quantitative RT-PCR assay were used to study AaMYB1 gene. Yeast two-hybrid, transient expression assay and overexpression of AaMYB1 in transgenic systems, were used to identify the function of AaMYB1.
Results: A key factor named AaMYB1 appears to be an R2R3 MYB transcription factor found, involved in regulation of the anthocyanin biosynthetic pathway from *A. arguta*. During *A. arguta* fruit development, the transcription of AaMYB1 is negatively correlated with the anthocyanin content, suggesting that the AaMYB1 gene is responsible for the repressed anthocyanin biosynthesis. AaMYB1 can interact with several bHLH regulators of the flavonoid pathway and inhibit the promoters of dihydroflavonol 4-reductase and anthocyanidin synthase. Overexpression of AaMYB1 inhibited anthocyanin accumulation in reproductive tissues via down-regulation of the main anthocyanin-related genes.
Conclusions: The functional characterization of AaMYB1 could negatively regulate the anthocyanin biosynthesis, and promote further studies.
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155 | Study on the influence of environmental conditions and population diversity on the decomposition rate of fungal community

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Objectives: Fungi are the primary decomposers in ecosystems, yet the relationship between fungal decomposition rate and its influential factors, including environmental conditions and diversity of fungi, has not

been quantitatively analyzed. To solve the problem, the decomposition rate model and system decomposition rate model were established according to the open-source data.

Methods: In the decomposition rate model, through multiple regression analysis of the data, the fungal decomposition rate displays an exponential relationship to the moisture tolerance and a linear relationship to the growth rate. While the growth rate has a power function related to the environmental temperature and humidity, respectively. In the system decomposition rate model, Lotka-Volterra interspecific competition model is adopted first to calculate the population size of different fungi. Then, the system decomposition rate is the accumulation of the product of the population size of different fungi and the corresponding decomposition rate.

Results: We divided the experiment into two groups, group A contains 37 species of fungi, while group B contains 10 species of fungi. Under the mild environmental condition (28°C, −.50MPa), when the fungal population size of the interspecific competition model is stable, the system decomposition rate of group A is 1932.4, while that of group B is 1698.6 (the unit of decomposition rate is mass loss over 122 days). This means the system decomposition rate of group A is 13.76% higher than that of group B. At this time, we change the environmental condition to a harsh one (10°C, −5MPa). Instantaneously, the system decomposition rate of group A dropped to 853.66, a decrease of 55.82%, while the system decomposition rate of group B dropped to 635.45, a decrease of 62.59%. This means the system decomposition rate of group A is 34.34% higher than that of group B. Then after 4 units of time, the system decomposition rate of group A gradually recovered to 1341.5, while that of group B was only 677.7. This means the system decomposition rate of group A is 97.95% higher than that of group B.

Conclusions: The results show that both environmental conditions and fugal diversity have a great effect on the system decomposition rate. And the abrupt change in environmental conditions will change the system decomposition rate clearly. In addition, the fungal diversity not only increases the system decomposition rate but also is meaningful to the robustness of the system. The system with more various fungus will recover faster when it experienced a decrease in decomposition rate caused by environmental condition change.

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156 | Effects of different forms and concentrations of selenium on fruiting body products and quality of *Cordyceps Militaris*

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Objectives: *Cordyceps Militaris* is a dual-purpose fungus for food and medicine. Its protein content is as high as 40.7%. The amino acids necessary for human body are not only complete, sufficient in quantity, but also appropriate in proportion. *C. Militaris* is rich in cordycepin, cordycepin, and ergosterol, which can expand trachea, calm, resist all kinds of bacteria and reduce blood pressure.

Methods: The effects of different selenium forms and concentrations on the growth and yield of *C. Militaris* fruiting body and the contents of adenosine and cordycepin were studied.

Results: (1) With the increase of selenium concentration, the yield, adenosine and cordycepin of *C. Militaris* fruiting body increased first and then decreased; (2) when Na_2SO_3 is used, compared with the CK, the dry weight of *C. Militaris* fruiting body increased by 23.15%, the content of adenosine increased by 35.23%, the content of cordycepin increased by 45.23%, and the content of Selenium increased by 2913.75%; when the concentration of selenium exceeded 60 mg/L, compared with the control, the mycelial growth and dry weight of Cordyceps Militaris were inhibited, the dry weight of fruiting body and adenosine increased by 35.23%, and the content of cordycepin decreased significantly; (3) when Na_2SO_4 is used, compared with the control, the dry weight of *C. Militaris* fruiting body increased by 6.15%, the content of adenosine increased by 17.93%, the content of cordycepin increased by 23.27%, and the content of selenium increased by 1239.71%; When the concentration of selenium exceeded 40 mg/L, the mycelial growth and dry weight of *C. Militaris* were inhibited and showed a significant downward trend.

Conclusions: Na_2SO_3 is the preferred exogenous selenium for selenium enriched *C. Militaris*. When its concentration is 30 mg/L, the effect of selenium enrichment is the best, and the yield and quality of *C. Militaris* are the best. This conclusion can provide theoretical basis and technical guidance for the production of selenium enriched *C. Militaris*.

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157 | Study on the harm of pesticide emulsifier residues to health and environment and its detection methods

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Objective: In recent years, poisoning cases of fruits and vegetables with pesticide residues have occurred frequently. Because the active components of pesticide emulsifiers are mostly small molecular organic compounds, gas chromatography (GC), liquid chromatography (HPLC), gas chromatography-mass spectrometry (GC-MS) and liquid chromatography-mass spectrometry (HPLC-MS) are often used. However, these methods often need to be sent to special laboratories for

detection. How to detect pesticide emulsifier residues quickly and in real time has become a research focus. In this study, an optical fiber immunosensor was used to detect sulfur and phosphorus residues in samples.

Methods: Firstly, the harm and causes of pesticide residues were studied, and the biosensor recognition method was established. The sample to be detected enters the molecular recognition element through diffusion, and after molecular recognition, it is specifically combined with the molecular recognition element to produce biochemical reaction. The generated biological information is transformed into optical or electrical signals that can be quantitatively processed through the signal converter, and then amplified and output by the instrument to achieve the purpose of analysis and detection. At the same time, SnO2 nanoparticles/perovskite heterostructure photodetector is used in the experiment to improve the service time and efficiency of the equipment.

Results: The research shows that the pesticide emulsifier residues are the most harmful and may cause cancer. The pesticide residues often contain methamidophos, parathion, benzene chloride and other harmful substances, which can promote the carcinogenesis of cells in various tissues of the whole body. The detection limit of SnO2 nanoparticles/perovskite heterostructure photodetector optical fiber immunosensor used in this study is .216 μg/L. It can effectively detect sulfur and phosphorus in pesticide residues.

Conclusion: Biosensor method is a research hotspot in the rapid determination of pesticide residues. It has good results compared with traditional methods in the aspects of diversification of determination methods, improvement of measurement sensitivity, shortening response time, improvement of instrument automation and adaptability to on-site detection.

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158 | Effect of dietary intervention combined with continuous subcutaneous insulin infusion on blood glucose level and pregnancy outcomes in patients

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Objective: To explore the effect of dietary intervention combined with continuous subcutaneous insulin infusion on the blood glucose level and pregnancy outcomes in patients with gestational diabetes mellitus (GDM).

Methods: A total of 60 GDM patients admitted to our hospital from February 2018 to August 2020 were selected, and divided into experimental group and control group according to the order of admission. The control group received continuous subcutaneous insulin infusion, while the experimental group additionally received dietary intervention to observe and analyze the changes of blood glucose level and pregnancy outcomes in the two groups.

Results: The blood glucose level during pregnancy in the experimental group was significantly lower than that in the control group ($p < .05$). The delivery results of pregnant women in the experimental group were better than those in the control group ($p < .05$). The incidence of neonatal complications in the experimental group was lower than that in the control group ($p < .05$).

Conclusion: Dietary intervention combined with continuous subcutaneous insulin infusion for GDM patients can control the blood glucose level of pregnant women, and reduce the probability of complications of pregnant women and infants, which is worthy of clinical promotion.

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159 | Application of enema intervention combined with intensive diet nursing in patients with chronic gastric ulcer and its influence on gastrointestinal function

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Objective: To explore the application of enema intervention combined with diet nursing in patients with chronic gastric ulcer and its influence on gastrointestinal function.

Methods: A total of 126 patients with chronic gastric ulcer from January 2019 to December 2020 were selected as the subjects and randomly divided into two groups. The control group was treated with enema intervention, and the observation group was combined with diet nursing on the basis of the control group. After 4 weeks of intervention, the self-management level, gastrointestinal function, compliance and satisfaction of the two groups were compared.

Results: The self-management level of the two groups was improved after 4 weeks of nursing, and the scores on diet management, disease management, self-efficacy, health beliefs and exercise management were dramatically higher than those in the control group. The levels of serum motilin and gastrin in both groups after nursing were lower than those before nursing, and that in the observation group were enormously lower than those in the control group. After 4 weeks of nursing, the observation group's compliance with enema, compliance with diet, regular review of compliance, intervention methods, doctor-patient communication, operation satisfaction were tremendously higher than the control group.

Conclusion: Enema intervention combined with diet nursing provides an effective approach to the therapy of patients with chronic gastric ulcer.

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160 | A comparative study of Chinese and Korean massage based on literature survey

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Objective: To compare the characteristics of Chinese and Korean massage.

Methods: Taking "massage" as the key word, we searched in CNKI, Wanfang, and VIP database, respectively, collected literature, summarized, and analyzed Chinese and Korean massage.

Results: According to documents, Chinese massage originated in Luoyang, Henan Province. The Yellow Emperor's Internal Classic expounds the origin, manipulation, clinical application, indications and treatment principle of massage. Massage therapy was also introduced into South Korea in the Sui and Tang Dynasties. In 1613, the Dongyi Bogam (Precious Mirror of Oriental Medicine) introduced the names of stilts, guidance, massage, and so on. However, due to the reasons of traditional conservative ideas in South Korea at that time, the massage therapy failed to get further development there. There are eight commonly used manipulations of Traditional Chinese massage: pressing, rubbing, pushing, holding, kneading, trembling, and beating. Usually, several manipulations are used together. Korean massage is mainly massage, supplemented by lifting and pulling, with a gentle force on the human body. Generally, in Traditional Chinese Massage, the strength of the arm and body are used. The manipulations are required to be powerful, uniform, soft, deep, and lasting. However, Korean massage techniques are relatively soft. Massage Ointment (oil) and hot compress are widely used in Korean massage. Massage is usually accompanied by gentle language to relax, which is widely used in the beauty industry. The treatment time of Chinese massage is about 10–30min, while Korean massage for more than 60 min. Chinese massage is generally carried out on the massage bed, while the Korean massage is generally carried out on cushions.

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161 | Evaluation of clinical mental health active intervention system in the improvement of mixed learning methods in Cyberspace

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Objective: To study the effect of mental health active intervention system on the improvement of College Students' mixed learning methods in cyberspace.

Methods: A total of 130 students in the experimental group and 130 in the control group were selected from the college students of Dongguan vocational and technical college. The experimental group used the above comprehensive psychological intervention model for one year, while the control group was a blank control. The life events scale, overall well-being scale (GWB), self-harmony scale (SCCs), Eysenck Personality Questionnaire (EPQ) and symptom checklist 90 (SCL-90) were used, Social avoidance and distress scale (SAD) was used as an

evaluation tool. The two groups were tested before and after the experiment.

Results: after the active intervention of mental health, the P (psychoticism) score of the experimental group (46.4 ± 9.5) ($p \leq .05$) was lower than that of the control group (50.2 ± 9.1) ($p \leq .05$), the flexibility score (48.1 ± 6.3) ($p \leq .05$) was higher than that of the control group (41.3 ± 7.8) ($p \leq .05$), the E (extraversion) score of the experimental group increased, the total score of SCL-90 and the scores of obsession, depression, interpersonal sensitivity, anxiety, and psychosis decreased, ($p \leq .05$) the academic performance of the control group was significantly improved before and after the experimental group ($p \leq .05$), while the academic performance of the control group had no significant change ($p \geq .05$).

Conclusion: The mental health active intervention system can help college students adjust their psychological balance, promote the improvement of mixed learning methods in cyberspace, and improve their learning effect.

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162 | Prevention of Voice Diseases in Vocal Music Majors

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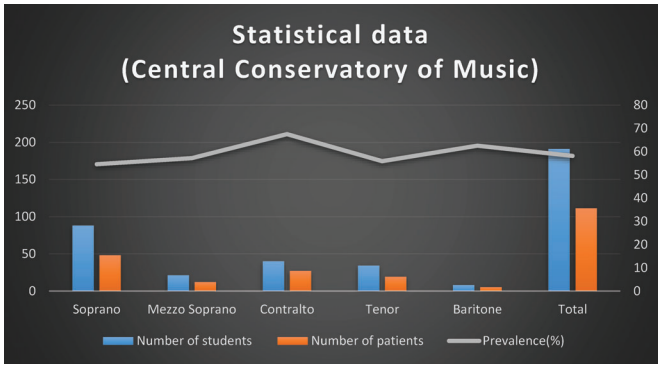
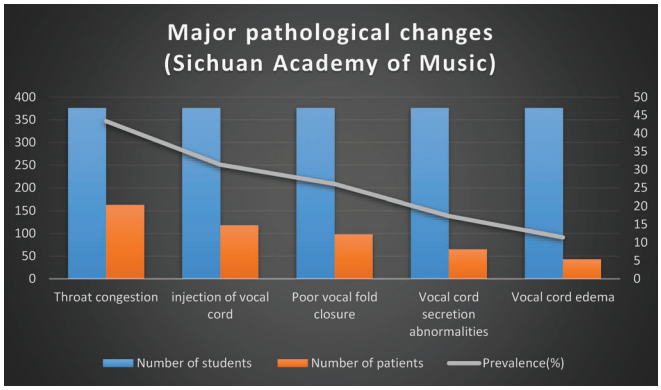
Objective: College students in the vocal music major are heavy voice users, and they are a group with a high incidence of voice diseases. Before 2000, in the era of elite education in higher education in China, Central Conservatory of Music had counted cases of students suffering from voice diseases in the vocal department of the school during 15 consecutive years, and conducted analysis and judgment. In the past 15 years, the school has trained 191 students majoring in vocal music. Among them, 111 people have different degrees of voice diseases, accounting for more than 58%, and the number of times patients has reached 208. The prevalence of students with different voice parts is roughly the same, almost all about 60%. It is shown below:



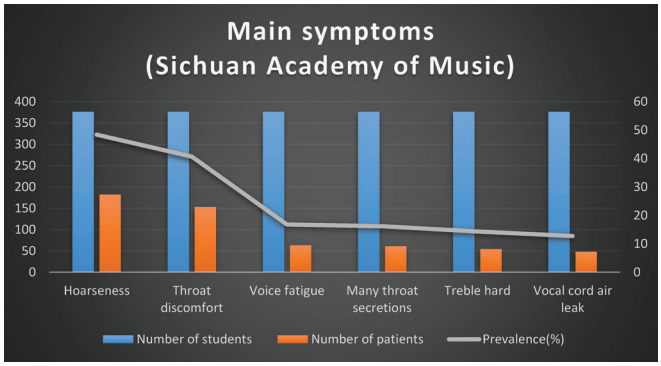
In terms of symptoms, it occurs mainly in vocal cord edema, subglottic laryngitis, unilateral vocal cord inflammation, vocal cord submucosal hemorrhage, secondary infectious laryngitis, etc. Borderline vocal cord inflammation, vocal cord vasodilatation, excessive ventricular band exercise, limited vocal cord hypertrophy, vocal cord nodules, vocal cord polyps, etc. remain relatively rare. Among them, the acute traumatic tissue reaction of the vocal cords or larynx caused by excessive singing and vocal movement accounted for more than 50%, and the main manifestations were congestion and edema. In addition, subglottic laryngitis and vocal cord inflammation accounted for about 20%.

In the era of popularization of higher education in China after 2000, Sichuan Conservatory of Music has also counted the occurrence of 376 cases of voice disorders in the school's students who majored in vocal music for 5 consecutive academic years. There are 5 types of common main symptoms, including 163 cases of Throat Congestion, accounting for 43%, and Injection of Vocal Cord in 118 cases, accounting for 31%. Poor Vocal Fold Closure caused by different reasons, accounting for 26%, Vocal Cord Secretion Abnormalities totaled 65 cases, accounting for 17%, and Vocal Cord Edema reached 43 cases, accounting for 11%. They are shown in the figure:

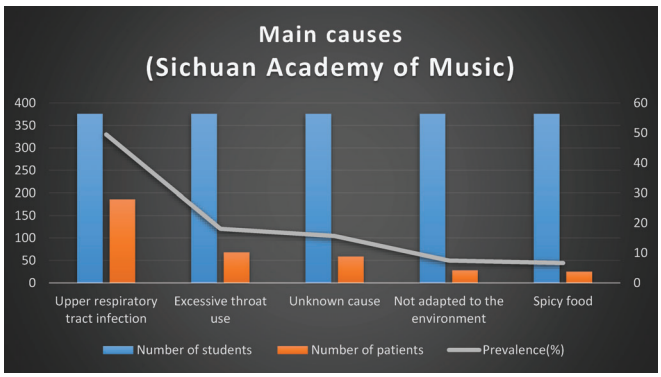


From the data above, it can be seen that more than half of the students whose main major is vocal music will have various degrees of voice disease. According to statistics, there are 182 cases of Hoarseness, accounting for 48%, 153 cases of Throat discomfort, accounting for 40%, and 63 cases of Voice Fatigue, accounting for 16%. There were 61 cases of Many Throat Secretions, accounting for 16%, 54 cases of

Treble Hard, accounting for 14%, and 48 cases of Vocal Cord Air Leak, accounting for 12 %. The figure is shown below:



By making investigation and judgment of various aspects such as disease conditions and patient self-reports, we found that the causes are mainly concentrated in the following aspects. Among them, there are 186 cases of Secondary Voice Disorders caused by singing after upper respiratory tract infection, accounting for 49%, 68 cases of Excessive Throat Use, accounting for 18%, and 59 cases of Unknown Cause, accounting for 15%, 28 cases of Not Adapted to the Environment, accounting for 7%, and 25 cases of Spicy Food, accounting for 6%. They are shown as follows:



Through the analysis and research of the above-mentioned cases, we can try to explore the regularity of the occurrence of voice disorders in vocal music majors and the corresponding prevention and treatment measures. We believe that the key to preventing voice disorders is to avoid excessive exercise in singing and vocalization, and to avoid errors and loss of control in vocalization methods and techniques, so that we can reduce various acute traumatic tissue reactions and avoid the occurrence of voice disorders.

Methods & Results: Using the voice less without exceeding the limit is the basis for prevention. At the same time, we must pay attention to the rules of singing training, and not to break it. If still suffering from the accident, you should nip it in the bud. If possible, as long as there is a patient, whether it is serious or not, you should seek help from a professional doctor, and make a diagnosis through various means.

The treatment and recovery of common voice diseases generally use antibiotics, glucocorticoids and other drugs. The principle of using drugs is short-term and sufficient amounts as well as paying attention to the degree of goodness, to avoid abuse and side effects.

Accordingly, the correct method is, in a sense, a good protection of the voice. Even patients with mild or early voice diseases can recover by finding the correct way to vocalize under the guidance of professional teachers and doctors. It has also been clinically found that moderate and appropriate voice trainings can promote the metabolic absorption of the disease and the recovery of vocal function when patients suffer from voice disorders. Of course, this needs to be checked by medical staff and singing instructors.

Thus it can be seen that the correct method of vocalization is the key to the prevention and treatment of voice disorders. In the singing movement, if the respiratory system, vocal system and resonance system cannot form an organic synergy, there will be constraints on each other, which increases the probability of voice disorders. And the correct way is to let the laryngeal muscles and respiratory muscles, the vocal organs and the respiratory organs form a coordinated cooperation under the control of the advanced nerve center. This requires students to explore and experience through long-term practice with the help of teachers.

Finally, we must pay attention to a problem. Since the human body is a whole, its health is also systemic. The prevention of diseases firstly depends on the overall health of the body, which is also a prerequisite for a healthy voice. Therefore, it's helpful to avoid disease by regular exercise, a good life pattern, balanced nutrition, dietary hygiene, less spicy foods, less irritation to throat, etc. Nearly 50% of the voice diseases in the aforementioned cases are caused by upper respiratory tract infections after a cold, which is a clear proof.

Conclusion: Voice disease is a common phenomenon for vocal students, but it is an unbearable burden for them. In order to prevent diseases as much as possible, they need to learn health care knowledge, strengthen prevention awareness, avoid excessive singing exercises and voice abuse, and especially strive to master the correct voice method under the guidance and help of teachers. Once vocal students acquire the correct method, they can put their vocal physiology and psychological state on a relatively benign track during the learning process, which can not only improve their singing level step by step, but also avoid the occurrence of voice disorders as much as possible.

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163 | Application effect of targeted nursing model in operating room nursing of patients with gestational diabetes mellitus and its influence on patients' negative emotions and nursing satisfaction

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Objective: To explore the application effect of targeted nursing model in operating room nursing of patients with gestational diabetes mellitus (GDM) and analyze its influence on patients' negative emotions and nursing satisfaction.

Methods: The clinical data of 70 GDM patients admitted to our hospital from December 2019 to 2020 were retrospectively analyzed. They were randomly divided into the control group (routine nursing) and the experimental group (targeted nursing), with 35 cases in each group. The relevant clinical medical indicators of the two groups were compared and analyzed.

Results: Compared with the control group, the experimental group achieved better results in both fasting and 2 h postprandial blood glucose levels, lower SAS and SDS scores, and higher overall satisfaction with nursing, with statistically significant differences between the groups.

Conclusion: Implementing targeted nursing model in the operating room nursing for GDM patients has better effect. It can effectively control the glycemic index, and provide important protection for the pregnancy outcome; also, it is beneficial to reduce patients' negative emotions, so that they can maintain physical and mental pleasures during pregnancy; compared with the conventional model, targeted nursing can better satisfy the patient's practical needs, achieving better recognition and higher clinical application value.

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164 | Clinical efficacy of functional rehabilitation training combined with acupuncture and moxibustion therapy in treating early-mid knee osteoarthritis and its effect on patients' knee function and quality of life

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Jiangen He and Weijiao Fan equally contributed to this work.

Objective: To explore the clinical efficacy of functional rehabilitation training combined with acupuncture and moxibustion therapy in treating early-mid knee osteoarthritis (OA) and its effect on patients' knee function and quality of life.

Methods: Ninety patients with early-mid knee OA admitted to our hospital from April 2018 to 2020 were selected as the research object. Conventional treatment was performed to the control group, and functional rehabilitation training combined with acupuncture and moxibustion therapy was conducted to the experimental group, so as to compare their treatment effect, satisfaction with diagnosis and treatment, mental state, severity of pain, knee function and quality of life.

Results: Compared with the control group, the experimental group presented significantly higher satisfaction, better treatment effect, higher GQOLI-74 scores, lower HAD scores, lower VAS scores after intervention, and lower WOMAC scores (p all $< .05$).

Conclusion. Combining functional rehabilitation training with acupuncture and moxibustion therapy in treating early-mid knee OA shows significant treatment effect and is able to improve the knee function, promote the quality of life and alleviate the adverse emotions of patients, which increases the satisfaction with diagnosis and treatment and is worthy of application and promotion.

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165 | Research on the method of constructing continuous nursing service standards for the disabled elderly at home and its impact on patients' quality of Life

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Yanyan Zhou and Hongqing Luo equally contributed to this work.

Objective: To explore the method of constructing the standard of continuous nursing service for the disabled elderly at home and its impact on the quality of life of patients.

Methods: A total of 102 cases of disabled elderly at home were selected as subjects. The control group adopts conventional nursing intervention, and the observation group introduces the demand-oriented concept on the basis of the control group. After 3 months of nursing, the effects in the two groups were compared.

Results: The incidence of adverse events in observation group was lower than control group. The awareness rate, quality of life, and satisfaction in observation group were higher than control group.

Conclusions: Establishing continuous care service standards based on the service needs of the elderly can improve the quality of life and satisfaction of patients and reduce the incidence of adverse events.

Acknowledgements: This study was supported by Chongqing Joint Medical Scientific Research Project of Science and Health (No. 2021MSXM243).

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166 | The nursing effect of leading health education path in neurosurgery patients with dysphagia and its influence on swallowing function

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Objectives: This study aims to explore the nursing effect of leading health education pathway in neurosurgery patients with dysphagia and its influence on swallowing function.

Methods: A total of 88 patients with dysphagia were divided into two groups by random number table ($n = 44$). The control group was given routine nursing care. Leading health education pathway nursing was given in observation group on the basis of control group. After 4 weeks of intervention, the curative effect was evaluated. And the nutritional status, daily living ability, frog field drinking test score, Swallow X-ray video fluoroscopy (VFSS) score, swallowing function classification, awareness rate, and compliance were compared between the two groups.

Results: The nutritional status and activities of daily living in the two groups after nursing were higher than those before nursing. After 4 weeks nursing, the levels of ALB, PA, Hb, and MBI in the observation group were increased. The swallowing function of the two groups was significantly improved after 4 weeks nursing. The frog field drinking test and VFSS scores of the observation group were also increased. The nutrition intake, awareness rate of pathogenesis and disease hazards, compliance with diet, regular review, and timely feedback in observation group were higher than those of the control group.

Conclusions: The leading health education path used in neurosurgical patients with dysphagia can help improve the nutritional status and swallowing function of the patients.

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167 | The effect of nursing intervention on the life quality of patients with nasopharyngeal carcinoma undergoing radiotherapy

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Fengyun Bai and Yufen Niu contributed equally to the work.

Objectives: To explore the impact of nursing intervention on the life quality of nasopharyngeal carcinoma (NPC) patients undergoing radiotherapy.

Methods: The control group ($n = 45$) used routine nursing intervention. The observation group ($n = 45$) provided preventive nursing intervention on the basis of routine nursing. The satisfaction of nursing intervention, the difference in the life quality of patients before and after nursing, and the incidence of complications of radiotherapy for NPC were compared between the two groups.

Results: The nursing intervention satisfaction in observation group (93.33%) was significantly higher than that of the control group (82.22%). Before nursing, there was no significant difference in the life quality between the two groups. After nursing, the life quality of observation group was significantly higher than that of the control group. Compared with the control group, the incidence of radiation dermatitis, nausea and vomiting, and oropharyngeal mucosal reactions in observation group was significantly decreased.

Conclusions: Nursing intervention can effectively prevent the occurrence of common complications of radiotherapy in NPC patients and improve patients' satisfaction and life quality.

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168 | Application of home-based nursing intervention in patients with bladder tumor after total cystectomy with orthotopic ileal neovascularization

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Objective: Explore the application effect of home-based nursing intervention in patients with bladder tumor after total cystectomy with orthotopic ileal new bladder.

Methods: A total of 136 patients divided into two groups averagely. The control group (CG) received routine nursing, the observation group (OG) received home-based nursing intervention.

Results: Urodynamic were improved after 3 months of nursing. The Qave and Qmax levels of OG were higher than CG. Renal sinus separation and bladder residual urine volume were lower than CG. The physiological function and emotional function of the OG were higher than CG. Nursing effect, nurse-patient communication and service attitude satisfaction in OG were higher than CG. During the nursing period, the incidence of choking and choking, scald and falling from bed was lower.

Conclusion: Home-based nursing intervention in patients with bladder tumor undergoing total cystectomy with orthotopic ileal new bladder can improve the patients' urodynamic indicators, which is worthy of popularization and application.

Acknowledgements: This work was supported by Science and Technology and Development Guidance Program of Tangshan, Hebei and Technology Project "Family-based nursing intervention in patients with bladder tumors after total cystectomy in situ ileal neobladder" (No. 09130220a).

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169 | Clinical effect observation of rehabilitation exercise and supportive care in patients undergoing radical mastectomy of breast cancer

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Objective: To explore the clinical nursing effect of supportive care and rehabilitation exercise in patients with breast cancer undergoing radical mastectomy.

Methods: A total of 564 patients who underwent breast cancer surgery from 2015 to 2019 were enrolled in this study. All of them were randomly divided into two groups. Patients in control group received conventional traditional nursing care, and patients in observation group received rehabilitation exercise and supportive psychological care. The simplified supportive care needs scale was used to evaluate the supportive care needs of patients before and after care, and OQL before and after care was evaluated by the quality of life survey scale.

Results: After supportive care and rehabilitative exercise, the satisfaction of supportive care in the observation group was higher than that in the control group, and the score of quality of life was significantly higher in the observation group than that of the control. In addition, incidence of lymphedema was significantly reduced after rehabilitation exercise.

Conclusion: Supportive care together with rehabilitation exercise can promote the early functional recovery and psychological reconstruction of patients with breast cancer after operation, which means this option contributes to promote rehabilitation and improve quality of nursing.

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170 | Effects of pediatric detail care on the efficacy, pulmonary function and inflammatory factors of pediatric bronchopneumonia

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Objective: The aim of current study was to investigate the effects of pediatric detail care on the efficacy, pulmonary function and inflammatory factors of pediatric bronchopneumonia.

Methods: Sixty patients with pediatric bronchopneumonia admitted to our hospital from January 2019 to June 2020 were selected and divided into a control group ($n = 30$, with conventional care) and an observation group ($n = 30$, with pediatric detail care on the basis of conventional care). The efficiency, clinical indicators of the children (recovery time of temperature, symptom-free time, hospitalization time), lung function indicators, inflammatory factor levels, and family satisfaction with the care were compared between the two groups after nursing.

Results: After care, the treatment efficiency in observation group was higher than control group; the temperature recovery time and hospitalization time in the control group were longer than the observation group; the PEF, TPTEF/TE, and VPEF/VE of the children in the observation group was higher than the control group. The disappearance time of cough, fever and lung rales in the observation group was earlier than the control group. The levels of CRP, IL-6, and TNF-α in the observation group were lower than control group. The satisfaction of the families in the observation group was higher than control group.

Conclusion: The detailed care in pediatric bronchopneumonia could significantly improve the efficacy, improve the lung function of children and promote recovery.

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171 | Application effect of whole-course high-quality nursing in operating room nursing and its influence on postoperative complications

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Objective: To explore the application effect of whole-course high-quality nursing in operating room nursing and its influence on postoperative complications.

Methods: The data of 100 patients requiring surgical treatment in our hospital from February 2020 to 2021 were retrospectively analyzed. They were randomly divided into high-quality nursing group and control group, with 50 patients in each group. The control group received routine operating room nursing, while the high-quality group received whole-course high-quality nursing to compare the surgical indexes, stress indexes, nursing satisfaction and incidence of postoperative complications between the two groups.

Results: Compared with the control group, the high-quality nursing group achieved significantly better surgical indexes ($p < .001$), better stress indexes ($p < .001$), better nursing satisfaction ($p < .05$), and a lower incidence of postoperative complications ($p < .05$).

Conclusion: The whole-course high-quality nursing can improve the surgical condition of patients, reduce their stress response to surgical stimulation, lower the incidence of postoperative complications, and improve nursing satisfaction, which should be popularized and applied in practice.

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172 | Effect of deepening detail nursing combined with psychological nursing intervention on negative emotions and quality of life in patients with nephrotic syndrome complicated with coats disease-like retinal vasculopathy

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Objective: To explore the effect of deepening detail nursing combined with psychological nursing intervention on negative emotions and quality of life in patients with nephrotic syndrome complicated with Coats disease-like retinal vasculopathy.

Methods: The data of 120 patients with nephrotic syndrome complicated with Coats disease-like retinal vasculopathy treated in our hospital from January 2020 to 2021 were retrospectively analyzed. They were divided into experimental group and control group according to the order of admission, with 60 patients in each group. Both groups received psychological nursing, while the experimental group additionally received deepening detail nursing to compare the negative emotion score, quality of life score and nursing satisfaction between the two groups.

Results: Compared with the control group, the experimental group achieved a significantly lower negative emotion score ($p < .001$), a better quality of life score ($p < .001$), and higher nursing satisfaction ($p < .05$).

Conclusion: Deepening detail nursing combined with psychological nursing intervention for patients with nephrotic syndrome complicated with Coats disease-like retinal vasculopathy can effectively reduce their negative emotions, improve their quality of life, and improve nursing satisfaction, which should be promoted in practice.

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173 | Application of whole-course systematic nursing combined with cognitive behavioral nursing intervention in patients with acute angle-closure glaucoma and its effect on SAS and SDS scores

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Objective: To explore the application effect of whole-course systematic nursing combined with cognitive behavioral nursing in patients with acute angle-closure glaucoma.

Methods: A total of 84 patients with acute angle-closure glaucoma treated in our hospital from June 2018 to 2021 were selected for a retrospective study. According to the nursing intervention schemes, they were divided into nursing group A (routine nursing) and nursing group B (whole-course systematic nursing combined with cognitive behavioral nursing), with 42 cases in each group. The clinical application effect of the two groups was compared after intervention.

Results: The intraocular pressure (IOP), mental state and quality of life in both groups were improved after intervention. Compared with nursing group A, group B achieved significantly lower IOP on the 3rd day of intervention and at discharge ($p < .05$), lower SAS and SDS scores after intervention ($p < .05$), and higher quality of life and nursing satisfaction ($p < .05$).

Conclusion: The whole-course systematic nursing combined with cognitive behavioral nursing intervention can effectively reduce the IOP of patients with acute angle-closure glaucoma, relieve their depression and anxiety, promote their recovery, and improve their nursing satisfaction and quality of life.

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174 | Application of comprehensive nursing in imageological examination on breast cancer patients

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Objective: This study set out to analyze the application value of comprehensive nursing in imageological examination on breast cancer patients.

Methods: The study selected 116 breast cancer patients who underwent elective surgery in our hospital from February 2018 to September 2020 and randomly assigned them into control group and study group, with 58 in each group. In the study, control group was provided routine nursing while study group was treated with comprehensive nursing measures. Meanwhile, the study compared the two groups in terms of psychological state, adverse reactions, rate of imaging, image quality, treatment compliance, and nursing satisfaction.

Results: According to our findings, patients of study group had significant lower score of self-rating anxiety scale (SAS) and self-rating depression scale (SDS) scores compared to those of control group ($p < .05$); study group had higher treatment compliance, nursing satisfaction and more good or excellent images compared to control group ($p < .05$). Both the rate of adverse reactions and the rate of examination suspension were lower than those in the control group ($p < .05$).

Conclusion: Results of this study suggested that comprehensive nursing can adjust the psychological state of breast cancer patients during imageological examination, prevent adverse reactions, improve the examination compliance, image quality and nursing satisfaction.

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175 | Application of rehabilitation path education in cardiac rehabilitation of patients with coronary heart disease undergoing percutaneous coronary intervention

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Objective: To explore the application of rehabilitation path education in cardiac rehabilitation of patients with coronary heart disease undergoing percutaneous coronary intervention.

Method: From the numerous patients treated in our hospital from January 2020 to 2021, 100 patients undergoing percutaneous coronary intervention for the first time were selected and divided into control group (50 cases) and study group (50 cases) according to the numerical random method. Conventional basic education was used in the former group, while rehabilitation path education was used in the latter group. The cardiac rehabilitation of the two groups was compared.

Results: The rehabilitation knowledge mastery, self-efficacy level score and self-management scale score in the study group were significantly higher than those of the control group, and the difference was statistically significant ($p < .05$); The control of risk factors in the study group was significantly better than that in the control group, and the difference was statistically significant ($p < .05$).

Conclusion: The application of cardiac rehabilitation path education has a significant effect on the patients with coronary heart disease undergoing percutaneous coronary intervention, which can improve the mastery of rehabilitation knowledge and self-management and control ability and improve the treatment effect of patients.

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176 | Study on the effect of nursing intervention and self-efficacy of the concept of acceptance and commitment in patients with severe cerebral hemorrhage

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Objective: To explore the nursing effect of acceptance and commitment concept nursing intervention in patients with severe cerebral hemorrhage and its influence on self-efficacy.

Methods: A total of 88 patients with severe cerebral hemorrhage were selected as subjects, and they were divided into two groups by lottery, the control group was treated with routine nursing care, and the observation group was jointly accepted and committed to nursing intervention on the basis of the control group. Both groups completed 4 weeks of nursing care. The two groups were compared with rehabilitation training compliance, self-efficacy, complications and adverse events.

Results: The compliance scores of rehabilitation training in the two groups were higher than those before nursing at 4 weeks after nursing ($p < .05$); the observation group's compliance with physical exercise, exercise effect monitoring, active advice seeking, and total compliance scores were higher than the control group 4 weeks after nursing ($p < .05$); the self-efficacy scores of the two groups were higher than those of the control group at 4 weeks after nursing ($p < .05$); the scores of daily life, health behavior, compliance behavior, and emotional management in the observation group were higher than those of the control group ($p < .05$); The incidence of constipation, pressure ulcers, and infection and the incidence of choking, coughing, and falling from bed 4 weeks after nursing in the observation group were lower than those in the control group ($p < .05$).

Conclusion: Acceptance and commitment of nursing intervention in patients with severe cerebral hemorrhage can improve the compliance of patients with rehabilitation training, improve the self-efficacy of patients, and reduce the incidence of complications and adverse events. It is worthy of popularization and application.

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177 | Effect of air volleyball on muscle function of middle-aged and elderly people

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Objective: To explore the impact of air volleyball on muscle function of the elderly, so as to provide reference for improving the quality of life of the elderly and the promotion of air volleyball in the elderly.

Methods: Thirty healthy middle-aged and elderly men (≥50 years) who volunteered to participate in this study were randomly divided into experimental group ($n = 15$) and control group ($n=15$). The experimental group received air volleyball training intervention three times a week for 16 weeks and health knowledge publicity once every 4 weeks, while the control group only received health knowledge publicity once every 4 weeks without any regular training. The muscle strength and muscle function of the two groups were measured and evaluated before and after the experiment. Muscle strength test indexes include grip strength, back strength, iliopsoas muscle strength, quadriceps femoris muscle strength, hamstring muscle strength, tibialis anterior muscle strength, etc. The muscle function evaluation method adopts SPPB muscle function evaluation method, including balance experiment, 4-meter walking experiment and timed end sitting and standing experiment. The test data were statistically analyzed by spss25.0 software × 2 repeated measures ANOVA was used to analyze the inter group and intra group differences before and after the test.

Results: After 16 weeks of intervention, the muscle strength of iliopsoas muscle, quadriceps femoris muscle and anterior tibial muscle in the experimental group were significantly higher than those in the control group ($p < .05$). The score of SPPB scale in the experimental group was significantly higher than that before the intervention ($p < .05$), and there was no difference in the control group before and after the intervention ($p > .05$); There was no significant difference between the two groups before intervention ($p > .05$). After intervention, the score of spbb scale in the experimental group was significantly higher than that in the control group ($p < .05$).

Conclusion: Regular air volleyball for 16 weeks can improve the trunk muscle strength and lower limb muscle strength of the middle-aged and elderly, significantly improve the muscle function of the middle-aged and elderly, and improve the ability of balance, coordination and exercise.

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178 | Study on the characteristics of body shape, function and sports ability of young men's Gas Volleyball Players

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Objective: By testing the body shape, function and sports ability of young men's Gas Volleyball Players, this paper summarizes the physical characteristics of excellent gas volleyball players, analyzes their common and individual characteristics, which can be used to guide the physical training of Gas Volleyball Players and provide reference basis for their selection criteria.

Methods: A total of 65 young men's gas volleyball players were tested in terms of body shape, function and sports ability, and compared with the national physique monitoring results in 2020. Morphological indexes include height, weight, waist circumference, hip circumference,

etc. Functional indexes include vital capacity, step test, sitting body flexion, eyes closed and one foot standing, etc. Sports ability indexes include grip strength, back strength, sit ups, pushups, standing long jump, 50 m, cross jump, etc.

Results: Compared with the ordinary people of the same age in China, the body shape, function and sports ability of air volleyball players have significant characteristics. It is manifested in significantly higher height, low body fat content, significant differences in physical function indexes such as vital capacity and step index, and excellent performance in back strength, cross jump, sit ups, 50 m, standing long jump and so on.

Conclusion: The physical function and sports ability level of young men's gas volleyball players have obvious characteristics, which can be used as an important basis for selection and training.

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179 | Study on gender of human lower limb movement impact in dynamic human motion measurement

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Objectives: In daily life, the sports injury of human joints has gradually become a kind of sports epidemic, especially in the state of running or jumping, which will directly lead to irreversible injuries such as cartilage injury of joints. In this paper, the sports action measurement of common sports was carried out on 235 male and 438 female adults, to analyze the risk distribution of sports habits in sports injury.

Methods: The dynamic physical fitness evaluation system TRACKING Model T200 and T300 were used in this research. We use wearable IMU motion capture equipment to test their lower limb habitual movement, including vertical jump, in situ fast running and high leg lifting running.

Results: We analyzed the population aged 18 and over by gender. According to the correlation analysis of the data, we found that the values reflecting the maximum movement impact force at the four fixed points of the lower limbs on the left and right sides of the subjects have strong consistency. Therefore, $G = (G1 + G2 + G3 + G4) / 4$ was used to characterize the impact force risk, where G is the multiple of gravity 9.8 m/s^2.

The results are as follows:

The maximum impact value in the test results is 6.66*G* for men and 6.80*G* for women. Among men, the proportion of subjects with $G <= 2$ was 4.68%, that of women was 11.19%, that of men with $2 < G <= 4$ was 25.53%, that of women was 12.79%, that of men with more than 4*G* was 69.79%, and that of women was 76.03%.

Conclusions: Through the experiment, we can see that men have greater exercise risk than women in moderate exercise intensity exercise, and women have higher risk of big impact due to exercise habits than men.

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180 | The application of blockchain technology on medical and healthcare

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Background: The current medical system is huge but inefficient, and the security and privacy of medical data are low. In order to further improve the reasonable distribution of medical resources, it is necessary to accelerate the national medical management informatization under the current information age.

At present, there are problems to be solved in the national medical field, which focus on the following aspects: 1) the interoperability of medical information; 2) the regulatory and control of medical disputes; 3) the reasonable distribution of medical resources. While blockchain has a broad application prospect in the medical field, mainly including four categories of application directions: 1) decentralized distributed structure can be applied to medical data sharing, such as the establishment of electronic medical records; 2) the property of security and confidentiality of blockchain, through the use of reliable on-chain data to complete, greatly solve the risk of medical claims caused by information asymmetry; 3) by applying the blockchain technology, all nodes of the drug supply chain will record the drug information in circulation on the blockchain, and any drug can be verified on the blockchain;. 4) blockchain smart contract based on health management can provide solutions to various medical services.

Methods: Blockchain as a kind of public decentralized distributed ledger, has the features such as multiple maintenance, tamper-resistant, conducive to solve the problem of privacy in the process of medical data sharing, providing medical data security sharing and

exchange platform, and effectively prevent data by malicious tampering or third party abuse and resell. The characteristics of blockchain, such as decentralization, immutability, anonymity and traceability, provide solutions to ensure the security and privacy of medical information in the process of sharing.

Results: The application of blockchain technology can establish an electronic medical records system, and make the on-chain data safe and complete, and make all the nodes of drug supply chain reliable and stimulate the health management.

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181 | Application of holographic technology in recovery training of autism spectrum disorder

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Objectives: One in 68 children in China suffers from Autism Spectrum Disorder (ASD) and the number of children aged 1–14 years with ASD may exceed 3 million. Various experiments have proven that the construction of rehabilitation interventions can effectively improve ASD symptoms and the person's cognitive level. Holographic technology, as a new interactive technology that is immersive, interactive, and adaptable in the information age, is widely used in daily life. Holography, however, is rarely applied to the rehabilitation of ASD children. The purpose of this research is to design a rehabilitation and training system for autistic children using holographic technology, with the aim of ultimately improving their autistic symptoms and cognitive and communication levels.

Methods: The method was to build a multi-modal holographic interaction system, allow children with ASD to use it, and test the results. The system uses cameras, sensors, space audio, and optical media to build a virtual interaction element component library, and a targeted interaction scene as a base from which to interact. Children with autism could then interact with holographic objects in the holographic interaction system. By building autonomous, trusting, and connected human-computer relationships, the children could then complete corresponding training tasks to improve their levels of cognition and communication. In order to verify the effects of the designed system, a test experiment on user psychological and physiological indicators was carried out.

Results: After using the system, many indicators of the tested children, such as their sensory ability, social ability, sports ability, language ability, and self-care ability improved. After being trained by the system, the tested children's negative behaviors were weakened, social responses were more active, and social initiation was enhanced.

Conclusions: Holography is effective in the rehabilitation and treatment of children with ASD. A multimodal holographic interaction system can bring a certain degree of social recovery to children with ASD, and stimulate their engagement in beneficial and stable social behavior.

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182 | The impact of high-quality nursing on maternal nursing quality, nursing standard rate, nursing complaints & postpartum complications

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Objectives: The comparison is based on the impact of high-quality nursing measures on maternal care quality, nursing standard rate, nursing complaints, and postpartum complications.

Methods: The 124 parturients admitted to the obstetrics and gynecology department of our hospital from January 2019 to 2021 were selected as the research objects, and they were randomly divided into two groups, group A and group B, with 62 cases in each group. The mothers in group A were given routine nursing care, while the mothers in group B were given nursing measures based on high-quality nursing. The quality of care, standard rate of care, nursing complaints and incidence of postpartum complications were compared between the two groups.

Results: The time of the first stage of labor, the time of the second stage of labor, and the time of the third stage of labor in group B were significantly shorter than those in group A, and the difference was statistically significant ($p < .05$); the length of hospital stay in group B was significantly less than that in group A, and the labor pain score of group B was significantly lower than that of group A, the difference was statistically significant ($p < .05$); the rate of newborn care standard of mothers in group B was significantly higher than that in group A, and the difference was statistically significant ($p < .05$); there were only two cases of maternal complaints about nursing care in group B, accounting for 3.23%, and the complaint rate was significantly lower than the 9 cases in group A, accounting for 19.35%, the difference was statistically significant ($p < .05$). The total incidence of postpartum complications in group B was 3.22%, which was significantly lower than 19.35% of group A, and the difference was statistically significant ($p < .05$).

Conclusions: Intervention based on high-quality nursing measures has a better nursing effect for the parturient, higher maternal care quality and nursing standard rate, lower nursing complaint rate and complication rate of the parturient and family members, and high satisfaction with nursing, which can be clinically It is widely recommended for applications.

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183 | The impact of high-quality nursing on maternal nursing quality, nursing standard rate, nursing complaints and postpartum complications

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Objective: The purpose of this study is to explore and analyze the effects of high-quality nursing services in obstetric nursing.

Method: The observation group implemented high-quality nursing services, and the control group implemented routine nursing services. The quality of nursing work, nursing satisfaction, occurrence of complications, and quality of life of patients were compared and analyzed between the two groups.

Results: In terms of nursing quality, the observation group's nursing proficiency, basic nursing, and nursing standard degree were significantly better than those of the control group. The nursing satisfaction rate of the observation group was significantly higher than that of the control group. The observing group's maternal care compliance rate and nursing complaints were significantly better than those of the control group. The observation group had significantly lower postpartum hemorrhage, puerperal infection, and dysuria than the control group.

Conclusion: The application of high-quality nursing services during the delivery of obstetric women has a good quality of nursing work. At the same time, women's satisfaction rate with nursing care is also high, which has important clinical application value.

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184 | Parametric design and 3D printing practice of porcelain pillow for assisted rehabilitation

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Objectives: The paper demonstrates the feasibility of applying parametric design to the design of porcelain pillow, which provides a more scientific reference for the modeling of porcelain pillow.

Methods: Firstly, the parameters of porcelain pillow such as standard height, objective soft hardness, and contact pressure as well as contact area are tested. Secondly, factor analysis method is used to extract evaluation factors, and SPSS statistical analysis software is used to explore the correlation between subjective comfort and objective physical indicators. Then, the application strategy of parametric technology in porcelain pillow design is proposed, the parametric design can provide effective support for the user analysis, dynamic data, structural optimization and so on. Finally, combined with practical cases, 3D ceramic printing technology is used to finish the modeling of porcelain pillow, and evaluate the method presented in this research.

Results: A parametric design and 3D printing practice of porcelain pillow for assisted rehabilitation is presented, and verified by designing and 3D ceramic printing practice, as well as user experience based on numerical and experimental researches.

Conclusions: Based on the analysis, verification, and evaluation of the subjective comfort and objective physical indexes of porcelain pillow, this research applies the parametric design to the whole process of porcelain pillow product design. Nowadays, the design filed is very complex and changeable. In this context, if we can combine the parametric design method with porcelain pillow for assisted rehabilitation, the best design form can be found quickly and properly under the support of parametric design. Which has practical significance for the efficient design of porcelain pillow products, and also useful for the improvement of product quality. Additionally, it can shorten the development cycle and increase the competitiveness of products. Through the research of it, the parametric design can be better adapted to the design practice under different demand backgrounds.

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185 | Design and production of a multimedia animation: Healthy diet principles for diabetes patients

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Objectives: Regardless of advanced medical technology, diabetes is still a chronic disease, and if complications occur it will not only affect life expectancy, but also consume a lot of social resources. Recently,

medical professionals strived to find treatments to control blood glucose and prevent patient complications, including restricted diets, blood glucose measurement, medication usage, exercise, and else. They improved the patient's ability to perform self-care. The diabetic diet is crucial component of self-care. Therefore, the objective of this study is to understand the diabetic diet and design a multimedia animation to assist patients in self-executing diet control, as a reference in health care

Methods: This study mainly focused on the diabetic diet and aimed to explore whether the use of multimedia animation can promote a balanced nutritional diet content for diabetic individuals. The multimedia animation process was designed after collecting relevant information including the types of healthy diet recommended by FEMH. Then, followed-up to examine whether attention to a balanced diet intake and healthy habits improved among diabetic patients. (1) Preproduction: Nutritionists provides information on the five "W" s (Who, What, When, Where, Which) and related information on dietary and eating-out principles for diabetic patients. (2) Production: Appropriately designed graphics based on the information provided in the script, different scenes should also be changed through different locations. (3) Post-production: Final review of the multimedia animation to determine whether any necessity to modify or add pictures in the script, and to proofread the audio files. The animation movie can be output after this stage.

Results: Upon completing the animation, the final stage is to produce audio files and subtitles for the screenplay, enabling diabetic patients to learn through reading and listening to the finished multimedia animation during their hospital re-visit. Particularly, since most of the patients are seniors, the vivid animation will make the content easier for Diabetics to understand.

Conclusions: This study designed a multimedia animation for the promotion of the diabetic diet, hoping to effectively improve dietary intake and behavior among diabetic individuals. Furthermore, the animation content can also be used as digital teaching material in health information education courses.

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186 | A novel multiobjective dietary recommendation algorithm for healthy menus

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Objective: The continuous progress of technology and society makes people's pace of life faster. Busy work, life pressure, irregular diet, and bad habits make more and more people in a sub-health state. If the sub-health state is not improved in time, it will lead to various diseases. The choice of healthy meals is important for daily life. It can not only maintain a healthy body but also avoid diseases caused by malnutrition. In the past, people chose healthy food mainly through active methods rather than passive recommendations. However, consumers do not have the professional knowledge of doctors and nutritionists, which may lead to poor dietary choices. With the rapid development of science and technology, recommender systems can effectively help people improve their health by providing constructive and personalized suggestions. The dietary recommendation aims to use recommendation technology to provide personalized dietary suggestions according to users' needs.

Methods: To solve the above problems, we propose a novel multiobjective dietary recommendation algorithm (MDRA) for providing personalized healthy menus. The MDRA not only considers users' preferences and coverage of healthy nutrients but also considers the economic situation.

Results: The MDRA performs much better than the traditional recommendation algorithms in menu support decisions. MDRA integrates two collaborative filtering methods and adds ingredients to food. Through multiobjective optimization, the menu lists can achieve higher user satisfaction, nutrients coverage, and lower economic payment.

Conclusion: The multiobjective dietary recommendation method can provide consumers or patients with food ingredients more in line with their tastes, which not only meets the needs of consumers, but also takes into account the balance of nutrition, and can effectively prevent and control diseases, for example, overweight, hypertension, and malnutrition.

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187 | Multiobjective adaptive recommendation technology for dietary choices considering nutrition and location balance

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Objective: Dietary choices play an important role in preventing and controlling diseases, such as diabetes, heart disease, and obesity. However, people face many problems when choosing dishes in restaurants: 1) Most users without the skills of nutritionists, cannot accurately calculate the nutrition and calories of each dish. 2) The energy consumed by users in different states is different from their physical conditions, and the nutrition they need is also various. 3) The dish with lots of nutrients may not meet the user's taste. 4) The location of the restaurant is important for users. Due to the rapid development of electronic technology, it is easy to obtain the real-time physical state of users through health detection equipment. The recommender system based on electronic detection equipment can both consider the needs of users, their physical condition, taste preference, and geographical location.

Methods: To solve the complex problem of dietary recommendation, we propose a multiobjective adaptive recommender system based on health conditions (MARHC), which is designed for choices of dishes considering physical condition, taste preference, and geographical location of users. The physical condition is collected by health detection equipment, including temperature, heart rate, blood pressure, energy expenditure, etc. These parameters are collected and used to calculate the nutrition required by users. The required nutrition, user preference, and location are considered simultaneously in the multiobjective recommender system. The MARHC provides the user with a balanced list of dishes.

Results: The results show that the proposed MARHC algorithm can achieve excellent performance regardless of the maximum, minimum, or average value when comparing nutrition, preference, location, and other indicators. Through extensive experiments, the effectiveness of our proposed MARHC in balancing nutrition, preference, and location is verified.

Conclusion: Our research provides convenient and feasible recommendations for users with different physical characteristics when eating outside. It not only provides nutrition that needs to be supplemented for users' current physical condition, but also takes into account users' preferences and geographical location, and provides various consideration-based suggestions for users to recommend appropriate dishes.

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188 | Design of field modulated magnetic gear based in jejunal nutrient tube

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Objectives: By virtue of the bigger output torque, and torque density, field modulated magnetic gear (FMMG) with axial-field has the advantages of the compact and no contact, and can be widely used in medical equipment. In order to shorten the design period of the FMMG in jejunal nutrient tube, the output torque expression considering various factors become more and more necessary.

Methods: The radial dimensions of FMMG have been divided into several series, such as the inner radius of the inner back iron R is from 5 to 15 mm. Thicknesses of the permanent magnet (PM), the air gap, the inner and outer back irons, thickness of the ferromagnetic polepieces were divided into tens of levels within a certain range. Based on Maxwell stress tensor method, and a lot of finite element simulation results, the rules of the output torque with the main parameters have been obtained. Considering optimization design of the output torque and component assembly of the FMMG prototype, the value range of the particular parameter could be given. Then, the expression of the output torque was determined with the multivariable support vector regression.

Results: To FMMG of special size series, the radial thicknesses of the main components and the air gap thickness can be selected. The product number of the PM can be selected according to market. The expression of the output torque can be given as follows: $T=L\sigma[\frac{R^2}{\mu_0}(1.989B_r-1.297)-K_s\frac{102(BH)_{max}}{4\pi}-59.52]$. Where μ_0 is the space permeability; B_r is the remanence of PM, T; $(BH)_{max}$ is maximum magnetic energy product, MG•Oe; K_s is the saturation coefficient of the magnetic circuit; σ is the magnetic leakage coefficient at the end; L is the axial effective length, m. Transmission efficiency should be added when the inner magnetic ring speed is considered. The higher the speed, the lower the transmission efficiency.

Conclusions: The output torque is proportional to the square of the inner diameter of the inner backing iron R, and the axial effective length L. The maximum error between the calculation expression of output torque and the finite element simulation is 3.5%. This completely meets the design accuracy requirement.

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189 | A study on the relationship between psychological problem and VR game immersion

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Objectives: This thesis analyzed the correlation between the psychological problem and VR contents. VR contents is one of the representative entertainment industries in South Korea and is an industry that has a great influence on becoming a powerhouse as cultural contents. However, VR and immersion are expressed as a negative vocabulary of contents addiction and are referred to as social problems and youth problems, and they give negative perception to the content of VR games. All users have the right to enjoy the content, but only negative words are used in poisonous VR games and they are packed as if they are social problems.

Methods: The frequency of using VR games is based on the 4-point scale of "very much" to "not at all" with respect to 'the frequency of using VR device for game or entertainment purposes'. In addition, the emotional problem was answered by the four points scale from "very" to "not at all" for the five areas of attention, aggression, physical symptoms, social anxiety and depression. To investigate the effect of psychological problems on the frequency of VR game use Repression analysis was performed. First, the difference between the variables according to gender and the frequency of VR game use were. A Study on the Relationship between psychological Problems and VR game in Adolescents 99 significant ($t = 23.35$, $p < .001$). In other words, boys had a significantly higher frequency of VR game use than girls. In addition, there were also gender differences in emotional problems, including aggression ($t = -3.33$, $p < .01$) and physical symptoms ($t = -7.15$, $p < .001$), depression ($t = -7.88$, $p < .001$), female students were significantly higher than male students. For male students, the final model with five domains of emotional problems was $F = 9.37$ ($p < .001$), so statistically significant results were verified, emotional problems were estimated to have a 5.1% influence on the frequency of game use. As a result of checking the influence of each area of emotional problems on the frequency of VR game use, Attention problems ($t = 4.42$, $p < .001$) and social withdrawal ($t = 2.70$, $p < .01$) and depression ($t = -2.56$, $p < .05$) were found to be significant. The male students were more likely to use the VR game more frequently when they were careful and socially depressed, whereas the more frequently they were depressed, the less frequently they used the VR games. In the case of female students, the final model ($F = 8.46$, $p < .001$), in which five areas of psychological problems were used, was statistically significant, psychological problems were estimated to have a 5.8% influence on the frequency of VR game use. As a result of checking the influence of each area of psychological problems on the frequency of VR game use, only the attention problem ($t = 3.25$, $p < .01$) proved to be significant. Therefore, the psycological problems other than the attention problem did not explain the frequency of the VR game use, and the more frequent the attention problem, the higher the frequency of the VR game use.

Conclusions: We found that students who were not motivated or energy-conscious about daily life tend to show no tendency or interest in VR game use through the items related to "depression," the positive aspects of the VR game and youth psychological problems were derived through the conclusion that the students who are active and emotionally bright in all the games have a high frequency of using the VR game contents.

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190 | The impact of the COVID-19 pandemic on eating and exercise behaviors in eating disorder patients and the general population: evidence from China

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Objective: The COVID-19 lockdown has significantly impacted people's mental health worldwide. Patients with a history of eating disorders (ED) are particularly vulnerable. Although China has undergone several waves of COVID-19 outbreaks till now, the literature on the impacts of the pandemic on eating disorders and exercise behavior of ED patients and the general population remains limited. In order to fill this research gap, the current study aimed to look into changes in eating and exercise behavior in a Chinese sample of patients with a history of ED and the general population during the first COVID-19 outbreak.

Method: The study surveyed 2659 people, including 361 with a self-reported eating disorder (ED) history. The rest of the respondents were categorized as the general population. The survey was administered online through a data collection firm during China's first outbreak of the COVID-19 pandemic. The COVID-19 Isolation Scale (CIES) and other measures related to physical activity were used to assess participants. Furthermore, information on respondents demographic characteristics was also collected in the survey.

Result: The demographic characteristics of the respondents matched those of China's national average. The results show that the ED patients experienced increased symptoms in the pandemic. During the lockdown, a higher proportion of participants with binge eating disorder (44%) reported gaining weight and reducing exercise than other subtypes of ED. However, the results related to the general population were different. Although a significant proportion of respondents reported increased restricting and binge eating behaviors in the general population group, only a few reported less exercise than before the pandemic. Furthermore, there were age, gender, and place of residence differences in those who experienced the effects of the pandemic. For

instance, middle-aged females (36–55 years old) appeared to be more resilient among the general population group. Most of them did not gain weight or reduce exercise compared to pre-pandemic levels. The most vulnerable group in the general population was the young adults (18–24 years old). The findings showed that about 31% of young adults reported reducing exercise compared to pre-pandemic levels. In addition, about 11% of young adults also reported gaining weight during the lockdown. Among the general population, a higher proportion of urban residents reported reduced exercise than the rural residents. There were no significant differences among the respondents with respect to income or education. Overall, our research findings are consistent with studies conducted in other countries.

Conclusion: This research concludes that ED patients are more vulnerable to the pandemic than the general population. However, some segments of the general population have also experienced worse impacts of the pandemic in gaining weight and reduced exercise. While middle-aged women are more resilient to these effects, young adults appear most vulnerable. The findings emphasize the importance of increased monitoring and support to ED patients during the COVID-19 pandemic. Furthermore, the varying effects of lockdowns on the general population's physical health must be acknowledged and monitored in the context of the pandemic and its long-term consequences. Given the ongoing nature of the pandemic, this study provides valuable and timely insights to policymakers and health professionals to minimize the effects of the pandemic.

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191 | Quality control function of the quality control circle in reducing the incidence of foreign bodies in the finished infusion

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Objective: The quality control circle activities was used to reduce the incidence of foreign bodies in the finished infusion during the centralized preparation of intravenous drugs and ensure the safety of infusion.

Methods: The management theory, methods, and skills of the quality control circle was applied to the control of foreign body infusion of finished products in the Intravenous Medicine Blending Center (PIVAS). Then, the finished infusions were checked, and the visible foreign bodies in the infusion were counted. According to the nature of the infusion foreign body, the source was searched, the cause was analyzed, the countermeasures was formulated, the goals were set, the countermeasures were implemented, and the scientific management tools were fully used to guide the completion of circle group activities.

Results: The incidence rate of foreign bodies in the finished infusion after the improvement was decreased by 75.98% compared with before the improvement, which was far beyond the expected 56.42%, and the decrease in the follow-up period reached 94.41%. The standardized operation specification for the centralized deployment of intravenous drugs was formed, and the department's finished product infusion inspection system was formulated.

Conclusions: The application of the quality control circle to the foreign body management of finished infusions not only reduces the incidence of foreign bodies, but also improves the team spirit of the circle members and the ability to solve problems.

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192 | Development of durable antibacterial nylon fabrics with potential application for Wig – A patient's need

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Objectives: Nylon fiber is a synthetic polymer that possesses outstanding physical and chemical properties such as good strength, flexibility, and air permeability. Nylon fiber has been widely used worldwide for various products including bedding, wipes, clothing, surgical gowns,

wig, etc. The outbreak of COVID-19 boosts a surge in consumer demand for antibacterial fabrics that have the ability of resistance to bacteria attack because textile materials are good medium for microorganism growth and breeding. The present study thus aims to develop a durable antibacterial nylon fabric that could be used as wig against household washing. This wig would provide a solution for patients need chemotherapy to increase their self-confidence.

Methods: The method of "pad-dry-cure" process was used to treat the nylon fabric samples. The N1 finishing formulation was prepared by adding binder and cationic antibacterial agent to deionized water. N2 finishing solution was prepared by mixing binder and inorganic antibacterial agent in deionized water. The sample was first padded with the pre-prepared finishing formulation. Afterwards, the sample was dried in an oven at 100°C for 2 min and then cured at 150°C for 1 min. After antibacterial finishing, the samples were washed with shampoo for different cycles at room temperature. Each cycle lasts 1 min. Finally, the antibacterial property of treated samples was qualitatively conducted against gram-positive *S. aureus* and gram-negative *K. pneumoniae* according to AATCC TM 147-2011.

Results: The antibacterial results demonstrate that both samples treated with N1 and N2 have excellent antibacterial activities, particularly against *S. aureus*. However, after washing with shampoo, N1 samples show a distinct decrease in the inhibition zone and the samples fail to kill bacteria. By contrast, N2 samples show satisfactory antibacterial properties after 52 washing cycles. Moreover, there is no significant change in the antibacterial activity of N2 samples after 52 washing cycles. This suggests that the inorganic antibacterial agent has stronger affinity to nylon fiber than cationic antibacterial agent treated nylon fabric presents durable antibacterial activity.

Conclusions: The inorganic antibacterial agent shows strong affinity to nylon fiber and can be used for developing durable antibacterial nylon fabrics against washing.

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193 | Can textile materials be used for making reusable face mask – A solution to disposable mask?

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Objectives: Due to the outbreak of COVID-19, a great demand of disposable face mask has been introduced in the past year. However, disposable face mask introduces environmental and sustainable issue to the community. In order to provide an alternative to disposable face mask, we explored the use of textile materials for making reusable face mask which would be a solution for addressing the disposable face mask problem in our community.

Methods: The reusable face mask was made from textile materials with three-layers. The outer layer was made from 100% cotton woven fabric. The middle layer, which has filtration properties, was made from 100% polytetrafluoroethylene and the inner layer was made from cotton (98%)/lycra (2%) knitted fabric. In order to evaluate the reusable properties, the three-layers type face mask was washed 30 times with gentle hand washing with mild detergent. The particulate filtration efficiency (PFE) and bacterial filtration efficiency (BFE) before and after washing were assessed according to ASTM F2100.

Results: The results showed that, before washing, the three-layers type face mask can reach good PFE and BFE results with both greater than 95%. After 30 washings, the PFE and BFE results are still greater than 95%.

Conclusions: Three-layers type face mask was made and experimental results revealed that with the proper selection of textile materials for constructing the three-layers structure in face mask, good filtration efficiency could be obtained. In addition, washing process would not affect the filtration efficiency.

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194 | Application and development of human body circulation automatic monitoring system for medical intelligent wearable devices

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Objective: Cardiovascular disease is a kind of disease that is difficult to detect in daily life and easy to occur suddenly. The traditional way of monitoring to the hospital has poor real-time performance, which is easy to delay the treatment of patients. With the development of wireless communication technology, medical wearable devices have entered the era of wireless interconnection. It is possible to realize the remote transmission of human medical data through wearable devices. In this study, a medical human body data remote transmission system based on micro wearable devices is designed to monitor patients with cardiovascular diseases.

Methods: The most critical part of medical wearable devices is actually composed of built-in sensors, integrated chips, wearable fabrics, wireless communication devices, mobile terminals and background storage and early warning systems, so as to intelligently interact with the wearer's physiological and pathological information. The system uses a SnO_2 nanotube/perovskite heterostructure photodetector to collect human pulse, blood pressure, respiration, heart rate and other information, and realize real-time data transmission. At the same time, a set of early warning system is established at the receiving end. Once the monitor encounters the condition, the system will send the specific problem and patient location information to the designated person of the patient through the mobile phone.

Results: Experiments show that SnO2 nanotube/perovskite heterostructure photodetector has the advantages of low power

consumption and long life time. Intelligent wearable devices, using technologies such as ICN, DZD, big data analysis and cloud computing, use biosensors to convert the concentration of biomass into electrical signals to monitor various indicators of biomass, and infiltrate biology, chemistry, physics, medical and electronic technologies, with low cost, low energy consumption, high speed, high access, wide range High performance and many advantages.

Conclusion: compared with traditional medical devices, medical wearable devices have the advantages of light weight, small volume, strong portability and real-time, comfortable wearing, simple operation, and convenient maintenance.

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195 | Principle of conceptual design methodology for medical mechanical product based on constraint function

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Objectives: The inspiration of mechanical product conceptual design is related to the designer's practice closely, and the acquisition of the function principle solution of the medical mechanical product is a process of continuous knowledge training and brainstorming.

Methods: Firstly, constraint function decomposition and design constraint loading for medical mechanical product function module was achieved by establishing function decomposition and structure mapping method based on constraint function, integrating with constraints elements, including complete machine performance index and main structure parameters, etc. Secondly, detailed mapping structure component and its function connection form of the assembly were obtained. Finally, the modeling, simulation, and physical property analysis of the lifting device for operation is taken as a case study to obtain structure scheme evaluation and optimum concept.

Results: (1) Several optional structure forms are obtained in the process of constraint function analysis and design constraints loading for each function module. (2) Specific structure form and the connection between features are fixed with constraints of the whole performance and the main structure parameters of the locking and lifting mechanism for operation are concerned. (3) The final design solution of lifting device for operation is determined by modeling and simulation of the product and physical analysis.

Conclusions: The solution of function decomposition and structure reflection based on constraint function has been proposed for the mapping from functional principle to specific product form. (1) Based on proposed design hypothesis, function structure mapping method based on constraint function is established. (2) Applying function principle analysis to the lifting device for operation, a number of optional structure form are obtained after the constraint function analysis and design constraint loading for each function module. (3) The constraint function comprehensive evaluation is implemented by using "multi-factor fuzzy mathematics comprehensive evaluation method."

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196 | Recent advances on nano-fibrous materials for wearable energy harvesting devices

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Abstract: In today's digital age, the need for portable electronics and biomedical devices shows a dramatic growth in the human daily life. At same time, the developments in sensors technologies and microscale biomedical devices created a unique opportunity for several promising applications. Wearable electronics that can be attached to clothing, accessories, and the human body are one of the most promising subfields. The energy requirement for these devices with existing strategies are insufficient considering the reduction in device sizes and the necessity of being flexible, and even more, being able to stretch. Therefore, energy harvesting technologies have been recognized as a suitable energy source in the last decade.

This paper is mainly focused on reviewing the recent advances on advanced nanofibrous materials for wearable energy harvesting devices with more emphasize on piezoelectric and triboelectric nanogenerators. Nano materials have numerous possible commercial and technological applications including use in electronic. In the last few decades, there has been significant progress in one-dimensional (1D) nanostructures with nanoscale and molecular scale properties that can satisfy the demands of the 21st century, for example, conjugated polymer nanofibers/nanoparticles, nanowires, nanotubes, etc. These nanostructures have a deep impact on both fundamental research and potential applications in nano devices and systems, nanocomposite materials, bio-nanotechnology and medicine.

Herein, wearable energy harvesting devices and their future potential, electrospinning, and its place in energy applications are overviewed. Moreover, piezoelectric, triboelectric, and hybrid nanogenerators

fabricated or associated with electrospun fibrous materials in our research group are presented.

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197 | Fabric for the outer fabric in cloth face mask – Antibacterial and antiviral study

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Objectives: Cloth face mask with good filtration efficiency could be a substitution of disposable face mask due to environmental and sustainable issue. In case of cloth face mask, the outer fabric exposed to environment could provide a barrier to bacteria and aerosol so that those harmful substances cannot be breathed in. Therefore, there is a need to develop an antibacterial and antiviral fabric for constructing the outer fabric in cloth face mask.

Methods: 100% cotton woven fabric, used for making outer fabric of cloth face mask, was treated by antimicrobial (cationic-based antimicrobial agent) and water repellent agent. In order to evaluate the durability of the treated cotton fabric, the treated cotton fabric was washed 30 times with gentle hand washing with mild detergent. The antibacterial and antiviral properties of the cotton outer fabric were evaluated by AATCC Test Method 100 and ISO 18184 respectively. The water repellency of the treated cotton fabric was assessed by AATCC Test Method 22.

Results: The results showed that the outer cotton fabric could achieve good antibacterial properties to *Staphylococcus aureus* and *Klebsiella pneumonia* with and without washing. In case of antiviral properties, the treated cotton fabric shows good antiviral effect on H1N1 even after washing. The outer cotton fabric also achieve good water repellency even after 30 washings. The washing process does not affect the antibacterial and antiviral as well as water repellent properties of the outer cotton fabric in this study.

Conclusions: In this study, we developed effective outer cotton fabric with good antibacterial, antiviral and water repellent properties. This could provide helpful information to textile manufacturer to develop new fabric materials for healthcare use.

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198 | The application in electronic medical record device's patent research of technology adoption life cycle

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Objectives: In this research hypothesizes the Technology Adoption Life (TAL) cycle tool provides a visual cycle graph, to provide decision-making evaluation of innovation, research, and design resource input. Then, whether the number of patent applications in different years can provide cycle modeling and decision-making reference, including: (1) the choice of patent application classification, (2) understanding the degree of improvement of the entire product, (3) crossing the "Chasm?" in the market where the product patent application is applied.

Methods: This study adopt TAL cycle method to observe, and analyze the existing improvement description of electronic medical record device product's patent. The analysis method reveals the timeline, quantity, and data statistics of electronic medical record device applications in patent. The data source is the Taiwan Patent Database. The range of the data search includes the valid patent specifications that the database has collect, and maintained between year 2015 and 2021. This research uses quantitative analysis to summarize the patent output time. At the same time, use text analysis to confirm that the search results match the Electronic Medical Record Device (EMRD) target product "Smart wearable device", and draw the TAL-EMRD cycle, as references for resource input assessment during product research and development.

Results: According to the results of this study, the evaluation method which summarizes the information on patent layout advices of this case as following:

1. Inventions accounted for 88%, and new models accounted for 12%. 2. Since 2015, the number of patents has gradually increased every year, and reach the highest peak in 2020, accounting for more than a quarter of the total number of patents. 3. The number of patents in 2019 is within the measurement range, and the decrease is 10% less than that in 2018, and the reduction ratio is 20% compared to 2020. Was the year of the "Chasm!" In summary, the TAL-EMRD cycle records the existing application measures and research and development traces of the case in the database. This study also found that since March 2020 after the COVID'19 global pandemic, the patent development of case products has grown rapidly because EMRD products are widely used in personal health management and medical monitoring.

Conclusions: Based on the result of this study, the following suggestions are made for the practical application and future research of the TAL-EMRD cycle: (1) patent tracking of individual cases, (2) evaluation of software and hardware cooperative development, (3) data investigation of industrial research and development. And large study with an application of electronic medical record and device R&D is feasible and should be considered

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199 | Verification of novel head mounted display for mobile-based clinical mixed reality

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Objectives: When a user wears the HMD (Head Mounted Display) for the clinical VR (Virtual Reality) application, the external world is invisible to the user. As a result, the user can be dangerous due to insensitivity of the physical objects. However, the dangers can be avoided if the user wears the see-through HMD that the outer world is visible. To utilize this advantage, we designed a see-through HMD only with the affordable cardboard that runs on general smartphones. Also, we developed an application that uses the developed HMD.

Methods: Our application receives inputs from the back camera and draws a virtual camera and a virtual book at the bottom of the display. We fixed the position of these objects, so the user can see the objects when the user watches the fixed position. After drawing the virtual objects, the updated frame is duplicated into two planes and delivered into the display.

When the user touches the display, our application checks whether the user watches the virtual camera in the display for 5 s. In this case, it takes a picture and stores the picture into the drawn book. If the number of taken pictures are more than the page limit, the picture is stored on the next page within the book. If the user does not touch the display, the application checks whether the user watches the next button. In this case, the developed application shows the next page within the book.

Results: We draw virtual objects on the display, but the user can simultaneously watch the external world from the back camera. Thus, the user can avoid physical dangers because the user can see the physical world. Also, the user can feel the immersion and the presence that are the characteristics of virtual reality.

Conclusions: In this paper, we developed a see-through HMD that can be used for the MR (Mixed Reality) applications with the clinical purpose. Our HMD successfully received inputs from the back camera and drew the inputs to two separate planes on the display.

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200 | Research on exercise's mediating effect on university students mental health

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Objectives: With the development of modernization, mental health problems of college students keep emerging. Exercise has a profound impact on mental health. Although several studies have revealed the relationship between exercise and mental health and studied the mechanism of exercise on mental health by introducing mediating variables, the relationship and overall effect between body-esteem and emotional regulation is neglected. Therefore, this paper takes these two as mediating variables and incorporates them into the research framework of the impact of exercise and mental health, to further clarify the mechanism and significance of exercise in improving college students' mental health.

Methods: In this paper, 562 college students in Shanghai are selected as the research objects by mainly adopting the questionnaire survey method. Based on the investigation, a new structural relationship including two important variables, body-esteem and emotional regulation, was constructed, together with a mediating effect model.

Results: (1) There is statistical significance in the amount of exercise and body-esteem of college students of different genders. Male students achieve higher scores than female students in both the amount of exercise and body-esteem. The emotion regulation differs significantly among college students of different grades that sophomore students are better than freshman and junior students. (2) As the amount of exercise increases, the level of college students' body esteem is improved, while the impact on emotional regulation and mental health shows an inverted U-shaped change. (3) The amount of exercise is positively correlated with body-esteem and negatively correlated with mental health. Body-esteem, emotional regulation and mental health are all negatively correlated. (4) Body-esteem and emotional regulation have a negative predictive effect on mental health. The regression model is as follows: mental health = 37.196−.314* emotional regulation −.029* body-esteem.

Conclusions: Research on the mediating role of body-esteem and emotional regulation in exercises affecting mental health has deepened the awareness of exercises in social fitness exercises, physical education courses in colleges and independent exercise among college students, which encourages them to engage in exercise spontaneously. It motivates them to develop good habits of exercising and improve their mental health development.

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201 | The influence of football experience on the performance of inattentional blindness in healthy elderly people

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Objectives: With the growth of age, the way people categorize information will change. The decline of cognitive ability among the elderly leads to the frequent occurrence of inattentional blindness, which often brings adverse effects on their physical and mental health and life independence. Therefore, it is necessary to prevent or reduce

the occurrence of inattentional blindness in the elderly through effective strategies. In this study, the relationship between football experience and inattentional blindness is studied to explore whether football can reduce the occurrence of inattentional blindness in the elderly.

Methods: This study carries out a 12 week 36 classes exercise intervention for healthy elderly people aged 60–70 with five criteria of physical health, normal function, no major diseases, mental health and social adaptation, based on the experiment of dynamic inattentional blindness test, and systematically analyzes the experimental data of 60 healthy elderly people with football experience and 60 healthy elderly people without football experience.

Results: In the dynamic inattentional blindness task, there is no significant difference in the main task accuracy between the two groups. The awareness rate of the elderly with football experience is significantly higher than that of the healthy elderly without football experience ($p < .05$); In reducing the degree of inattentional blindness, the total training time and the level reached after training have a positive impact on the performance of inattentional blindness, the coefficients are .174 and .024, respectively. The training time has a significant positive impact on the performance of inattentional blindness, the coefficient is .427 ($p < .05$). The level of football and the total training time can effectively reduce the probability of inattentional blindness.

Conclusions: Football experience can reduce the occurrence of dynamic inattention blindness to a certain extent, and the exercise level, age and training time of the healthy elderly can effectively reduce the occurrence of inattentional blindness.

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202 | Static balance control feature of injured and non-injured freestyle ski aerials athletes based on multi-scale entropy method

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Xianpeng Zuo and Yuqi Cheng are the co-first authors.

Objectives: The multiscale entropy (Multiscale Sample Entropy, MSEn) method was used to explore the control feature of static balance ability between Injured and Non-injured freestyle ski aerials athletes.

Methods: Twenty seven (14 male, 13 female) athletes performed three kinds of standing (double leg, left leg, right leg) tasks and two kinds of conditions (eyes open, eyes closed) tasks standing on two kinds of support surfaces (stable surface, unstable surface) for standing test for 30 s, and recorded the data of (Anteroposterior, AP) and medial (Mediolateral, ML) direction before and after the athletes' pressure center (Center of pressure, COP). Calculating Multiscale Sample Entropy to analyze the feature of injured and non-injured athlete balance ability.

Results: 1) There was a significant difference between the MSEn value of the right leg standing in the ML direction and the unstable surface of the injured female athletes ($p < .05$), and between the MSEn value of the stable surface of the uninjured athletes standing in the AP direction and that of the unstable surface ($p < .05$); 2) There was a very significant difference between the injured and uninjured athletes in the AP direction of the left leg standing in the unstable surface with eyes open, and the MSEn value of the right leg standing in the AP direction of the stable surface with eyes closed ($p < .01$); 3) There was a significant difference in the MSEn value of the left leg standing in the ML direction of the stable surface between the injured and uninjured athletes with eyes closed ($p < .01$).

Conclusions: The multi-scale entropy method can effectively analyze the balance ability of injured and uninjured persons. The disturbance of visual factors has a great influence on the balance ability of athletes in ML direction, and the injury factors make the balance ability of athletes in AP direction worse, and it is also greatly affected by injury × visual factors. Under the influence of different interference conditions, the balance ability of male and female injured athletes decreases, and the balance ability of unilateral limbs is poor.

203 | Sports medicine experiment course and SWOT medical data analysis

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Objectives: In order to offer the experimental courses teaching advantages of human sports science in the new educational environment, we need to take the advantages of big data and the reversal of the teaching model to build a new "hybrid" teaching model reform.

Methods: Based on the SWOT analysis, this paper have a comprehensive analysis on the application of big data and turnover teaching model in the experiment course of sports medicine from four aspect: advantages and disadvantages of applying big data and flip teaching model to the experiment course of sports medicine, and opportunity and threat of applying big data and flip teaching model to the experiment course of sports medicine.

Results: Teachers are the key to the teaching quality, broaden the training channels for teachers and improve the level of teachers. The aim of experimental teaching is to cultivate students' study enthusiasm, improve their practical ability, form their initiative and creativity, and develop their independent learning and team-working learning qualities, so as to improve the overall quality of students. For big data development, more resources can flow into the experimental course. What's more, as the flip teaching mode are more adopted in modern class, it becomes more mature in education reforms, which is helpful in carrying forward the deep development of the experiment course of sports medicine.

Conclusions: The course of human sports science plays a key role in promotion the overall development of students, and provides the foundation for the systematic training in the physical education teaching process. The emphasis on theory has seriously hindered the development of human sports science experiments in colleges and universities. It is urgent for us to improve teaching concepts with the experimental course based on big data and flip teaching mode.

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204 | The influence of core strength training on the strength quality of sprinters

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Objectives: For the development of sprint training theory, the research will clarify what effect the core strength training will have on the strength quality of the sprinters. If the training can have a beneficial effect of influence, it will show that the core strength training can be integrated into the strength quality training of the Sprinters.

Methods: The experimental test scheme is designed around the strength quality index of Sprinters, namely strength and explosive power. In the scheme, a young sprinter is selected as the research object, and the strength quality of the research object before the core strength training is counted in advance. Then according to the core strength training scheme, the training items of the scheme include prone three-point support, one hand front flat lift, three-point support and one hand front flat lift the training intensity of each item was taken as the current limit level of the research object, and then the core strength training was carried out for 84 days according to the training plan. After that, the strength quality of the research object was tested again according to the strength quality index, and the test results were counted simultaneously to understand the current strength quality level of the research object, Comparing the statistical data before and after training, if the strength quality of the research object after training is higher than that before training, it shows that training has a beneficial effect on the strength quality. In addition, the test items of strength quality before and after training are barbell squat and standing triple jump, barbell squat is used to test strength and standing triple jump is used to test explosive force.

Results: Before training, the strength quality data of the research object was: strength 121.13 ± 82 kg, explosive force 8.24 ± After training, the strength quality data of the research object is 131.88 ± 267 kg, explosive force 8.43 kg ± 16 m, so the strength quality of the research object has increased significantly after training.

Conclusions: A core strength training has a beneficial effect on the strength quality of Young Sprinters, and reasonable core strength training can significantly enhance the strength quality of sprinters.

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205 | National standard dance is of positive significance to improve the health of middle-aged and elderly women

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Objectives: The mortality rate of female cardiovascular disease is on the rise in developed countries, especially in developing countries. Regular exercise is of great significance to the prevention and treatment of hyperlipidemia, hypertension, and coronary heart disease. It is found that the national standard dance is suitable for middle-aged and elderly women of all ages, and has positive significance in improving aerobic and anaerobic ability, agility, coordination, and core strength.

Methods: Data were collected with polar watch produced by polar electro oy of Finland, Casio stopwatch (HS-30W) of Japan and pony vital capacity tester produced by cosmod of Italy. Forty middle-aged and elderly women aged 50–60 were selected as the experimental group. They took the national standard dance exercise three times a week, one hour each time, and the experimental time was three months. The control group did not participate in activities. The physiological and biochemical indexes after exercise were mainly monitored. In order to evaluate the reliability of the test, the method of "measurement and re measurement" was adopted, and the correlation coefficient of the two test results was calculated.

Result: After the experiment, there were significant differences in heart rate and vital capacity between the experimental group and the control group; There were significant differences in LDL, HDL and LDL/HDL between the experimental group and the control group; There was no significant difference in serum total cholesterol (TC) between the experimental group and the control group.

Conclusion: The experimental group is aerobic exercise, the activities of related enzymes will be strengthened, thus affecting lipid metabolism. There was no difference in serum total cholesterol (TC) between the two groups, but the index was also improved. The speed of movement and the change of respiration are of positive significance to the improvement of the control and coordination ability of the central nervous system and the sensory ability.

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206 | A study of CNN based on image enhancement in lung image recognition of athletes

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Objective: After intense and strenuous exercise, athletes' immune function decreases and the likelihood of contracting pneumonia increases. This can lead to a reduction in the effectiveness of an athlete's training and therefore a reduction in career life expectancy. Existing methods for diagnosing pneumonia in athletes include physical examinations, laboratory tests and imaging tests such as chest X-rays and chest CT, but these traditional methods are overly dependent on medical expertise and inefficient. To address this problem, this paper proposes a convolutional neural network recognition model based on machine learning algorithms after image enhancement and validates its effectiveness. In this study, the effect of adjusting the distribution of coefficients was achieved by using contrast enhancement processing on the acquired athlete lung images, and then the edge coefficients were extracted and enhanced to highlight the edge information, followed by Curvelet inversion to obtain the enhanced athlete lung images. Finally, deep convolutional neural networks, decision trees and random forests were compared for recognition accuracy based on the athlete lung images. After contrast enhancement and extraction of edge coefficients, the images were significantly enhanced. The accuracy of the deep convolutional neural network was found to be 99.85% based on the athlete lung image comparison depth.

Methods: Image recognition; Convolutional neural network; lung images; CNN

Results: We can see that the accuracy of convolutional neural networks is higher than that of traditional machine learning on both the validation and test sets, especially on the test set, which is 10% higher.

Conclusion: This paper presents a method for lung image enhancement in athletes. First, we collected pulmonary medical images of the athletes. Then, the athlete lung medical images were enhanced by image enhancement methods such as contrast enhancement and enhanced edge coefficient. Later, deep convolutional neural network identification was used, and it was found that the convolutional neural network model trained with raw data and enhanced data increased by 4% and the test set by 2%, which shows that the enhanced data is conducive to the generalization ability of the model and make the model accuracy higher.

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207 | Bias of body height or body weight on vital capacity performance: A cross-sectional study among university students in Northeast Region, China

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Objective: This retrospective study looked to determine whether there is bias of body height or body weight in the vital capacity assessment and whether an optimum body height or body weight for vital capacity test could be determined.

Methods: In total, 17,895 university students aged 18–25 years from the selected region were randomly retrieved in this cross-sectional study (6599 boys and 11,296 girls). Participants were stratified by grades and sex and divided into four groups. Body height, body weight, and vital capacity were obtained from the annual national student physical health test in 2021.[1] Continuous variables are expressed by means and standard deviations for normally distributed variables and median values with interquartile ranges for non-normally distributed data. Categorical variables are shown as absolute numbers and percentages. Linear regression analysis was used to analyze the relationship of body height or body weight to vital capacity performance; a second-degree polynomial was used to determine best-fit curves for each of the anthropometric indicators tests.

Results: In terms of vital capacity, it showed a trend of declining from the freshmen to the seniors, and the male students were higher than the female students. Significant but weak to moderate correlations of body height, body weight, and vital capacity were found in university students, and the results are in part consistent with the findings of some Chinese researchers.[2–4] Body height and body weight were significantly associated with vital capacity in engaged university students. Body weight showed a more second-degree polynomial curvilinear relationship with vital capacity in boys than girls.

Conclusion: University students in China's Northeast Region with an optimal body weight demonstrated good vital capacity. Second-degree polynomial regression revealed optimum body weight for the vital capacity test. The relationship between body weight and vital capacity shows a second-degree polynomial curve, in boys than girls.

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208 | Bibliometric analysis of integrated sports and medicine in China

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Objective: In order to deeply explore the current research trends of the integration of sports and medicine, a review of the relevant research in the past 27 years was conducted to clarify the evolution context and research hotspots of the integration of sports and medicine, and to grasp the research trend in the field of integration of sports and medicine.
Methods: Using Cite Space V analysis tool, taking 505 literatures related to "Integration of Sports and Medicine" included in the CNKI database from 1995 to 2022 as samples, using bibliometrics and knowledge maps, the authors, Units, hot content, literature distribution, etc. are analyzed.
Result: There are 11 authors who have published more than four papers, and the top three are Fu Lanying, Fu Qiang, and Huang Yue; a total of four teams, including Fu Qiang and Fu Lanying as the core team, have relatively stable cooperation in the "integration of sports and medicine" research; There are 26 institutions with a number of publications ≥ 4, and the institution with the largest number of publications is Beijing Sports University, with a total of 14 papers; 28 keywords with a frequency of ≥ 7 in the 505 periodicals and literatures counted, and the keyword "integration of sports and medicine" appears The frequency reaches 278 times, and its frequency of occurrence is much higher than that of others. It is the research topic of this research field; the positive correlation between the frequency of keyword occurrence and the centrality is slightly deviated, and the top 3 centrality is "integration of sports and medicine," "Healthy China, Medical Colleges"; the research on "Integration of Sports and Medicine" presents three periods: the budding period (1995–2005), the smooth transition period (2006–2015), and the rapid development period (2016–2022).
Conclusion: The research level of "integration of sports and medicine" in China is not high, and the results are scattered; the density of researcher cooperation network is low, there is a lack of in-depth cooperation, and there is no clear core team; the rapid development time of research is short. In the future, high-level researchers should be encouraged to participate in research, close cooperation between researchers should be strengthened, and top-level design should be strengthened.
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209 | Analysis of online learning behavior in medical education in the post epidemic era

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Objectives: The medical online education mode based on big data aims to use big data technology to analyze students' online learning behavior, assist teachers in offline education behavior planning, and truly realize each student's personalized education.
Methods: Based on the relationship efficiency curve analysis method, this project starts with the similarity analysis of technical ability and availability opportunity, evaluates the efficiency improvement behavior of different individuals in the same action project, and eliminates social network isolation. This is a study of social labor, which can objectively reflect the process of students' high-level thinking and social development, and then through the clustering of data sets, correlation mining and other processes, build an opportunity for future use - learning ability education management program.
Results: In the post epidemic era of "Internet plus," medical online education mode can not only make learning more personalized and efficient, but also promote the value of modern educational reform. First, medical online education mode has turned the Internet that originally shielded from students into an Internet that can create new educational value. Second, the medical online education mode opens up an effective way for learners to acquire learning ability and meet their own learning needs; third, the online education and learning platform takes learners as the center, uses rich teaching means and tools, selects learning content suitable for online learning, provides high value-added and low-cost teaching resources, attracts learners together, constructs a new relationship between teaching and learning, and creates interactive teaching and collaborative teaching mode; fourth, medical teaching for a large number of learners has become a reality with the support of Internet technology, big data analysis technology and cloud technology.
Conclusions: Analysis of online learning behavior in medical education in the post epidemic era is how to analyze students' online learning behavior, optimize algorithms, and improve analysis methods, so as to make the analysis of learning, medical teaching, and other related data more accurate, rich, and valuable, make learning more efficient.
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210 | Research on the coupling of medical and health expenditure and economic development

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Objectives: At present, the problem of the aging population in our country is becoming more and more prominent, and the decline in the absolute size of the labor force "forces" the transformation and upgrading of industrial structure and economic transformation and upgrading. Increasing financial investment in medical and health care, extending residents' life span, and improving residents' physical fitness will help alleviate the impact of population aging on China's economic development and promote sustainable economic growth.

Methods: Based on the panel data of China's provinces and cities from 2010 to 2019, this paper constructs a coupling coordination degree model to analyze the degree of coordinated development between government medical and health expenditures and economic growth in different provinces.

Results: According to the results of the model, the level of coordinated development between government medical and health expenditures and economic growth has shown an overall upward trend. However, there are differences in economic development between different provinces, so the financial medical, and health expenditures of each province are different. Compared with the western region, the coordinated development level of government medical and health expenditure and economic growth in the eastern region is generally better.

Conclusions: Combining the current background of China's implementation of the Healthy China Strategy, and based on the previous analysis of the relationship between government medical and health expenditures and economic development, promoting economic development from relying on "demographic dividends" to relying on "health dividends", this paper proposes the correlation recommendations: 1. Reduce the difference between regional medical and health expenditures; 2. Vigorously develop the medical and health industry to promote economic growth.

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211 | Build a smart medical system and promote health management services

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Objectives: At present, China is calling for the healthy development of smart medicine and solving the people's needs for health care, whether it is the accelerated arrival of an aging society, the urgent needs of the people for health care, or the extremely uneven distribution of medical resources.

Methods: relying on information technology, establish a smart medical system led by the government, with the participation of hospitals and enterprises, and create a full life cycle model that widely adapts to the aging society, home-based elderly care and health care, and adapts to different levels and ages.

Results: Smart medicine will overcome the obstacles of information island, promote the vertical flow of high-quality resources, realize resource sharing, and provide people with richer and more convenient medical resources.

Conclusions: Smart medicine involves technologies such as medical perception, network interoperability, big data, and DE computing, which will enable Chinese society to enter a new era of intelligent medical and health from nutrition movement, health management, disease diagnosis, monitoring, and treatment.

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212 | A two-step re-ranking recommendation model incorporating pharmaceutical platform profits

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Objective: Due to the rapid development of digital technology and big data application, the online pharmaceutical platform has played an increasingly important role in providing patients with medicine and services. The rapid development of the online pharmaceutical platform has brought great pressure to the serviceability of information platforms. Better serving consumers and merchants have become the primary task of the platform. As an effective tool for information filtering and strategy support, the recommender system has been widely used in the medical industry. The recommender system can provide medicine and services that meet the needs of consumers. However, as a part of the online pharmaceutical platform, drug merchants want more commodity sales and to gain profits. Therefore, this paper aims to solve the problems of user demand and merchant commodity sales. By recommending accurate commodities to consumers and providing combined sales commodities, the recommender systems can meet the drug demand of consumers and also increase the sales and profits of drug commodities.

Methods: To solve the above problems, a two-step re-ranking recommendation model is proposed in this paper. The model is divided into two stages: 1) the model firstly generates initial recommendation lists by traditional recommendation algorithms according to user preferences, which is integrated based on the big data information of users on different platforms. 2) Based on the initial recommendation lists, the model considers the profits of the merchants, re-ranks the initial recommendation lists, and maximizes user preference and merchants' profit.

Results: The results show that the two-step re-ranking recommendation model not only provides products accurately to users but also significantly improves the profitability of merchants without loss of accuracy.

Conclusion: Our research integrates the big data of online pharmaceutical platforms, realizes accurate drug and service recommendations through patient information, and considers the sales and profits of drug merchants. This paper not only solves the problem of patients choosing drugs on the pharmaceutical platform but also provides drug merchants with a greater probability to sell combined drugs, to achieve a win-win situation between patients and drug merchants.

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213 | Data analysis of real earnings management, positive abnormal audit fee and audit quality of pharmaceutical listed companies based on model analysis

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Objectives: As one of the important infrastructures of the market economy system, the CPA audit system plays an important role in supervising the information disclosure of pharmaceutical listed companies. This research expands the relevant literature on audit fees, earnings management and audit quality in China's GEM, and at the same time provides certain practical enlightenment for regulatory agencies, accounting firms, etc.

Methods: This paper uses the modified Jones model to measure audit quality, and empirically examines the relationship between positive abnormal audit fee, real earnings management, and audit quality. It raises up two hypotheses and verifies the trueness through descriptive statistical analysis and checkout, regression result analysis, and robustness test.

Results: Through model analysis and data analysis, the empirical result has verified the trueness of the two hypotheses H1: Under certain other conditions, the positive abnormal audit fee is significantly negatively correlated with the audit quality. H2: Under certain other conditions, real earnings management plays a significant positive role in regulating the relationship between positive abnormal audit fee and audit quality.

The research shows that the correlation between positive abnormal audit fee and audit quality is significant negative. The relationship between the two affirms the "rent" theory. For pharmaceutical listed companies with a higher degree of real earnings management, the negative impact on audit quality of positive abnormal audit fee is significantly stronger than that of pharmaceutical listed companies with low real earnings management.

Conclusions: According to the results the paper got from the data and model analysis, in view of the fact that real earnings management will lead to high abnormal audit fee and damage audit quality, the supervisory authority should consider regulating the audit fee and curb

earnings management behavior of corporate management in order to lay a foundation for ensuring audit quality. In particular, China's pharmaceutical listed companies have stronger earnings management motives than the main board. Accounting firms should carefully consider the risks of concealing the litigation and reputation risks which is caused by the earnings manipulation of audited entities. They should pay more attention on perfecting their audit means legally. Only with these methods can China improve its audit quality and make the market competition and economy examination fairer.

214 | The important role of full cost accounting in medical economic management

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Objectives: The application of full cost accounting is one of the ways for hospitals to improve their own economic management, which is conducive to the construction of economical hospitals. In the past, traditional economic management methods lacked perfect mechanisms and professional management knowledge, which hindered the development of hospitals. With the promotion of the new cooperative medical system and other medical insurance measures, many hospitals are aware of their own shortcomings. Based on this, the significance and role of cost accounting in hospital economic management will be elaborated and analyzed.

Methods: First of all, through full cost accounting, the hospital's capital utilization rate can be greatly improved. For hospitals, its material requirements have obvious diversified characteristics, and all links of material purchase, storage, liquidation and later maintenance involve full cost accounting.

Secondly, through full cost accounting, the economic management level of the hospital can be effectively enhanced. Specifically, on the one hand, with the help of the implementation of the full cost accounting system, in addition to effectively enhancing the hospital's full cost control capabilities, it can also greatly enhance the full cost accounting awareness and saving awareness of hospital staff; on the other hand. Full cost accounting is not only the main content of full cost control, but also an important part of hospital economic management.

Finally, through full cost accounting, the core competitiveness of the hospital can be effectively enhanced, thereby promoting the sustainable development of the hospital. After all, medical institutions are not simply public welfare institutions. In the process of their operations and development, they need to take into account social and economic benefits, and need to ensure a balanced development between their own full-cost consumption level and the level of patient cost burden. It can be seen that full cost accounting is the most effective way to reduce the total cost of hospitals.

Results: Under the medical economic management system, full cost accounting has played a vital role. Relying on the management mechanism with full-cost accounting as the core, medical resources can be fully utilized, operating costs are reduced to a large extent.

Conclusions: While full cost accounting has improved work efficiency, work service attitude and work quality have reached a new level, reduced patient costs, and improved economic and social benefits.

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215 | The impact of the COVID-19 epidemic on China's central-south air transportation network

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Background: With the spread and epidemic of COVID-19 around the world, different countries have adopted differentiated strategies and methods to deal with it. China's strategy is to eliminate the possibility of local infection of COVID-19 as much as possible. Once there are sporadic local cases in a certain place, it usually interrupts the transportation connection between the area and the outside, especially the air transportation connection. Affected by COVID-19, the closure, suspension or restriction of airport capacity has a huge impact on the connectivity and robustness of the entire airport network.

Methods: In order to analyze the influence of the COVID-19 on China's central-south air transportation network, Susceptible Exposed Infected Recovered (SIER) model in different way is employed. We regard the airport as a person in original model; regard the air lines as the contacts between two people, for effective rate β; regard the number of the air lines as the infected probability between any two airports, for effective spreading rate σ. In addition, the recovered rate γ is treated as recovery status of affected routes in the model. In this case, the situation of the epidemic propagation and traveling patterns are predicted and analyzed. Then the real impact of the epidemic on China's central-south air transportation networks can be analyzed based on the connectivity of the airline network and improved indicators.

Results: According to the model, we can find the spreading situation of COVID-19 in airline networks, and we can simulate the evolution progress of the airline networks under the random attack of the epidemic. Based on the connectivity of the airline network and improved indicators, analysis results show that the connectivity of the airline network in China's central-south air transportation network is reduced obviously, and also shows poor robustness.

Conclusions: Use the Susceptible Exposed Infected Recovered (SIER) model can help us predict the situation of COVID-19's propagation in China's central-south air transportation network. The improved SIER model is highly adaptable.

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216 | Thinking on community management of sudden public health medical event

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Objectives: With the continuous application of grassroots local governance theory in China and deepening, the emergency management organizations at the grass-roots level gradually tend to be diversified, in the social emergencies emergency management pay attention to the government and social force in the process of participation, as an important cohesive ties to the government and the community, the community in the process of emergency management system construction also played a very important significance and function, This includes monitoring, crisis awareness, and prevention. Therefore, in the face of public crisis governance system construction can play a community emergency crisis management to maximize the role and degree plays a very important significance and role.

Methods: This article expounds the concept of the emergencies, introduces the mechanism of emergency management community analysis framework. Combined with the analysis of the new champions league outbreak cases, from the early warning and the preparation link, link of emergency response and disposal and recovery on the detailed analysis and evaluation stage, to analyze the problems exposed by the community in the process, The problems existing in the emergency management of community emergencies are summarized, including the lag in the construction of emergency team, the serious formalization of emergency plan, the weak risk prevention ability of community and the lack of coordination ability of community residents.

Results: Finally, it puts forward some countermeasures to improve the emergency management mechanism of community emergencies. 1) Promote and improve the risk prevention theory. 2) Improve the risk monitoring and early warning system. 3) Improve the urban risk prevention and control system. 4) Improving the weak areas of risk prevention at the grass-roots level.

Conclusions: Through the analysis, the emergency management is carried out, and the problems in the process of emergency management are further drawn. And within a reasonable on the basis of analyzing the cause of the problem, to emergencies emergency management of the community to provide the corresponding experience, and proposes the corresponding improvement scheme, namely, build community emergency response teams of volunteers, reasonable management community emergency plans, strengthening risk prevention capacity and improve the community governance model, community events to provide corresponding guarantee.

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217 | TSV-Net: A teacher-student network for semi-supervised semantic segmentation of liver tumors

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Objectives: The liver tumor is a common disease that seriously threatens human health, which has the characteristics of poor prognosis, low survival rate, etc. Liver tumor segmentation is an important part of liver tumor diagnosis and treatment, and its accuracy will directly affect the prognostic effect of patients. As we all know, training a deep convolutional neural network for liver tumors with accurate semantic segmentation results usually requires a large amount of labeled data. However, labeling data annotations for medical image segmentation tasks is expensive and time-consuming. Therefore, the research goal of this article is to use advanced deep learning networks to achieve accurate and efficient semi-supervised semantic segmentation of liver tumors.

Methods: This paper proposes a novel semi-supervised framework with uncertainty for liver tumor segmentation on 3D CT images. This framework can effectively utilize unlabeled data by encouraging consistent predictions on the same input under different perturbations. This framework can effectively utilize unlabeled data by encouraging consistent predictions on the same input under different disturbances. More specifically, it means that the framework consists of a student model and a teacher model, where the student model learns from the teacher model by minimizing the segmentation loss and consistency loss of the teacher model target. Besides, we also design a novel uncertainty perception algorithm so that the student model can use uncertainty information to learn from meaningful and reliable targets.

Results: We applied this framework to the task of liver tumor segmentation and verified it with the Liver Tumor Segmentation Challenge 2017 (LITS 2017) dataset. The results show that our method can achieve an accuracy of 85.12% in the evaluation index of the Dice coefficient, which demonstrates that our proposed method is superior.

Conclusions: Experiments show that this method is superior to other advanced semi-supervised methods in the segmentation performance of liver tumors. In general, TSV-Net seems to be an effective method to achieve semantic segmentation of brain tumors, and it has played a perfect role in the effect.

218 | An artificial vision system "Eye in Eye"

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Abstract: Visual impairment seriously affects the quality of life. People with visual impairment caused by diseases such as retinal degeneration, macular degeneration and other accidents currently may use artificial visual assistance systems, for example, electrode arrays implanted in the retina or visual cortex, to help restore partial vision capability, or to improve quality of their daily lives. Here we present a new artificial vision device, "Eye in Eye (EIE)." This EIE is an artificial device built in a human eye. It uses a micro LED curved screen combined with a micro focusing lens to project natural or artificial images on the natural retina, thus offering color vision and other informative patterns. A micro focusing lens is used close to the retina to focus the images, and it can turn an angle to the axis so that the artificial EIE device can create images at selected area of the retina. The artificial EIE device may help people with visual disabilities and provide a new solution for the artificial vision system.

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219 | A multifunctional intelligent interactive platform built on the skull

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Abstract: As one of the most active research directions at present, brain-computer interface (BCI) technology is developing rapidly. As a bridge between the brain and external devices, BCI could be used to read out the information in brain, and to write data into brain. In medical applications, it could allow real time observation of the brain activities and functions. And, it may serve as a path for material transportation between the brain tissues and the outside equipment.

Here, we propose a multifunctional intelligent BCI platform built on the skull. This artificial platform replaces part of the cranium. It is a combination of a communication data base, an on-site computer, an onsite multifunctional micro-laboratory, and a power supply. The multifunctional micro-laboratory integrates multiple modules such as the miniature microscope, the nerve electrode, microfluidic channels, the ultrasound window, and optical windows. The on-site computer includes a micro-processing system, a micro-control system, and a micro-brain-computer interface chip. Various parts of the platform can cooperate with each other to realize different functions.

The communication database is either used to receive and transmit data from the cloud in real time, or to store the data for recall. The on-site computer is used to control the multifunctional micro-laboratory for various information interactions between the brain and the outside world, according to the instructions of the communication database. The information interactions may include the optical observation and regulation of neurons, the electrophysiological recording and interference, the ultrasound imaging and treatment, and the transportation of chemicals. In addition, the interactive platform can be used for navigation and games after being combined with various in vitro sensing devices. Therefore, the multifunctional intelligent BCI platform built on the skull will be an alternative choice for brain study and treatment.

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220 | Requirement analysis of medical communication equipment sensor LVC test environment based on DoDAF

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Objective: To describe the mission, capability requirements and technical requirements of medical communication equipment LVC test environment, analyze the consistency verification relationship between various requirements, and discuss the basic process of medical communication equipment LVC test environment requirement analysis based on DoDAF method, so as to provide a new scientific method for medical communication equipment LVC test environment requirement analysis and research.

Methods: The requirements description of medical communication equipment LVC test environment based on DoDAF mainly describes the mission requirements, capability requirements and technical requirements of medical communication equipment with the help of DoDAF's operational view and capability view products. Mission requirements mainly analyze mission tasks, conditions and standards required to achieve objectives; The capability requirements analysis takes the tasks determined in the requirements analysis as the main basis, determines the capability requirements for completing the tasks under given conditions and standards, and obtains a prioritized capability gap list by evaluating the existing and planned system capabilities; The technical requirements analysis determines the technical support required by the LVC test environment of medical communication equipment to achieve the test purpose.

Results: According to the mission and task of the equipment, analyze the activities and capabilities required to complete these missions and tasks, and then analyze the required system and system functions according to the activities and capabilities to be completed. These

steps can basically complete the demand analysis of the equipment after repeated for many times. After this step is completed, the same analysis route is used to complete the equipment requirements under the background of other tasks. By integrating the requirements of different task backgrounds, the overall requirements of medical equipment system can be completed. In general, the process of requirements analysis using DoDAF architecture framework can be summarized as six elements, two matrices, three mappings and two verifications.

Conclusion: Based on the requirement analysis of medical communication equipment LVC test environment based on DoDAF, the task requirements of medical communication equipment LVC test environment are obtained by using task architecture model and system architecture model to describe the research object in detail under the constraints and support of technical architecture, Through the cooperative work of medical staff and engineering technicians, the capability requirements and unified relevant technical indicators of medical communication equipment are obtained. Its rigorous and scientific demonstration process provides a new scientific method for the analysis and research of LVC test environment requirements of medical communication equipment based on DoDAF.

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221 | Real world study on Chinese medicine treatment for epilepsy based on electronic medical record data

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Objective: Based on the electronic medical data of hospital information system, the application characteristics of Traditional Chinese Medicine (TCM) rehabilitation in the real world are studied. The purpose is to analyze the diagnostic characteristics, characteristics of TCM technology in the real world for epilepsy patients, and to provide a reasonable reference for the clinical technology of TCM.

Methods: Based on the large-scale integrated data warehouse of EMR data in the information system of the Second Affiliated Hospital of Guizhou University of traditional Chinese medicine, the EMR data of epilepsy patients treated with traditional Chinese medicine from January 1, 2015 to December 30, 2020 were extracted. Spss21.0 statistical software was used to analyze demographic information, diagnosis information and rehabilitation intervention information of traditional Chinese medicine.

Results: In this study, frequent itemsets were used to mine and analyze the "symptom syndrome method prescription," TCM characteristic technology and its outcome in 3126 electronic medical records of epilepsy patients intervened by TCM characteristic technology: (1) Clinically, three syndrome types (frequency $\geq$ 10) are more common in patients with "Yin deficiency of liver and kidney, Hyperactivity of liver Yang, wind and phlegm disturbance." "Nourishing liver and kidney, calming wind and phlegm, calming liver and suppressing yang, clearing liver and purging fire" were considered as the treatment methods (frequency $\geq$ 10). Self-made prescription, Dingxian pill and Tianma Gouteng decoction (frequency $>$ 300) were most commonly used in clinical prescriptions. (2) The frequent itemsets mining of "symptom-syndrome-treatment- prescription" and traditional Chinese medicine technology of patients in medical records "disturbance of liver Yang, pricking and bleeding," "deficiency of kidney essence, smearing of traditional Chinese medicine," "Invigorating qi and promoting blood circulation, acupuncture" and other items collectively present clinical syndrome differentiation and treatment information. (3) The results of 3126 medical records were related to the mining of frequent itemsets of traditional Chinese medicine technology. The frequent itemsets with more than 10% itemset support were "electroacupuncture, improvement," "auricular point sticking, improvement," which indicated that the application rate of electroacupuncture and auricular point sticking technology in the intervention of epilepsy was high, and the clinical effect was significant.

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222 | Image recognition of medical imaging equipment based on mobile edge computing and caffe depth learning framework

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Objectives: According to the business requirements of on-line monitoring and inspection of medical imaging equipment, the image recognition technology based on Caffe depth learning framework is studied. The image recognition algorithm based on depth learning

uses deep convolution neural network model. This paper puts forward the whole architecture of intelligent medical imaging equipment on-line monitoring system, and focuses on the structure and function of medical imaging equipment on-line monitoring system software which provides real-time data for the operation condition of medical equipment and the development of medical imaging equipment monitoring field.

Methods: Aiming at the business demand of on-line monitoring and inspection of medical imaging equipment, this paper studies the image recognition technology based on deep learning and effectively improves the efficiency of image recognition through the research of AlexNet network model which has already been applied to the on-line monitoring system of medical imaging equipment.

Results: In the online monitoring of medical testing equipment, the deep learning algorithm uses multi-layer nonlinear feature processing to extract the input data step by step through simulating the cerebral cortex, simplifies the complex feature extraction work and has the advantages of high recognition rate, fast learning speed and less time-consuming. Mobile edge computing technology uses edge cloud services to provide specific intelligent services for specific perceptual applications. This method provides more stable, extensive and low delay services for perceptual applications.

Conclusions: AlexNet network model is used to significantly improve the performance of convolutional neural networks through larger data sets, stronger models and more optimized fitting technology applications. Mobile edge computing server provides cloud computing services and storage services near the user's access network edge that can minimize delay, save bandwidth of core network and reduce cross-regional traffic, thus the optimal solution is calculated according to location and context perception to alleviate network security and user privacy problems.

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223 | Culture embedded in anti-epidemic measures

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Objectives: This paper mainly aims to construct an index system evaluating the health communication effects of Traditional Chinese Medicine in treating COVID 19.

Methods: In this paper, the authors used social network analysis (SNA), analytic hierarchy process (AHP) and in-depth interviews. Based content analysis and SNA, culture-oriented textual research is processed to refine the practical and exact role of *Culture* in the CONVID-19 penetrated health communications. In the meantime, regarding justification, objectivity and feasibility as the main aims, an evaluating system is also established and discussed via Delphi technique and AHP to fully cover the culture driven health communication effects.

Results: This paper concludes with a three-faceted CONVID-19 health communication effects evaluating system with cultural features. Given the prominent role that Web-based Communication Index (WCI) plays. According to the analysis, it is easy to get the conclusion that the first-level media exposure indexes are mainly focused on the amount of reading, reposting and liking. As for cultural cognitive indexes, the width of doctor-patient interactions is the major indicator in the second dimension including average reading numbers, follower scale and the specific genre and registers of each particular post. At the third level, doctor-patient attitude and sentiment are fully explored within the indexes concerning muti-platform usage, post originality, news source, theme and readability. In addition, the weight allocation is submitted with AHP, Delphi style interviews and questionnaires of several scholars specialized in both communications studies and practitioners of both doctors and patients. Against the existing literature and WCI, a number of multi-party optimizations and iteration are also carried out to ensure the effectiveness and feasibility.

Conclusions: Despite of the authors' ultimate attempt, a perfectly scientific, unified and universal evaluating system is yet to construct for culture deconstruction. Therefore, this present paper paves the way to bridge the cultural impacts and health communication effects.

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224 | A molecular dynamics study shows that second-sphere residues control turnover in the factor inhibiting hypoxia-inducible factor (FIH) variants

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Objectives: **F**actor **I**nhibiting **H**ypoxia-inducible factor (FIH), an αKG-dependent iron-containing hydroxylase, controls the hydroxylation of Asn803 of **H**ypoxia **I**nducible **F**actor (HIF), a transcription factor in the function of O_2 homeostasis in mammals. HIF as well as its hydroxylase FIH enzyme was found as the key targets for cancer therapy and biological engineering.

Methods: Wild-type FIH system, Gln239 and Arg238 variants were created and productive molecular dynamics (MD) simulations were run

for all the systems using the CHARMM36 force fields implemented in the CHARMM program.

Results: Molecular dynamics studies showed that second-sphere residues Gln239 and Arg238 had an large impact on the O_2 binding on the catalytic junction of Fe atom in the O_2 activation pathway. The result matched well with experimental findings and it can explain the monotonically decrements of kinetic parameters in the Gln239Ala, Gln239Asn, Gln239Glu and Gln239Leu variants. Our theoretical results were in accord with the experimental findings.

Conclusions: Our MD simulation showed that second-sphere residues Arg238, Gln239, and substrate HIF-1α poly-peptide chain played a vital role on positioning O_2 molecule in the catalytic active junction of Fe and regulating the substrate in the right position. These results were practical and they were potential to be applied to the cancer therapy, enzymatic engineering, and pharmaceutical industry.

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225 | Research on UAV network and its application in emergency medical help technology

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Objective: The onset time of many patients is random. Therefore, when patients suddenly get sick, first aid measures are very important. It is an effective scheme to use UAV network technology to give first help to patients with sudden attack. As a medical UAV, the advantage is that it can respond quickly, which is exactly the technology required by various hospitals to take medical first aid measures. For patients with sudden diseases such as heart failure, drowning, trauma, and various respiratory problems, time is the most precious. If they can arrive at the scene a few minutes in advance to rescue the patient, it is possible to save a person's life. Especially in the absence of medical conditions, even if the emergency call is dialed, the ambulance may not be able to rush to the scene immediately. At this time, it is more important to use UAV for medical purposes to carry out rescue.

Methods: When a person breaks out of heart disease, UAVs for medical purposes can be used to arrive at the scene in the shortest time with life-saving equipment such as automatic external defibrillator (AED) and cardiopulmonary resuscitation (CPR). The UAV for medical use is a small rotary wing aircraft, which can be remotely operated and controlled by users, the GPS sensor, camera and communication device of the positioning device are installed on the UAV. The power supply is powered by lithium battery to provide enough energy so that the UAV can fly longer time and longer distance in the air. The convenience of UAV is that it can implement remote control. The UAV can also set the program in advance to make it fly according to the designed route. When the UAV arrives at the patient's site, the UAV operator can communicate with non-medical professionals at the patient's site through walkie talkie and video equipment to guide those without medical expertise to rescue the patient.

Results: Using UAV for medical use to rescue patients can save a lot of valuable time. For patients with sudden onset of heart disease, time is life. If you buy more valuable time for the patient, the probability of survival of the patient can be greatly increased, which may save the patient's life. Before the professional medical personnel arrive at the patient site, they can guide the on-site personnel to assist in medical first aid through the video and voice communication equipment installed on the UAV, which can greatly improve the success rate of first aid.

Conclusion: UAV for medical use is widely used. UAV can be used as a kind of first-aid equipment. For patients with sudden heart disease, UAV for medical purposes can quickly reach the patient site, which is not affected by local landform or road traffic congestion. Therefore, UAV has a rapid and convenient role. In addition, UAV, as a medical emergency equipment, can also transport blood products. For many small-scale hospitals in remote areas, if they encounter a patient who needs large-scale blood transfusion, and at this time, the hospital's blood bank may not have enough blood to meet the needs of patients. At this time, UAVs for medical purposes can carry specific blood products and rush to the scene in the shortest time, thus alleviating the huge pressure faced by the hospital's blood bank. With the continuous progress of modern electronic technology, the carrying capacity and endurance of medical UAV have been greatly improved, which can provide timely medical services for more patients who need first aid.

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226 | Predict the pro-/anti-longevity genes with data fusion and classification methods

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Objectives: To understand the ageing process is an interesting problem for biologists. Genes are regarded as the most important factors that have influence on the process of ageing. In this paper, we focus on discovering the genes with performing classification methods over Protein–Protein Interactions (PPI) and Gene Ontology (GO) data.

Methods: The genes are labeled with pro-/anti-longevity, each gene has features based on the GO of three types: Molecular Function, Cellular Component, and Biological Process. The genes are from three model organisms: *C. elegans*, *D. melanogaster*, and *M. musculus*. We perform a data fusion on the previous three datasets. Then we use classification

methods, including XGBoost, Bernoulli Naive Bayes, K-nearest neighbor, Logistic Regression, Support Vector Machine, to predict the labels of the genes.

Results: We use the G-means to evaluate the classification methods. For the *C. elegans*, the Support Vector Machine has the highest G-means, that is, 71.3%. For the *D. melanogaster*, the Bayes has the highest G-means, that is, 55.9%. For the *M. musculus*, the Logistic Regression has the highest G-means, that is, 73%.

Conclusions: For genes of different types, we can fuse heterogeneous data and employ the classification methods to predict the pro-/anti-longevity with a high scores, which, will help the biologists to better understand the ageing process.

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227 | Construction and analysis of EST - SSR marker genetic map of sweet potato

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Objectives: In this study, two sweet potato varieties Tainong 27 was used as the male parent and Puning seed as the female parent, were used to construct the genetic map of both parents.

Methods: The mapping population F1 with 334 hybrid progeny was obtained by the principle of "double pseudotest crosse" with two parents, and 354 EST-SSR markers of the male parent and 351 EST-SSR markers of the female parent were obtained from the selected 448 pairs of EST-SSR polymorphism markers of sweet potato. Using EST-SSR polymorphic markers and Joinmap 4.0 mapping software, the genetic linkage maps of the parents were constructed under the condition of LOD = 5.

Results: Finally, 28 paternal genetic linkage groups were constructed, including 190 markers, the total length of the map was 7484.8 cm, the average distance between markers was 39.4 cm, and 22 maternal genetic linkage groups, including 166 markers, the total length of the map was 6727.2 cm, and the average distance between marker sites was 40.5 cm. The markers are mainly concentrated on the linkage group of F.01 and M.01, and more than half of them have segregation distortion under the condition of $p \leq .01$.

Conclusions: In the study, a large F1 population was used to construct the longest parental genetic map of sweet potato up to now, and the phenomenon of partial separation was discussed in depth. The results enriched the EST-SSR marker genetic map of sweet potato, and provided further theoretical and practical basis for its molecule-assisted breeding.

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228 | Development of the sign system using expended reality (XR) prototype in general hospital

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Objectives: A general hospital is a public building with a high flow of people and has the purpose of curing various pathological symptoms. Considering that the main user is patients with discomfort, it is necessary to provide information that is easy to walk, enter, and find directions through visual stimulation in a general hospital. Previous research suggests that general hospital users have experienced difficulties in finding their way. The purpose of this paper is to verify the elements of an optimal general hospital sign system that allows users to easily reach their desired destination by using an XR (eXpended Reality) prototype that is realistic and easy to update.

Methods: The components can increase the visibility of a sign by differentially selecting the size, background, and color of characters and fonts in consideration of the location and distance of the sign. Information was collected by eye tracking which can see exactly where are staying to determine the location of a sign. By utilizing XR's overlay technology that enables a realistic user experience, prototype of sign system that can quickly and easily recognize and find a desired destination was verified. Five types of different characters, colors, pictograms, and layout sets were used as prototypes. After experiencing the XR prototype, usability evaluation was conducted for experts.

Results: In order for users to effectively obtain information, it is necessary to design a sign system in consideration of visual elements by identifying hospital users. As a result of verification using XR prototype in this study, hospital users preferred the sign design that harmonizes with the space. Among the 50 participants, more than 70% preferred a prototype composed of text color contrasting with the background, intuitive and simple pictograms, and a sans serif font rather than a serif font. Usability of the XR prototype was conducted on a 5-point scale through heuristic evaluation of five sign system experts. A checklist of 10 items was made and a test for empirical evaluation was performed while looking at the prototype. As a result of the evaluation, most items showed high scores above the average. Above all, the results showed excellent scores in terms of predictability and visual effect.

Conclusions: The XR prototype, which combines real and virtual components to predict outcomes, is realistic and validates various design draft. In a future, it will be of great help in developing the user-centered sign system with high satisfaction in general hospital.

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229 | Research on the value of environmental ecology based on the method of storage conversions tract

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Objective: With the development of social economy and the surge of population, people's demand for the ecosystem is increasing day by day. Therefore, it has become an important principle to consider the relationship between various service functions of the ecosystem. However, modern people often ignore the environmental costs of economic development. Traditionally economic growth has been accompanied by environmental damage, which has affected the prospects for sustainable human development. We discusses how to establish an effective environmental value assessment model and how to incorporate environmental costs into the cost-benefit analysis of land projects.

Methods: In the process of land use ecosystem services function damage problem, using satellite remote sensing, the change of volume and the PSR model of theory or method, we construct the terrain classification accuracy, forest carbon sequestration of carbon cycle of land value and "source recognition - resistance response of surface building and environment," such as the model, the integrated use of the MATLAB, EVIEWS, and ENVI software programming to solve, the land value is obtained dynamic change process with time, the carbon sequestration of conclusion, finally gives reasonable suggestion according to the reality.

Results: According to our model, we define the sensitivity degree of each factor of ecosystem service value. The sensitivity coefficient is the ratio between the percentage change of the dependent variable and the percentage change of the independent variable value. If the sensitivity coefficient is greater than 1, it indicates that a small change in the independent variable can cause a large change in the dependent variable, so it is called the dependent variable is sensitive to the change of the independent variable. Conversely, the ependent variable is said to be insensitive to the independent variable.

Conclusion: The index system of ecosystem health evaluation established in this paper can not only reflect the current health status of the evaluation objects on the scale of watershed, but also reflect the economic status change of the subsystem ecosystem from the single index.

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230 | Automatic Chinese text summarization model based on LSTM neural network and application in medical case report analysis

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Objective: Most of the existing AI-based automatic text summarization generation studies are done on the basis of large-scale English datasets for training and evaluation, studies on Chinese datasets is still relatively small, and the readability of generated summarizations still needs further improvement compared with English summarization. Long Short-Term Memory (LSTM) neural networks have been used to generate summarization automatically, which have the ability to learn from "memory" and use more contextual information to determine the probability of the next word in text processing. The proposed MODEL based on LSTM can better extract key information in Chinese case report analysis.

Methods: In this paper, LCSTS, a Chinese short text dataset from HUST, is used as the training and testing set to build a Chinese generative automatic text summarization model based on LSTM neural network, and improve the quality of the generated Chinese text summarization by training and testing on the LSTM neural network model to optimize the structure, functions and parameters, etc. The optimized LSTM neural network model is compared with the classical Word2Vec and TextRank algorithms for Chinese text summary generation quality. The following issues are addressed: LSTM is essentially a deep learning neural network, and the number of hidden layers and hidden layer neurons determines its main performance, which has a decisive impact on the quality of Chinese text summary generation; the neural network learning algorithm determines the adjustment method of the weights of each connection layer, and the learning algorithm used is important for the quality of LSTM Chinese text summary generation; the activation function chosen has an important impact on the training effect of neural network.

Results: Experiments show that the proposed LSTM neural network-based Chinese generative automatic text summarization model improves the performance of the sentence summarization system, which better extracts the important information from Chinese case report and can select key information fragments more effectively and copy them into the output intact, thus significantly improving the extraction quality of the sentence summarization system.[5] The generated basic extraction units can effectively solve the problem of unimportant and repetitive information and can significantly improve the performance of the summarization system, which has the advantage of better describing the importance differences between sentences.

Conclusion: After the statistical learning phase based on rules and feature engineering, the research in the field of automatic text summarization is now entering the development period based on deep

neural networks. It is of great research significance to utilize the powerful characterization learning ability, automatic feature extraction ability, fitting complex functions and so on of neural networks to propose new models or address the inadequacy of existing work in the field of automatic text summarization to enhance the performance of summarization systems.

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231 | Implementation logic optimization artificial neural network borrowing from random forest

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Objective: There is evidence that neural networks outperform machine learning algorithms in many fields. Neural networks learn by continuously learning until they arrive at the best set of features that satisfy the predicted values. However neural networks amplify variables into a series of numbers and once it has completed its learning phase, the features become indistinguishable to us. Therefore, an attempt can be made to optimize artificial neural networks by borrowing the implementation logic of random forests, thus weakening their uninterpretability.

Methods: Neural networks are networks of computational models and are a method of machine learning. Computers learn to perform tasks by analyzing training samples. It largely mimics human cortical functions and can replicate the same way of thinking and perceiving as humans. A neural network is a hierarchy of interconnected nodes that contain activation functions that compute the output of the network. Because neural networks roughly mimic the human brain, they will include thousands of interconnected nodes. A node can be connected to several nodes in its lower-level layer that receive data, as well as several nodes in its upper-level layer that receive data. Each input data point receives a weight, which will be added, subtracted, multiplied and divided. If the weighted sum equals zero, a deviation is added and then passed to the activation function. A random forest is a collection of decision trees, so the final nodes and leaf nodes will be the majority class of the classification problem or the average class of the regression problem. A random forest grows many classification trees, and for each output of the tree, the tree is called a "vote" for that class. Prior to neural network learning, the neural network is divided into different classes of neural lines with random samples for each line drawn from the training data, borrowing the implementation logic of the random forest classification model. After the samples are selected, a subset of features is used to split into the selected neural lines. Each neural line is spread according to the maximum range specified by the parameters until it votes on the class. Finally, the neural lines are then compiled into a neural network, and the interpretability of the neural lines can be used to provide some explanation of the entire neural network.

Results: Training the optimized neural network model on 9 datasets from the OpeML.org data repository reduced the final prediction slightly in only 1 case by simply integrating the results of the average. Thus, it is shown that the neural network obtains some interpretability without much change in model performance.

Conclusion: Random forests and neural networks are different techniques that learn in different ways, but can be used in similar domains. Random forest is a machine learning technique, while the neural network is a deep learning technique. The implementation logic of random forest is used to optimize the neural network so that it follows a certain logic and can be interpreted for a wider range of applications.

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232 | Build accurate financial assistance model based on support vector machine to improve the mental health level of students from poor families

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Objective: The identification of poor students in colleges has always been a difficult part in the financial aid work of colleges in China, and it also restricts the overall improvement of the financial aid work of colleges. At the present stage, there are problems that the criteria for identifying poor students are too simple and the quantification level is low. By establishing a model to accurately identify the identity of students from poor families, we can maintain the fairness of the use of educational funds and improve the mental health level of College students.

Methods: In the face of the above-mentioned shortcomings of traditional research methods in the identification of poor students in college financial aid, machine learning highlights its strong vitality. The application of SVM in the identification of students with financial difficulties in colleges can make scientific and accurate identification of students with financial difficulties based on the limited existing sample data. In order to find the best SVM model with the best recognition performance for the specific scenarios of accurate financial aid for college students, in-depth research is still needed. An SVM-based accurate financial aid model for college students is proposed, important features are extracted from the consumption data of sponsored and non-sponsored students to establish a training set and a test set, and the SVM model with hyperparameters is optimized based on the training set.

Results: The experimental results show that the recognition rate of the optimized SVM recognition model is 69.8% and 67.9% in the training and test sets, respectively, and the SVM outperforms the K-nearest neighbor algorithm and the plain Bayesian classifier in the recognition rate and reduction of overfitting of financial aid recipients. The experimental results show that the optimized SVM model has advantages in the accurate recognition rate and reduction of overfitting of college financial aid recipients compared with the classical pattern classification algorithms K-Nearest Neightbors and Navie Bayesian Classifier.

Conclusion: SVM can map feature space to high-dimensional space by kernel function, thus solving nonlinear classification problems, it is good at solving small-sample learning problems, requiring less data compared to artificial intelligence models such as deep learning. The KNN algorithm requires a pre-set number of neighboring point, which often requires some experience and is not effective in identifying high-dimensional feature vector data sets. Compared with the NBC algorithm, SVM basically does not involve probability measures, effectively avoiding the process of induction to deduction, and the classification boundary is only determined by the support vector. Compared with K-Nearest Neightbors and Navie Bayesian Classifier algorithm, SVM is also able to effectively reduce overfitting on the training set.

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233 | Patient health education and digital media in general hospitals

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Objectives: Research on the application of digital media technology in patient health education in general hospitals is intended to use digital media technology to improve the level of patient health education.

Methods: The application of digital media technology in patient health education in general hospitals is mainly through the following two methods:

1. Digital media accelerates digital hospitals and realizes rehabilitation teaching sharing.

A digital hospital is to carry out a comprehensive digitization of all information resources, so that the hospital can be extended in time and space, and digital hospital is formed based on reality. The digital hospital office platform contains many patients' libraries, mainly providing digital information resources such as multimedia courseware. It allows doctors and nurses to log in any materials they need in anytime and anywhere. The established digital system can realize online answering and online communication, realize differentiated patient rehabilitation guidance, and change the mode of patient health education.

2. Digital media strengthens the awareness of innovation and enhances doctors' health education capabilities.

Training is the main way for doctors to improve their informatization technology literacy. As the hospital, it is necessary to strengthen the informatization training of doctors in order to improve the ability of doctors to apply digital health education. For example, when making a "micro-class," there are only about 10 min of video. Doctors need to determine the topic selection, collect production materials, video recording, post-compositing, and then to the production and release of supporting micro-class resources to improve the doctor's health education ability.

Results: As the people's demand for health and wellness continues to increase, traditional health education methods can no longer meet the needs of the people The digitization of traditional missions and education models will be the development direction of hospital health education services under the current Internet + model.

Conclusions: The great application of digital media technology has improved the quality of patient rehabilitation education and can be widely used in general hospitals.

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234 | Research on social needs of biomedical engineering graduates from international joint union

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Objectives: According to statistics, there are about 33,000 hospitals in China, and medical engineers account for only 10% of the total number of hospitals, which is far from 30% abroad. A large number of medical institutions need a large number of biomedical engineers. The purpose of this study is to explore the general situation of social demand for talents graduated from the major of biomedical engineering, especially on international background.

Methods: Randomly collections of 150 online recruitment informations as sample. The screening conditions are: recruit undergraduate graduates majoring in biomedical engineering, with specific recruitment number and job description. Jobs can be divided into eight directions including medical equipment/devices, medical/nursing/hygiene, pharmaceutical/bioengineering, new energy, electronic technology/semiconductor, software, instrumentation/industrial automation, etc. The principal component analysis and the cross coupling analysis were conducted on relevant factors.

Results: The post demand statistics show that the demand for management trainees and marketing posts is close to 50%. The post demand for biochemistry, data analyst and equipment engineer accounts for nearly 40%. Moreover, these posts have international background requirements for talents. The cross analysis results show traditional medical device enterprises have huge talent demand for sales and after-sales positions (38.83%), the emerging biological and pharmaceutical engineering has a great demand for experimental engineers such as biochemistry and molecular biology (51.46%). According to the results of regional distribution analysis, the first tier cities have a great demand for biomedical engineering professionals, of which the demand of enterprises in Shanghai and Beijing accounts for 48.12%

Conclusions: The demand of enterprises for high-quality, high-level talents with international background in biomedical engineering is large and tends to increase. Sino foreign joint union is a new mode to improve the training of talents in this major. The research results can provide useful reference information for the construction of new engineering, exploration and adjustment of biomedical engineering professional structure and talent training mode.

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235 | Promotion of medical physics in science education to students' literacy and deep popularization of biomedicine

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Background: China needs effective and deep science popularization to biomedicine. For the serious homogeneity and generalization of medical physics courses, the poor supporting role of biomedical engineering, and the insufficient development potentialities, aiming at fundamental tasks of establishing morality and cultivating people, we must explore a high-quality construction program of medical physics course and deep popularization of science.

Methods: We cooperated with physics curriculum-construction and popularization of science, reinforced traditional ideological education. Integrating universal physics courses with ordnance majors, implementing mixed, layered and interesting course, consolidating students' understanding of physics principles, and strengthening biomedical engineering applications, we formed a method of ideological education in curriculum with the school's characteristics and background.

Results: We explained the core of deep popularization of science, which citizens' scientific and technological literacy is rooted in mind for widespread. Four characteristics of deep popularization of science are refined, respectively, its intension are the universality and infiltration of scientific thinking, the depth of "point" in content is coordinated with the expansion of "surface," it emphasizes the internalization of scientific and technological methods and knowledge acquisition ability instead of focusing on knowledge, its goal is to imperceptibly influence scientific and technological ideas and paradigms into the behavior of the audience. We constructed a four-tier course-platform for physics which intersect the first and second-level courses, with the combinations of online and offline courses, large and small classes, intensive lectures and discussions of theoretical analysis and practical exploration. In addition, an integrated assessment method was established. Thus, we launched a combination of medical physics curriculum and ideological education which rooted in ordnance and artistic, and three practical application paths.

Conclusions: The course was successfully applied 5 years and widespread promoted among 30,000 students, on and off campus. This work embodied the soul of universal physics class of "exploring rule after encountering phenomenon, performing creation according to principle, pursuing loyalty and precision," which enabled students to Cultivating Spirit and Shaping Soul, Enlightening Wisdom and Moistening Mind, meanwhile, helped the deep popularization of physics science and the biomedical literacy.

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236 | Health and disease prevention education should become a compulsory course for College Students

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Objectives: Health education in Colleges and universities is generally valued and welcomed by college students. In order to understand the needs of students, help them establish modern health awareness, make them master the necessary knowledge of health prevention and first aid, improve the effect of health education, correct bad habits, and achieve the purpose of health promotion. This topic combines many years of health education practice and medical service experience for students, uses questionnaire survey and mathematical statistics to study health education, and explores the innovative mode of health education in Colleges and universities.

Methods: The total number of students involved in this research is 800. There are 200 freshmen, including 135 boys and 65 girls, with a male to female ratio of about 2:1. There are 600 sophomores, 389 boys and 211 girls. The ratio of male to female is about 1.85:1. Send out the same questionnaire "what are the better suggestions for health education in terms of content and form?" 53 questionnaires with incomplete answers and unclear expression were selected, and 747 questionnaires with complete expression were left. The answers were classified and registered, and the more concentrated contents were sorted and reported according to categories. Spss26.0 was used for statistical analysis.

Result: Total 747 questionnaires were collected and analyzed. The results show that classroom teaching is combined with out of class teaching; The teaching contents include first aid, common diseases and drugs, prevention and treatment of infectious diseases, sexual knowledge, healthy diet, healthy life, common sense of seeing a doctor, medical treatment of students, medical insurance, etc.

Conclusion: Health education in the minds of college students is recognized, is a very needed elective course. The application of new media technology and innovation of network health education can significantly improve the ability of college students to deal with diseases; students attach importance to health education, but efforts need to be made to change their health awareness.

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237 | Pre-hospital emergency system, A BeiDou-based emergency information interaction platform

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Background: In the field of pre-hospital emergency care, the 15 min from when the patient is picked up by an ambulance to when the patient is transferred to the hospital is called the "golden fifteen minutes." During this period, the doctor on the ambulance needs to make a preliminary subjective clinical diagnosis based on the primary symptoms of patients. However, due to existing technical limit, doctors cannot retrieve the past medical history of patients on the ambulance, which poses a significant obstacle to accurate pre-hospital diagnosis.

Further, in special circumstances (such as earthquakes, etc.), the cut-off of public signals prevents the ambulance from getting in touch with the hospital in time, making accurate pre-hospital diagnosis more critical. How to overcome this problem so that the doctors can obtain the history medical record of the patients in time has become an urgent problem to be solved.

Methods: In this research, we designed a medical record transmission system that can be used under any geographical conditions and special events. By using the short message information transmission function of Beidou satellites, our system is capable to help doctors in ambulances make an accurate pre-hospital diagnosis. First, the doctor in the ambulance enters the basic identity information of the patients through the operation terminal of the ambulance, and the Beidou satellite transmits the information to the console in real-time. After the console matches the patient information, it collects the medical history information by calling the electronic medical record of patients. Further, using the International Classification of Diseases (ICD), the medical history information is transmitted to the ambulance console, realizing pre-hospital medical record scheduling. Moreover, our system can also be used in various unique situations worldwide to provide patients with better health protection.

Conclusions: An ambulances loaded Pre-hospital medical record transmission system based on Beidou satellite.

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238 | Two instruments for diagnosing and pre-treating individuals' psychological self-efficacy and practical abilities in systems thinking and simulation

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Objectives: Cultivating knowledge workers in the fields of medicine, public health, toxicant pollution, environment management to have the abilities to think about systems as a whole, treat the dynamic and complex problems, and understand the effects of system feedback and time delays is a very important issue. Institutions and practitioners should offer system dynamics training, which are composed of systems thinking and systems simulation, in order to cultivate knowledge workers with this high-level thinking and analytical ability. In order to effectively diagnose and pre-treat the cultivating outcomes, this research develops two instruments to assess individuals' psychological self-efficacy and practical abilities in systems thinking and systems simulation.

Methods: Based on relevant literature, expert opinions and application practices, a five-item instrument for assessing psychological self-efficacy and a 12-item instrument for assessing practical abilities were developed. The relevant empirical data were collected and were used for analyzing and examining these two instruments.

Results: The items for assessing psychological self-efficacy are self-assessment of drawing a useful causal loop diagram, finding critical variables and relationships, utilizing archetypes, drawing a useful stock flow diagram, and executing simulation. The items for assessing practical abilities include the abilities to draw causal loop diagram and stock flow diagram correctly and completely, model evaluation and verification, scenario simulation, policy evaluation and analysis, and effective problem solving.

Conclusions: This study develops two useful instruments for assessing individuals' psychological self-efficacy and practical abilities of systems thinking and systems simulation. These two instruments will be of value to learners, mentors, trainees, and practitioners in analyzing, diagnosing, and pre-treating to improve an individual's self-efficacy and practical abilities in systems thinking and systems simulation. The results of this study will be helpful for the assessment of professional competence in the fields of medicine, public health, and toxic pollution

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239 | Meta analysis of cancer incidence and socio-economic factors

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Objective: At present, a large number of literatures have discussed the relationship between cancer incidence and socio-economic factors. Due to the different sample selection, the inconsistency of included variables and the difference of simulation methods, the conclusions of these studies are quite different, and even the opposite conclusions appear. This study analyzed the socio-economic factors affecting the incidence of cancer by combing the current literature, using meat analysis technology and CMA software.

Methods: 1) Included literature. 57 literatures on socio-economic factors affecting cancer incidence from 1965 to 2020 were selected for analysis. The standard error rate is estimated by other methods, but there is no standard error rate. 2) Selection of effect value. The incidence of cancer was used as the effect value. 3) The heterogeneity among the studies was analyzed. When there is serious heterogeneity, any method to measure the average effect cannot capture the real nature of the economic phenomenon under discussion. 4) Sample description items: publication time, sample country and whether it is a developed country. 5) Socio economic factors. Including: human development index, urbanization, GDP, unemployment rate, inflation rate, regional characteristics, etc. 6) Publication bias analysis. 7) Mean effect value estimation and heterogeneity test. 8) Meta regression analysis.

Results: 1) There is great heterogeneity among studies. 2) There is publication bias, and the publication bias is corrected by cutting and filling method. 3) Sample factors have little effect on the research results. 4) The incidence of cancer is positively correlated with human development index, urbanization, GDP and unemployment, but not with inflation.

Conclusion: In countries with high Human Development Index (HDI), the total incidence rate of cancer is 2–3 times that of low or medium HDI countries. In developed countries, the population has a longer life span and a higher incidence rate of cancer, while the incidence rate of cancer in underdeveloped countries is relatively low, and more deaths are caused by infectious diseases. Some causes of cancer are changing from poverty and infection to lifestyle.

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240 | Performance characteristic on medicine distrtibuted storage systems

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Background: With the development of clinical medical technologies, distributed storage systems has utilized exponentially. Distributed storage systems are largely divided into centralized ones and decentralized ones. In centralized distributed storage systems, all requests must go through a metadata server which manages requests processing, so the metadata server becomes a bottleneck. Because of this bottleneck, decentralized distributed shared-nothing storage systems have utilized for medicine. Unlike centralized storage systems, each client node is responsibility for request processing without the metadata node in decentralized shared-nothing distributed storage systems. For this reason, data consistency between replications for critical operations such as write, append, and rename in each client node must be directly guaranteed. Therefore, additional requests are required between client nodes and server nodes for data consistency.

File size/Performance	Read (MB/s)	Write (MB/s)
4KB	15	50
1MB	100	320
4MB	100	320

Analysis: In order to analyze I/O performance on medicine storage system based on decentralized shared-nothing distributed storage systems, I measured I/O throughput under various file size. For the experiment, I used GlusterFS with two replications as the decentralized storage systems and executed 16 threads. File sizes were 4 KB, 1 MB, and 4 MB. As shown in Table, 4KB showed very lower read and write I/O performance compared to 1 MB and 4 MB. In 4 KB small size file, additional requests occurred as much as the number of critical operations such as write. In contrast, the ratio of additional requests to critical ones is small with 1 MB and 4 MB. That is, severe low performance were shown due to overhead caused by additional operations with small sized file.

Conclusions: Most of medicine files stored in distributed storage systems were large. So, the overhead caused by additional requests did not affect the I/O performance. But, recently, small clinical data sets are also used with predictive modeling and machine learning, so the size of files stored in the distributed storage systems is getting smaller Through the experiments, I found that decentralized distributed file systems are inefficient for handling small medicine files due to additional requests. For this reason, new solutions for handling small medical files are required.

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241 | The demand of the rural medical professionals and the professional reform in Hubei Province, China

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Objective: Presently, in the central and western regions of China, especially in the impoverished mountainous area, the team of rural medical professionals is aged, appearing age fault. It is badly in need of a large number of young doctors running deep in villages and communities and augmenting the existing team, so as to realize the dream of health China. In order to meet the needs of the development of the health service system of villages and communities, it is necessary to strengthen the clinical practice and application ability training for students. The practical medical personnel who is willing to work and stay at countryside, and is competent for the job for the villages and communities will be cultivated. The orientation of cultivation is to satisfy the vocational requirements of the job, which purpose is to train the ability of the students, prioritizing the scheme of talent cultivation.

Methods: We adopted the methods of document search, questionnaire survey and personal interview. The survey questionnaire was issued on the Platform of Questionnaire Star, and the respondents are health centers of towns and communities, and medical rooms of villages in Hubei Province, China. The survey content includes structures of age, the professional title and education background, and in-service continuing education and training, and the status of professional and technical personnel recruitment, and brain drain of rural doctors. There are totally 203 effectively questionnaires retrieved.

Results: The survey results show that the age of the rural doctors is mostly between 31–40 years old, which to total ratio is 43.3%, indicating the age structure relatively reasonable. The second more age is between 41–50 years old, the number accounting for 29.1%. The third

one is under 30 years old, the number accounting for 14.3%, and the last one is more than 50 years old, accounting for 14.3%. It makes clear that young rural doctors is relatively few, which will directly lead to the shortage of reserve talents of health service and to the disadvantage of succession of the new to the old of health workers in the countryside. The professional titles of rural doctors mainly take the position of junior certified doctor and assistant medical doctor, respectively accounting for 37.4% and 28.6%, and associate senior professional title and above are very few. The ratio of non-professional title is 8.4%. There are 147 rural doctors whose education background is senior high school or technical secondary school, the proportion being 72.4%. There are only 19 rural doctors who have junior college and above education background, accounting for 9.4%. The rest 37 ones are graduates of junior secondary schools, whose ratio is 18.2%. The ratio of the rural health workers with low-levels of education is too large. The structure of education background results in the total level of education lower, which restricts the development of village health service centres. Meanwhile, because the rural doctors receiving formal education are few and the level of medical technology is limited, the demand of medical treatment of the general rural residents cannot be satisfied. If villagers want to see a doctor, they have to go to the major hospital of county towns or above, which exacerbates their difficulty of getting medical service.

Conclusion: For the sake of solving the problem of the difficulty of getting medical service for peasants, it is essential to work together for both the central government and the local government. Increasing financial input and implementing relative policy encourage medical graduates going to work at the grass-roots. Reasonably confirming the fund input proportion of health protection and optimizing the structure of the fund input make the government financial investment policies favor rural areas more, legitimately raising the wages of medical workers at grass-roots level. In addition, drawing up a long-term plan of talent training cultivates qualified talents, and making favorable policy promotes the title of a professional post in rural medical center.

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242 | Study on the rural medicine professional curriculum system based on the vocational certificate and practice requirements

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Objective: Recently, in rural villages across large areas, especially in poor mountainous area of China, rural medical professionals are facing the dilemma about having no successors. Rural health workers at the level of town and village are old and lacking. Graduates in medical universities and colleges are mostly reluctant to work at health centers of towns and medical rooms of villages, causing the disruption to supply chains of rural doctors. To completely ensure the health of rural residents, the Minister of Education of China has added the rural medical specialty in the Catalogue of Specialty of Secondary Vocational Schools in 2010. Hubei Province, China begins to approve a few eligible vocational colleges setting up the rural medical specialty.

Methods: The survey questionnaire is issued online in Hubei Province, which includes rural doctors' responsibilities, requirements of occupation abilities, and the effect of specialized courses learned on work. There are totally 189 effectively questionnaires retrieved. The service years of respondents of rural doctors are 5–39 years, average 21 years. There are 11 respondents with college degree, 128 with vocational school degree, and 50 without any education background but inheriting from master to apprentice.

Results: The responsibilities of the rural doctors are shown in Table 1, most of the rural doctors supplying basic medical service and public health service, and seldom engaging in family planning counseling and rehabilitation medical service. The common diseases treated by the rural doctors are shown in Table 2. Internal medicine diseases and pediatric diseases are usually healed by the rural doctors, the next is dermal diseases, surgical diseases and diseases of obstetrics and gynecology are seldom treated, and mental disorder is rare. The rural doctors believe the major courses include anatomy, histoembryology, physiology, pharmacology, diagnostics, internal medicine, surgery, obstetrics and gynecology, pediatrics, usually nursing techniques, and sanitary regulation. Most of them think mathematics and English are unimportant to their work.

Conclusion: Courses are the core of talent training. The construction of the curriculum system is an important support of the rapid development of vocational education. The rationality of the curriculum system

TABLE 1 The responsibilities of the rural doctors

Items	Number of persons	Ratio (%)
Basic medical service	189	100.0
Public health service	171	90.5
Family planning counseling	35	18.5
Rehabilitation medical service	30	15.9

TABLE 2 The common diseases treated by the rural doctors

Items	Number of persons	Ratio (%)
Internal medicine diseases	189	100.0
Surgical diseases	40	21.2
Diseases of obstetrics and gynecology	38	20.1
Pediatric diseases	186	98.4
Dermal diseases	162	85.7
Mental disorder	6	3.2

directly involves with the quality of talent training. The rural medical specialty is a new major. The professional courses of clinical medicine and public health cannot be simply combined into those of the rural medicine. The employment of the graduates of the rural medical specialty mainly orients rural medical rooms, which will become rural doctors. Due to the auxiliary inspection equipment is little in the rural medical rooms, it is necessary to strengthen the operational ability of the students of the medical specialty. Hence, newly added two practice courses are skill training of clinical diagnosis and that of public health service. In addition, the courses of language, interpersonal communication, medicopsychology, and medical ethics can improve students' ability of language expression and interpersonal communications, computer application course can raise office efficiency in their future, and moral education courses can play an important role in forming their outlook on life and world, so these six courses are on the list of main courses.

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243 | Application of graphene electrochemical sensor in monitoring estradiol in industrial wastewater

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Objective: Trace estradiol in water environment is a typical natural estrogen and one of the common endocrine disruptors. It can directly or indirectly interfere with human and animal nervous system, have adverse effects on biological reproductive system, endocrine system and immune system, and have teratogenic, carcinogenic and mutagenic effects. In this study, a graphene electrochemical sensor was prepared and applied to the monitoring of estradiol in industrial wastewater.

Methods: Fe_3O_4/MnO_2 doped graphene electrochemical sensor was prepared, and the river water in Qintai River, Binzhou City was collected with .22 μM membrane filtration. Estradiol was not detected in the lake water. Different concentrations of estradiol solution were added to the blank river water, and the response performance of the electrode was measured by differential pulse voltammetry.

Results: The experimental results show that the differential pulse voltammetry response signal increases with the extension of time when adsorbed for 1–6 minutes. The adsorption rate of estradiol by Fe_3O_4/MnO_2 graphene electrochemical sensor increased rapidly within 3 min. With the extension of adsorption time, the increase rate slowed down and tended to equilibrium after 5 min, indicating that the adsorption gradually reached equilibrium. The Molecularly Imprinted Electrochemical Sensor Based on Fe_3O_4/MnO_2 doped graphene hybrid material showed good sensitivity and selectivity, which provided a new method for the electrochemical detection of estradiol in aqueous environment.

Conclusion: Graphene electrochemical sensor can be applied to the monitoring of estradiol in industrial wastewater. It has the advantages of simple preparation and high sensitivity.

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244 | A detection method of polycyclic aromatic hydrocarbons utilizing BSA-SVM combined with excitation-emission matrix fluorescence technique in mixed system

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Objectives: Polycyclic aromatic hydrocarbons (PAHs), the earliest known chemical carcinogens and the important contaminants for environment and food. Up to now, more than 200 kinds of PAHs have been found, among which Acenaphthene (ANA), Fluorene (FLU) and Naphthalene (NAP) are common. Long-term exposure to PAHs can cause damage to the respiratory system, circulatory system, kidneys and liver. So, the aim of this study was to establish a method based on three-dimensional fluorescence spectroscopy and bird swarm algorithm optimization of support vector machine (BSA-SVM) for the quantitative analysis of ANA in the mixed aqueous.

Methods: A method for the determination of ANA concentration in mixed solutions by processing the fluorescence spectrum data was developed by using a FS920 fluorescence spectrometer in combination with BSA-SVM. ANA was selected as the substance to be tested and FLU as the interference substance with a concentration of .5–4.5 μg/L to prepare single component solutions and mixed solutions of different concentrations. The fluorescence spectrum data of the mixed solution with emission wavelength λ_{em} = 322 nm and excitation wavelength of 240–370 nm were selected as the input and the predicted concentration of ANA was selected as the output for quantitative analysis. There are 16 groups of models, 8 groups are selected as the training set and 8 groups as the test set. The concentrations of ANA sets were 1.4, 2.0, 2.4, 2.6, 3.3, 3.4, 3.7, 3.9 μg/L, respectively.

Results: After each parameter of the algorithm is initialized, the optimal penalty factor C and kernel parameter G of SVM are obtained through training, which are input into the SVM model, and the predicted concentration values are 1.4057, 2.0021, 2.4084, 2.6109, 3.3300, 3.3627, 3.71419, and 3.92823 μg/L, respectively. The root mean square error (RMSEP) of the model was 3.2058×10^{-5}, and the average recovery was 100.28%.

Conclusions: The obtained spectral data were processed by the models GA-SVM, PSO-SVM and BSA-SVM. Through the comparison, the results showed that the BSA-SVM model could effectively avoid the influence of interfering substances and accurately determine the content of ANA in the mixed solution. Therefore, the next step of the experiment is to apply this method to the quantitative analysis of more types of PAHs in a more complex water environment.

245 | Deep learning-based traffic information estimation in accordance with call arrivals and handoffs

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Objectives: This study surveys the following issues: (1) the correlation between vehicle density and the number of call arrivals; (2) the correlation between traffic flow and the number of handoffs.

Methods: In Figure 1A, Road *i* is covered by Base Station *i* (i.e., Cell *i*); there are *m* cells; the practical vehicle density on Road *i* during time period *t* (i.e., $K_{i,t}$); the practical traffic flow on Road *i* during time period *t* (i.e., $Q_{i,t}$); the number of call arrivals in Cell *i* during time period *t* (i.e., $a_{i,t}$); the number of handoffs in Cell *i* during time period *t* (i.e., $h_{i,t}$). For vehicle density estimation, the numbers of call arrivals in adjacent cells (i.e., $a_{1,t}$, …, $a_{m,t}$) are adopted as the inputs of a neural network, and the practical vehicle densities (i.e., $K_{1,t}$, …, $K_{m,t}$) on adjacent roads are adopted as the outputs of the neural network for generating the estimated vehicle densities (i.e., $k_{1,t}$, …, $k_{m,t}$). For traffic flow estimation, the numbers of handoffs in adjacent cells (i.e., $h_{1,t}$, …, $h_{m,t}$) are adopted as the inputs of another neural network, and the practical traffic flows (i.e., $Q_{1,t}$, …, $Q_{m,t}$) on adjacent roads are adopted as the outputs of the

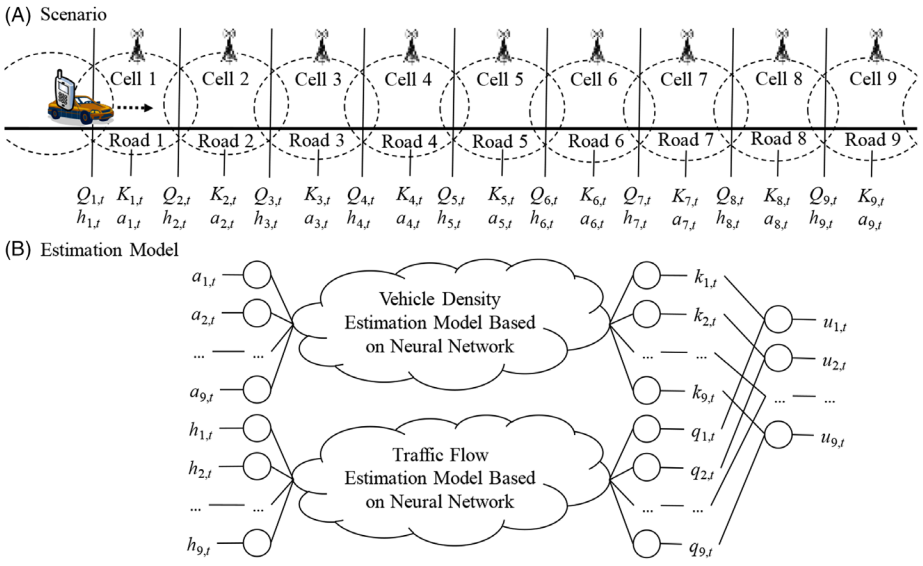

FIGURE 1 Traffic Information Estimation Based on Call Arrivals and Handoffs [Colour figure can be viewed at wileyonlinelibrary.com]

neural network for generating the estimated vehicle densities (i.e., $q_{1,t}$, …, $q_{m,t}$). For vehicle speed estimation, the estimated vehicle speed on Road i (i.e., $u_{i,t}$) could be obtained based on an equation (i.e., $u_{i,t} = q_{i,t} / k_{i,t}$) in Figure 1B.

Results: The mean absolute percentage errors (MAPEs) of the estimated vehicle densities, the estimated traffic flows, and the estimated vehicle speeds are 2.35%, 1.08%, and 1.76%, respectively.

Conclusions: The proposed traffic information estimation method could provide the estimated vehicle densities based on the numbers of call arrivals, the estimated traffic flows based on the numbers of handoffs, and the estimated vehicle speed based on the estimated vehicle densities and the estimated traffic flows.

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246 | The efficiency analyses of deep learning algorithms based on queueing model

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Objectives: Deep learning algorithms (e.g., Visual Geometry Group (VGG) network, residual neural network (ResNet), and dense convolutional network (DenseNet)) could obtain higher accuracies of image recognition. Although the graphics processing unit (GPU) could support parallel computing for these deep learning algorithms, the efficiency analyses of these algorithm have not been investigated.

Methods: This study adopts a M/D/1 queue for the efficiency analyses of deep learning algorithms. The practical service rates of VGG network, ResNet, and DenseNet are measured as μ_v , μ_r, and μ_d. The arrival rate of this queue is assumed as λ, and the utilizations of VGG network, ResNet, and DenseNet are denoted as ρ_v (i.e., λ/μ_v), ρ_r (i.e., λ/μ_r), and ρ_d (i.e., λ/μ_d). Therefore, the mean waiting time of VGG network, ResNet, and DenseNet in the queue could be estimated as $\frac{\rho_v}{2\mu_v(1-\rho_v)}$, $\frac{\rho_r}{2\mu_r(1-\rho_r)}$, and $\frac{\rho_d}{2\mu_d(1-\rho_d)}$, respectively.

Results: In the practical environments, a GPU (GeForce GTX 1060) is used, and the size of each image is 224×224. In the case of smaller batch size (i.e., batch size = 1), the service rates of VGG network, ResNet, and DenseNet are 74.56 (image/minute), 42.21 (image/minute), and 42.59 (image/minute); in the case of bigger batch size (i.e., batch size = 9), the service rates of VGG network, ResNet, and DenseNet are 104.96 (image/minute), 165.01 (image/minute), and 188.98 (image/minute), respectively. The mean waiting time of each algorithm is illustrated in Figure 1. The results show that the GPU could support parallel computing especially for deeper neural networks (e.g., ResNet and DenseNet) with a bigger batch size.

Conclusions: DenseNet could obtain higher accuracy of image recognition and higher service rates with a bigger batch size by using a GPU. DenseNet could be executed by an online server with GPUs for real-time image recognition.

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247 | Fuel consumption estimation method based on clustering-based deep learning model

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Objectives: The fuel consumption covers a higher ratio of cost in logistics and public transportation. Therefore, fuel consumption estimation is an important issue for reducing the fuel consumption cost of intelligent transportation system (ITS) applications. This study proposes a fuel consumption estimation method in accordance with the records from on-board units (OBUs) without fuel consumption detectors.

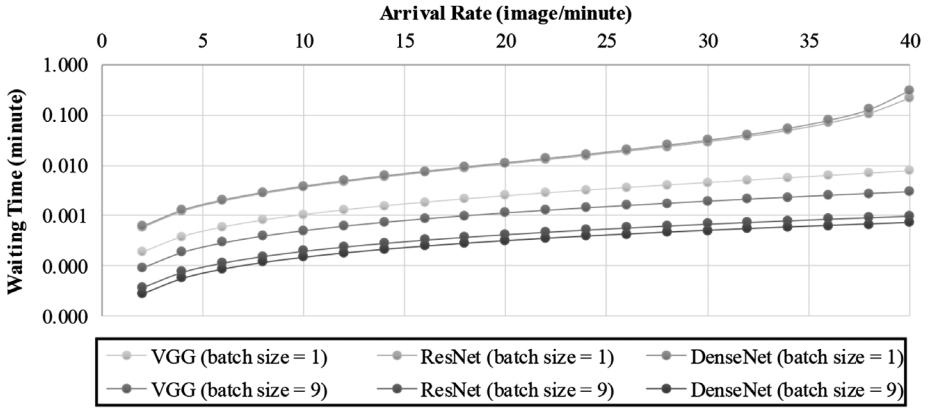

FIGURE 1 The Results of Mean Waiting Time

TABLE 1 The accuracy of each method

Without Clustering			With Clustering		
Linear Regression	Logistic Regression	Neural Network	Linear Regression	Logistic Regression	Neural Network
82.92%	76.69%	92.90%	87.60%	87.04%	**94.39%**

Methods: An OBU equipped in each car reports the speed of the car to an ITS server every 30 seconds. During a month, the count of a specific car with idle speed (i.e., 0 km/hr) is denoted as x_0, and the count of a specific car with speed interval $((n-1)\times 10$ km/h, $n\times 10$ km/h] is denoted as x_n, where $n \geq 1$ and $n \in \mathbf{Z}$; these variables are adopted as the inputs of neural network. Furthermore, the fueling charge of the car during the month which is reports to the ITS server by the driver is denoted as y; the fueling charge is adopted as the output of the neural network. This study proposes a clustering-based deep learning model for fuel consumption estimation; all records are clustered into two groups (i.e., higher fueling charges and lower fueling charges) in accordance with its fueling charge, and the records in these two groups are used to train two neural networks, respectively.

Results: The records during November are selected as training data, and the records during December are selected as testing data. The estimated value of y is denoted as $\hat{y}$. The accuracy which is defined as $1-|\hat{y}-y|/y$ is used for evaluating the performance of the proposed method. Table 1 shows that the accuracy of the proposed method is 94.39% and higher than that of other methods.

Conclusions: The results show that the proposed clustering-based deep learning model could improve the accuracy of fuel consumption estimation, and the proposed method could be used to estimate fuel consumption for logistics and other ITS applications.

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248 | Research on psychological driving factors of enterprise green strategy choice

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Objective: In order to realize the world sustainable development, the concept of green strategy is gradually popularized and accepted all over the world. Enterprises have enhanced their awareness of environmental protection, and formulated green development strategies to reduce environmental risks. However, the psychological choice of green strategy is affected by various internal and external factors. The research on the psychological driving factors of enterprise strategic choice is of positive significance for improving environmental performance.

Methods: This paper uses the ASSET4 ESG database of Thomson Reuters, uses the environmental performance scores and main business data of 1834 enterprises in G7 and BRIC countries from 2007 to 2017, and comprehensively considers the impact of different countries, industries, policies and regulations. The environmental performance and main business data of enterprises are discussed to study the psychological factors affecting the choice of green strategy.

Results: The choice of enterprise green strategy was affected by diverse factors. First, policies and regulations. Under the constraints of national and industrial policies and regulations, the behavior against laws and regulations shall be punished and the behavior of protecting the environment shall be encouraged. Therefore, the enterprise will have subjective initiative and take relatively positive behavior to adapt to the changes of macro conditions. Second, market drivers. The external driving forces related to the market have an impact on the choice of green innovation strategy of enterprises. This impact mainly comes from investors, consumers and competitors. Investors exert pressure on the environmental performance of enterprises by influencing the financial market, and consumers exert pressure on the environmental performance of enterprises through the choice of consumption behavior. Competitors' pressure comes from the environmental performance of similar enterprises in the same industry. Third, the internal environment of the enterprise. The role of enterprise internal factors in the choice of green innovation strategy mainly refers to the impact of enterprise's own attributes on its environmental behavior mode, including enterprise scale, enterprise financial status, enterprise industry attributes, enterprise internal governance, enterprise R&D investment and so on.

Conclusion: Many external and internal factors have an impact on enterprises' choice of green strategy. We should strengthen the guidance to enterprises, encourage enterprises to choose green strategy scientifically, increase green innovation investment, enhance sustainable competitiveness of enterprises, and create a green and harmonious social ecological environment.

249 | Experimental study on material properties of transgenic maize stalk

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Background: Maize is a cereal crop with great potential for yield increase. However, lodging not only reduces maize yield, but also represents a challenge to mechanized harvesting. The inherent material mechanical properties of maize stalk are closely correlated with

its lodging resistance. Improving the quality of maize and obtaining transgenic maize with excellent lodging resistance through genetic engineering is a good way to develop efficient and sustainable agriculture.

Methods: This study is aimed to investigate the material properties of transgenic maize stalk. Five groups of transgenic maize stalks and one group of non-transgenic maize stalks were selected and measured internode length, internode diameter, internode cortex thickness and other geometric data. On this basis, according to the characteristics of maize stalk, the tensile and compressive test-pieces of each group were made respectively, and the tensile and compressive tests were carried out by WDW-10E electronic universal testing machine.

Results Compared with the geometric data of non-transgenic maize stalk in group I, the internode lengths at the ear position of transgenic maize stalk in all groups except group II increase significantly; the internode diameters in all internodes of transgenic maize stalk in group II and III are larger; the node diameters in all internodes of transgenic maize stalk in group II augment; the internode cortex thicknesses in all internodes of transgenic maize stalk in all groups increase greatly; and it is speculated that, compared with other geometric data, transgenes from group II to group VI have a greater impact on the internode cortex thickness. In addition, the tensile strength, elastic modulus and compressive strength of maize stalk decrease with the increase of internode number, meanwhile the tensile strength and elastic modulus increase at the ear position; in comparison with the material properties of non-transgenic maize stalk in group I, the elastic modulus, tensile strength and compressive strength of transgenic maize stalk are improved effectively in some groups, and the maximum average enhancement rates are 33.64%, 42.64%, and 41.66%, respectively.

Conclusions The research results not only provide the necessary experimental data and reliable theoretical basis for dealing with the yield losses caused by maize lodging, but also give valuable references for breeding elite maize varieties.

250 | Analysis on lodging resistance of transgenic maize stalk

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Background: In China, maize has become the largest food crop, occupying a core position in agricultural production. However, lodging has a serious impact on the maize yield and quality. The researches show that the lodging resistance of transgenic maize stalk is related to both external and internal factors, which are often difficult to control. Therefore, the lodging resistance of transgenic maize stalk is generally improved by changing internal factors. For example, the root shape, internode diameter, internode length and cortex thickness of it. At present, researches on lodging resistance of maize stalk are mainly conducted on single factors or comprehensive factors through experimental means, and the influences of each factor are not sorted, among which researches on lodging resistance of transgenic maize stalk are especially few.

Methods: In order to study the lodging resistance of transgenic maize stalk, the finite element model of transgenic maize stalk was established considering its initial defects. On this basis, the failure modes, load-displacement curves and bearing capacity of transgenic maize stalk under different working conditions were studied by using the finite element nonlinear buckling analysis method. At the same time, the effects of elastic modulus, internode diameter, cortex thickness and internode length on the bending resistance of transgenic maize stalk at different growth stages were analyzed.

Results: The calculation results of the finite element model presented in this paper are consistent with the experimental results in the bending test, which proves the reliability of the model. The bearing capacity of transgenic maize stalk is significantly improved compared with that of non-transgenic maize stalk by 24.3% at seedling stage and 26% at ear stage, respectively. When elastic modulus, internode diameter and cortex thickness were increased by 5%–30% respectively, bearing capacity of maize stalk at seedling stage and ear stage increased to different degrees. When the internode length increased by 5%–30%, the bearing capacity of maize stalk at seedling stage and ear stage both decreased. The influences of various factors on the mechanical properties of transgenic maize stalk are ranked as follows: internode length, elastic modulus, internode diameter and cortex thickness.

Conclusions: The research provided necessary experimental and theoretical basis for breeding superior maize varieties and reducing maize production reduction due to maize lodging.

251 | Pharmaceutical equipment application and monohydrate s-nitrosocaptopril drying process in pilot plant experiments

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Objective: Monohydrate S-nitrosocaptopril (Cap-NO·H_2O) is a novel crystal form with a major breakthrough in stability and druggability. It is convincingly recommended as an alternative treatment of pulmonary arterial hypertension (PAH). Research progress of its dry powder inhalation is currently undergoing a pilot plant experiment. It is found that Cap-NO·H_2O was extremely sensitive to temperature and pressure fluctuation in drying process. Cap-NO·H_2O started to lose its crystal water at 41.9°C while acceleration of the process could occur if pressure fluctuation was larger than 5Pa, in which case the application of fluidized bed was narrowed.

Methods: Depyrogenation tunnel, a validated batch production equipment in manufacture, was selected for pilot experiments. Without changing its physical structure, a predictive multi-input-multi-output (MIMO) state-space model with automatic control system was designed accordingly. Specifically, the predictive MIMO state-space model was constructed by collecting real-time drying temperature and pressure data from the digital sensors to meet the rigorous requirements of Cap-NO·H_2O drying process. Three subsystems were constructed in the designed control system: discretization control to facilitate the computer control technology, the state feedback control to stabilize control system, and the decoupling control to untwist the coupled parameters.

Results: After the application of the designed control system, system response presented as a monotonic convergence with a residual error smaller than ±2%, as a desirable system performance. Therefore, it is proved depyrogenation tunnel is capable to dry Cap-NO·H_2O powder inhalation. In addition, the registration of the original drug is convincingly shortened.

Conclusions: The registration process of the original drug is put forth by research results. Field tests are required to validate its reliability.

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252 | The combination of particle swarm optimization and stochastic gradient descent with momentum

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Objectives: In recent years, several swarm intelligence computing algorithms (e.g., particle swarm optimization (PSO)) and stochastic gradient descent (SGD) algorithms (e.g., SGD with momentum) have been proposed for optimization. In PSO, the i-th particle's velocity $v_{i,d,t+1}$ and position $w_{i,d,t+1}$ for the d-th dimension at the $(t+1)$-th iteration are denoted as $\alpha v_{i,d,t} + \phi_p r_p(p_{i,d} - w_{i,d,t}) + \phi_g r_g(g_d - w_{i,d,t})$ and $w_{i,d,t} + v_{i,d,t+1}$, where the parameters include the weight of velocity α, the i-th particle's best known position $p_{i,d}$, the swarm's best known position g_d, the weights of the i-th particle's best known position and the swarm's best known position ϕ_p and ϕ_g, and the random variables r_p and r_g. In SGD with momentum, the momentum $v_{d,t+1}$ and updated variable $w_{d,t+1}$ for the d-th dimension at the $(t+1)$-th iteration are denoted as $\alpha v_{d,t} - \eta \varsigma_{d,t+1}$ and $w_{d,t} + v_{d,t+1}$, where the parameters include the learning rate η and the gradient $\varsigma_{d,t+1}$. For improving the performance of optimization algorithm, this study proposes the combination of PSO and SGD with momentum.

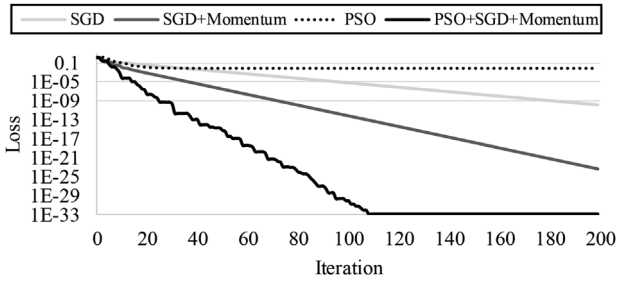

FIGURE 1 The accuracy of each method

Methods: The proposed method adds the SGD with momentum in the updating strategy of particle's velocity. In the proposed method, the i-th particle's velocity $v_{i,d,t+1}$ and position $w_{i,d,t+1}$ for the d-th dimension at the $(t+1)$-th iteration are denoted as $\alpha v_{i,d,t} + \phi_p r_p(p_{i,d} - w_{i,d,t}) + \phi_g r_g(g_d - w_{i,d,t}) - \eta \varsigma_{i,d,t+1}$ and $w_{i,d,t} + v_{i,d,t+1}$, where the gradient of the i-th particle for the d-th dimension at the $(t+1)$-th iteration is $\varsigma_{i,d,t+1}$.

Results: In practical experiments, the values of particle number, iteration number, α, ϕ_p, ϕ_g, and η are 100, 200, .5, .5, .5, and .25. The mean squared error function is adopted as the loss function, and a convolutional neural network is applied for evaluation. The comparison results are shown in Figure 1.

Conclusions: The results show that the loss of the proposed method is lower than the losses of other methods (i.e., SGD, SGD with momentum, and PSO).

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253 | Research on the approaches of energy transition under the biotechnology and drive of digital technologies

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Background: Energy transition has become a hot issue of global concern. It matters for the formulation of national development strategies and is the only way for China to achieve sustainable development. At present, the development of energy transition has shown a series of features, such as diversification, low carbonization, decentralization, digitalization, ecological, and globalization.

Methods: As for energy development in China, the main problems lie in the energy structure and the energy utilization rate. As energy transition pursues clean energy structure, efficient energy use, and low-carbon energy technologies, energy technology innovations are extremely urgent, and the development of digital technologies and biotechnology will have profound influences on the green transformation of energy. Driving the energy transition through digitalization, taking biotechnology as the core breakthrough point, using new energy

as clean energy, adjusting the energy structure to increase the proportion of new energy, and squeezing out low-efficiency and high-polluting disposable energy, so as to achieve harmony between man and nature. This is not only China's international responsibility. This is an important guarantee for China's health and clean living environment.

Results: Under the premise of meeting the basic energy needs of production and life, adjust the energy structure, implement digitization of energy utilization and biotechnicalization, realize the efficient use of fossil energy and large-scale use of new energy, avoid incomplete utilization and high loss of energy, and affect the people's living environment and health quality Only by improving the quality of the environment and enhancing the physical fitness of the people can we ensure the health of the people and the sustained and stable development of the economy.

Conclusions: This paper has summarized the development status and future development plans of the developed countries in the energy field and analyzed the achievements made by the developed countries in energy transition under the Biotechnology and drive of the existing digital technologies, aiming to provide a reference for the approaches of energy transition under the Biotechnology and drive of digital technologies in China.

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254 | Research on the structural design of multi-storey steel modular and steel frame composite buildings

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Objectives: The advantages of modular structure are obvious, overcoming the ecological disadvantages of traditional structures and reducing resource consumption. To propose a frame type steel frame and multi-storey steel structure module conforming structural system for multi-storey steel structure module building, and to propose the simplification method and simplification method according to the basic principle of force transmission path.

Methods: The unique double-beam form of the steel modular building system and the traditional steel frame structure will be differentiated, firstly, the calculated length coefficient of the modular column will be studied theoretically, then the equivalent stiffness of the double-beam will be deduced, and the formulae for the calculated length coefficient of the modular column with and without lateral shift will be derived by combining parametric analysis. Therefore, for practical multi-storey modular steel buildings, the length coefficients are calculated according to the nodal simplification method, and then a finite element model is established to compare the mechanical performance indicators and justify the simplification. If necessary, a time course analysis and a detail level building elastoplastic analysis should also be done.

Results: The non-lateral shifting modular frame units are built by adding supports to the modular frame and the finite element software is used to analyze the eigenvalues of the model. After the introduction of the calculated length correction factor $\eta = .96$, the formula for the calculated length factor of Zhu without the side-shift module was obtained; the method for the eigenvalue analysis of the frame unit with the side-shift module remained the same as that of the frame without the side-shift module, but there was a certain difference between the theoretical solution and the finite element solution. After the correction of the theoretical solution, it was found that the error between the corrected theoretical solution and the finite element solution was kept at 1%, and the accuracy of the calculation was good.

Conclusions: A more convenient, fast and reliable modular unit and connection method can be proposed for the modular buildings of multi-storey steel structures. After proposing a simplified method according to the nodal force transmission path, can be applied to the subsequent performance analysis session, and the comparison results of mechanical indexes are used to prove that modular buildings can be the main development direction of transformation in the field.

255 | Research on China's medical device export competitiveness and its influencing factors

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Background: The spread of novel corona-virus pneumonia worldwide has brought huge threats to the safety of people around the world. To cope with the crisis, China has increased its production capacity of medical devices to supply the world, especially the route countries of "Belt&Road." Due to the characteristics of knowledge intensiveness of medical devices, the export ability of medical devices can reflect a country's technological level and development quality. Therefore, it is necessary to measure the comprehensive competitiveness of China's medical device export and look for its key influencing factors, so as to provide policy suggestions for China to improve the quality of its medical device industry and lead the development in the future global competition.

Methods: We firstly constructed three indexes including the revealed comparative advantage index (RCA), the international market share index (MS), and the trade competitiveness index (TC), based on China's medical device products export data from year 2010 to year 2019 in the "Belt&Road" route countries, to calculate the comprehensive export competitiveness of China's medical devices by arithmetic mean method. The data was obtained from UN Com-trade database, recognized by HS code. Then we used the static and dynamic panel econometric models to investigate the influencing factors of China's medical device export competitiveness, including China's GDP, the importing country's GDP, the government health expenditure of the importing country, the population of the importing country, exchange rate, geographical distance and the number of Chinese researchers

etc. The robustness of the regression results was further verified by substituting some explanatory variables.

Results: It is found that in the last 10 years, China's export volume of medical devices increased significantly and its international market share increased continuously. However, the comprehensive competitiveness of China's export of medical devices is still relatively weak, and the upward trend is not obvious. The empirical regression results show that the growth of China's GDP can promote China's export competitiveness of medical devices, but the GDP of importing countries plays the opposite role. The increase of government health expenditure and population of importing countries can also promote the export competitiveness of China's medical devices. Due to the nature of necessities of medical devices, the impact of exchange rate and geographical distance is not significant. The number of Chinese researchers can significantly promote the export competitiveness of China's medical devices.

Conclusions: China's export competitiveness of medical devices is still not strong, and its development is still in the primary stage. China should increase investment in medical device research and development, and actively develop the market with more population and potential economic development in the "Belt&Road" area.

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256 | Deep learning-based vehicle speed estimation in accordance with call arrivals and normal location updates

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Objectives: This study surveys the following issues: (1) the correlation between vehicle density and the number of call arrivals (CAs); (2) the correlation between traffic flow and the number of normal location updates (NLUs).

Methods: This study trains two neural network models including a vehicle density estimation model (i.e., Model 1) and a traffic flow estimation model (i.e., Model 2) in Figure 1. The inputs of Model 1 include the numbers of CAs (i.e., $\{a_{1,t}, a_{2,t}, \ldots, a_{m,t}\}$), and the number of CAs in Cell i covering Road i during time period t is denoted as $a_{i,t}$; the outputs of Model 1 include the numbers of estimated vehicle densities, and the number of estimated vehicle densities on Road i during time period t is denoted as $k_{i,t}$. Furthermore, the inputs of Model 2 include the numbers of NLUs (i.e., $\{n_{1,t}, n_{2,t}, \ldots, n_{m,t}\}$), and the number of NLUs in the j-th location area (LA) during time period t is denoted as $n_{j,t}$; each LA includes more than one cell (e.g., Cell 1, Cell 2, and Cell 3 in LA 1 in Figure 1A); the outputs of Model 2 include the numbers of estimated traffic flows, and the numbers of estimated traffic flows on Road i during time period t is denoted as $q_{i,t}$. Finally, the equation (i.e., $u_{i,t} = q_{i,t} / k_{i,t}$) is applied to estimate the vehicle speed on Road i (i.e., $u_{i,t}$) for vehicle speed estimation.

Results and Conclusions: The mean absolute percentage error of the estimated vehicle speeds is 3.14%. The results show that the vehicle speeds could be estimated by the number of estimated vehicle densities based on the number of CAs and the number of estimated traffic flows based on the number of NLUs.

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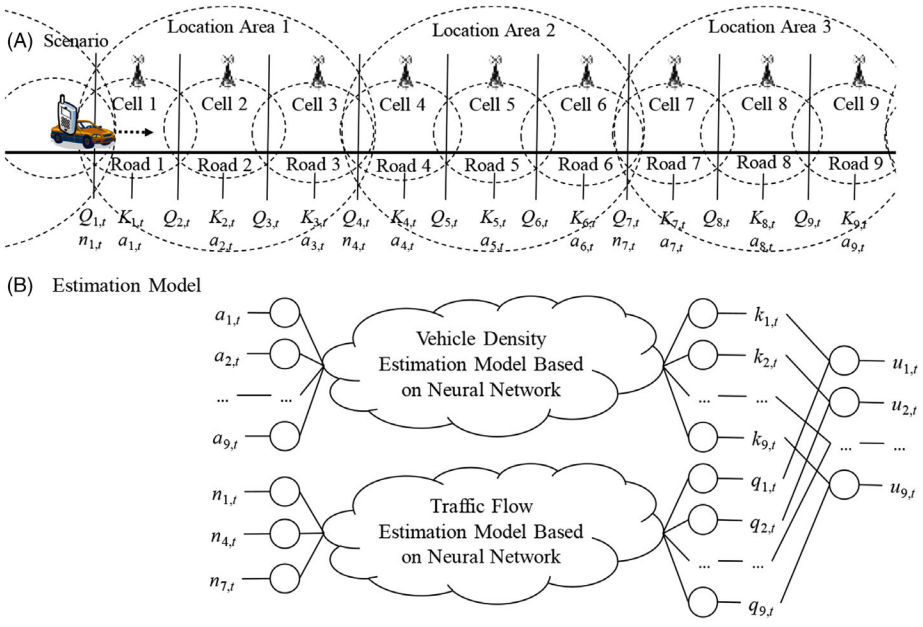

FIGURE 1 Traffic information estimation based on CAs and NLUs [Colour figure can be viewed at wileyonlinelibrary.com]

Science and Technology Talent Development Project of Education Department of Guizhou Province (No. KY[2017]308).

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257 | Selection of deep learning model based on AHP and queueing model

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Objectives: Due to limited graphics processing unit (GPU) resource, the request of image recognition may be blocked when the number of requests is large. Therefore, the selection of deep learning model could be modeled as the issue of multi-criteria decision-making (MCDM) to analyze several factors (e.g., accuracy, service level, etc.). Therefore, this study adopts the analytic hierarchy process (AHP) method to analyze the weights of accuracies and service levels for the selection of deep learning model.

Methods: In the first layer of AHP, a pairwise comparison matrix of accuracies based on ResNet and DenseNet is denoted as

$$\mathbf{W_a} = \begin{matrix} \\ R \\ D \end{matrix}\begin{matrix} \begin{matrix} R & D \end{matrix} \\ \begin{bmatrix} r_a/r_a & r_a/d_a \\ d_a/r_a & d_a/d_a \end{bmatrix} \end{matrix} \cong \begin{matrix} \\ R \\ D \end{matrix}\begin{matrix} \begin{matrix} R & D \end{matrix} \\ \begin{bmatrix} r_a/\alpha & r_a/\alpha \\ d_a/\alpha & d_a/\alpha \end{bmatrix} \end{matrix},$$

where the parameters include the accuracy of ResNet r_a, the accuracy of DenseNet d_a, and the summary of accuracies α; furthermore, another pairwise comparison matrix of service levels based on ResNet and DenseNet is denoted as

$$\mathbf{W_s} = \begin{matrix} \\ R \\ D \end{matrix}\begin{matrix} \begin{matrix} R & D \end{matrix} \\ \begin{bmatrix} r_s/r_s & r_s/d_s \\ d_s/r_s & d_s/d_s \end{bmatrix} \end{matrix} \cong \begin{matrix} \\ R \\ D \end{matrix}\begin{matrix} \begin{matrix} R & D \end{matrix} \\ \begin{bmatrix} r_s/\beta & r_s/\beta \\ d_s/\beta & d_s/\beta \end{bmatrix} \end{matrix},$$

where the parameters include the service level of ResNet r_s, the service level of DenseNet d_s, and the summary of service levels β. In the second layer of AHP, a pairwise comparison matrix of factors for accuracy and service level is denoted as

$$\mathbf{W_f} = \begin{matrix} \\ A \\ S \end{matrix}\begin{matrix} \begin{matrix} A & S \end{matrix} \\ \begin{bmatrix} a_w/a_w & a_w/s_w \\ s_w/a_w & s_w/s_w \end{bmatrix} \end{matrix} \cong \begin{matrix} \\ A \\ S \end{matrix}\begin{matrix} \begin{matrix} A & S \end{matrix} \\ \begin{bmatrix} a_w/\gamma & a_w/\gamma \\ s_w/\gamma & s_w/\gamma \end{bmatrix} \end{matrix},$$

where the parameters include the weight of accuracy a_w, the weight of service level s_w, and the summary of accuracies γ. Therefore, if the condition (i.e., $\frac{r_a}{\alpha}\frac{a_w}{\gamma} + \frac{r_s}{\beta}\frac{s_w}{\gamma} > \frac{d_a}{\alpha}\frac{a_w}{\gamma} + \frac{d_s}{\beta}\frac{s_w}{\gamma} \Rightarrow \frac{a_w}{s_w} > \frac{\alpha(d_s - r_s)}{\beta(r_a - d_a)}$) is satisfied, the ResNet will be selected for image recognition.

Results and Conclusions: In the practical case of road sign recognition, the accuracies of ResNet and DenseNet are .94 and 1; the service levels of ResNet and DenseNet are .102 and .075 based on the M/D/1 queue when the arrival rate is 40 images/minute and the service rates of ResNet and DenseNet are 42.212 images/minute and 41.586 images/minute. Therefore, if the weight ratio a_w/s_w is higher than 4.98, the ResNet will be selected for road sign recognition.

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258 | Deep learning-based traffic information estimation in accordance with location updates

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Objectives: This study surveys the following issues: (1) the correlation between vehicle density and the number of periodical location updates (PLUs); (2) the correlation between traffic flow and the number of normal location updates (NLUs).

Methods: In Figure 1A, there are l location areas and m cells; the practical vehicle density on Road i during time period t is $K_{i,t}$; the practical traffic flow on Road i during time period t is $Q_{i,t}$; the number of PLUs in Cell i during time period t is $p_{i,t}$; the number of NLUs in Cell i in Location Area j during time period t is $n_{i,t}$. For constructing models, the numbers of PLUs in adjacent cells (i.e., $p_{1,t}$, …, $p_{m,t}$) are adopted as the inputs of the vehicle density estimation model based on a neural network, and the practical vehicle densities (i.e., $K_{1,t}$, …, $K_{m,t}$) on adjacent roads are adopted as the outputs of the model for generating the estimated vehicle densities (i.e., $k_{1,t}$,…, $k_{m,t}$). Furthermore, the numbers of NLUs in adjacent location areas (i.e., $n_{1,t}$, $n_{4,t}$, $n_{7,t}$, …) are adopted as the inputs of the traffic flow estimation model based on another neural network, and the practical traffic flows (i.e., $Q_{1,t}$, …, $Q_{m,t}$) on adjacent roads are adopted as the outputs of the model for generating the estimated vehicle densities (i.e., $q_{1,t}$, …, $q_{m,t}$). Finally, the estimated vehicle speed on Road i (i.e., $u_{i,t}$) could be generated based on the estimated vehicle densities and the estimated traffic flows in Figure 1B.

Results: The mean absolute percentage errors (MAPEs) of the estimated vehicle densities, the estimated traffic flows, and the estimated vehicle speeds are 1.97%, .81%, and 2.87%, respectively.

Conclusions: The proposed traffic information estimation method could provide the estimated vehicle densities based on the numbers of PLU, the estimated traffic flows based on the numbers of NLU, and the estimated vehicle speed based on the estimated vehicle densities and the estimated traffic flows.

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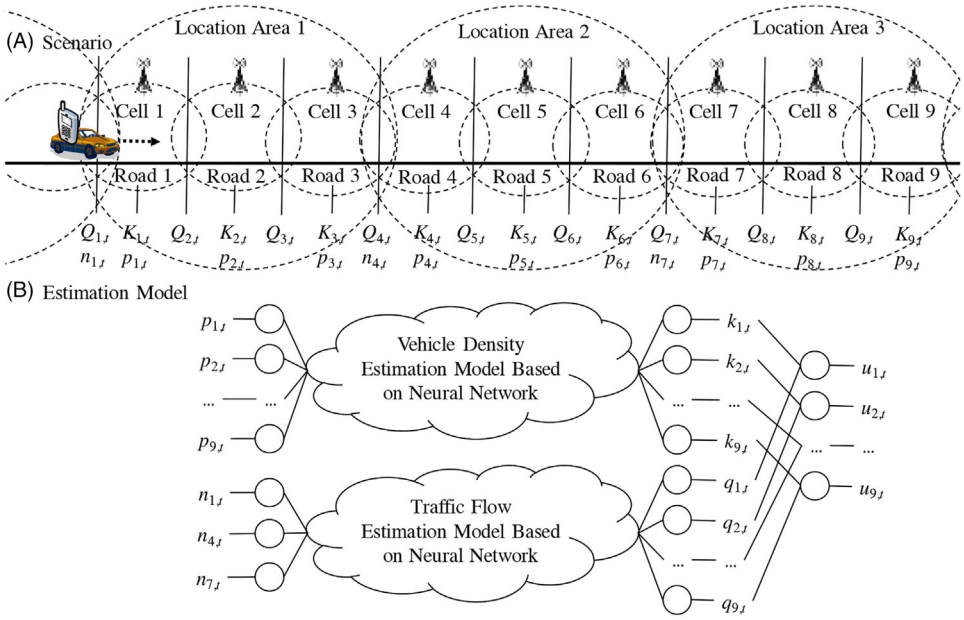

FIGURE 1 Traffic information estimation based on location updates [Colour figure can be viewed at wileyonlinelibrary.com]

259 | Feasibility and Safety Analysis of Endoscopic Closure in the Treatment of Colon Perforation

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#Yan Zhang and Xinrong Ji contributed equally to this work.

Objective: To investigate the feasibility and safety of endoscopic closure therapy in the treatment of colon perforation.

Methods: The clinical data of 8 patients admitted to our hospital for endoscopic closure treatment of colon perforation were retrospectively divided, and the closure treatment methods included endoscopic purse-string suturing and ultra-wide angle clips.

Results: All cases completed perforation closure treatment under endoscopy, among which 4 cases were medically induced perforations occurred during colonoscopy, 2 cases were diverticulitis with perforation, 1 case was foreign body perforation, and 1 case was spontaneous perforation. Two cases were discharged from the hospital after conservative medical treatment due to the unsatisfactory effect of the initial closure treatment and second endoscopic closure. Conclusion: The endoscopic closure method for colon perforation is feasible, safe and effective, and worthy of promotion and application.

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260 | The effect of comfort nursing in operating room on postoperative pain and time to get out of bed for patients with knee arthritis

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#Contributed equally to this work.

Objective: To investigate the effect of comfort nursing in operating room on postoperative pain and time to get out of bed for patients with knee arthritis.

Method: From February 2017 to April 2020, 86 cases of patients with knee arthritis whoundergone surgery in our hospital were selected as the research subjects. The patients were divided into a control group and a comfort group with 43 cases each by random drawing. All patients were given knee replacement surgery, the control group took conventional care during the perioperative period, and the comfort group were given comfort care in the operating room on the basis of the control group. The postoperative pain and the first time to get out of bed were recorded in the two groups. **Results**: The distance of getting out of bed in the comfort group 1–3 days after operation were more than that of the control group ($P<0.05$), and the pain score were not statistically different from the control group ($P>0.05$). The first postoperative ventilation time, laxative time and time to get out of bed in the comfort group were less than those in the control group ($P<0.05$). The

incidence of complications such as incision infection, lung infection, and venous thrombosis in the comfort group one month after surgery were 7.0%, which were lower than 27.9% in the control group ($P<0.05$).

Conclusion: The application of comfort nursing in the operating room for patients with knee arthritis can promote early getting out of bed and increase the amount of getting out of bed without increasing the patient's pain, which is conducive to promoting patient recovery and reducing the occurrence of complications.

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261 | Analysis of Influencing Factors of Patient-centered Nursing Model on Improving Nursing Compliance and Nursing Quality of Surgical Patients

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Objective: To explore the influencing factors of patient-centered nursing model on improving nursing compliance and nursing quality of surgical patients.

Method: A total of 86 surgical patients admitted to the hospital from January 2018 to May 2020 were selected as the research objects, and the clinical data of all patients were analyzed retrospectively: control group (40 cases) and intervention group (46 cases).

Results: (1) After the intervention, the nursing compliance rate of the patients in the intervention group (97.83%) was significantly higher than that in the control group (80.00%) ($P<0.05$); (2) After the intervention, the nursing quality of the patients in the observation group was higher than that in the control group. Significantly improved ($P<0.05$)

Conclusion: The patient-centered nursing intervention model can improve the nursing compliance and nursing quality of surgery, and be more easily accepted by patients. However, improving the quality of medical services, improving the trust between doctors and patients, and maintaining the relationship between nurses and patients are the keys to improving the quality of postoperative care for surgical patients.

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