本发明提出了一种增强型屏障功能的肠类器官芯片及其应用,该增强型肠类器官芯片包括至少一个结构单元,所述结构单元包括：上层子芯片、多孔膜和下层子芯片；其中,所述上层子芯片包括：第一流道,所述第一流道适于容纳肠类器官和第一培养液；所述下层子芯片包括：第二流道,所述第二流道适于容纳内皮细胞和第二培养液；所述多孔膜设置于所述第二流道的上方且覆盖所述第一流道的至少部分底部；所述第一流道朝向下层子芯片的投影经过所述多孔膜与所述第二流道至少部分重叠。其中,第一流道的宽度大于所述第二流道的宽度。利用本发明的增强型肠类器官芯片可用于研究病原体感染过程和致病机制,为肠相关疾病的新疗法提供了增强型屏障功能的研究平台。

{

"entities": {

"器官芯片": ["增强型肠类器官芯片"],

"结构组件": ["结构单元", "上层子芯片", "多孔膜", "下层子芯片", "第一流道", "第二流道"],

"应用场景": ["研究病原体感染过程和致病机制", "为肠相关疾病的新疗法提供研究平台"],

"评价指标": ["增强型屏障功能"],

"技术方法": [],

"材料/细胞": ["肠类器官", "第一培养液", "内皮细胞", "第二培养液"],

"药物": [],

"疾病": ["肠相关疾病"]

},

"relations": [

"[增强型肠类器官芯片] 包含组件 [结构单元]",

"[增强型肠类器官芯片] 包含组件 [上层子芯片]",

"[增强型肠类器官芯片] 包含组件 [多孔膜]",

"[增强型肠类器官芯片] 包含组件 [下层子芯片]",

"[增强型肠类器官芯片] 包含组件 [第一流道]",

"[增强型肠类器官芯片] 包含组件 [第二流道]",

"[增强型肠类器官芯片] 应用于 [研究病原体感染过程和致病机制]",

"[增强型肠类器官芯片] 应用于 [为肠相关疾病的新疗法提供研究平台]",

"[增强型肠类器官芯片] 使用材料/细胞 [肠类器官]",

"[增强型肠类器官芯片] 使用材料/细胞 [第一培养液]",

"[增强型肠类器官芯片] 使用材料/细胞 [内皮细胞]",

"[增强型肠类器官芯片] 使用材料/细胞 [第二培养液]",

"[增强型肠类器官芯片] 评价方法为 [增强型屏障功能]"

]

}

本发明提出了三维可灌注的血管化肠类器官芯片及其制备方法和应用,血管化肠类器官芯片包括至少一个结构单元,结构单元包括：上层子芯片、下层子芯片和多孔膜,上层子芯片包括第一流道；下层子芯片与上层子芯片键合；下层子芯片包括相连通的第二流道和培养基流道；多孔膜设置于第一流道和第二流道之间且覆盖第一流道的开口的至少一部分。利用本发明的血管化肠类器官芯片可以模拟体内血液流动和细胞表面受到的流体剪切应力,构建的血管化肠类器官在结构和功能上能够最大程度的模拟真实器官及其生理功能,具有绒毛样上皮等微结构,可在体外以高保真度重现生理反应,可应用于肠相关疾病的研究和新疗法及个性化药物筛选等,应用价值高。

{

"entities": {

"器官芯片": ["血管化肠类器官芯片"],

"结构组件": ["结构单元", "上层子芯片", "下层子芯片", "多孔膜", "第一流道", "第二流道", "培养基流道"],

"应用场景": ["模拟体内血液流动和流体剪切应力", "肠相关疾病的研究", "新疗法", "个性化药物筛选"],

"评价指标": ["血液流动", "流体剪切应力", "绒毛样上皮", "生理反应"],

"技术方法": ["制备方法"],

"材料/细胞": [],

"药物": [],

"疾病": ["肠相关疾病"]

},

"relations": [

"[血管化肠类器官芯片] 包含组件 [结构单元]",

"[血管化肠类器官芯片] 包含组件 [上层子芯片]",

"[血管化肠类器官芯片] 包含组件 [下层子芯片]",

"[血管化肠类器官芯片] 包含组件 [多孔膜]",

"[血管化肠类器官芯片] 包含组件 [第一流道]",

"[血管化肠类器官芯片] 包含组件 [第二流道]",

"[血管化肠类器官芯片] 包含组件 [培养基流道]",

"[血管化肠类器官芯片] 应用于 [模拟体内血液流动和流体剪切应力]",

"[血管化肠类器官芯片] 应用于 [肠相关疾病的研究]",

"[血管化肠类器官芯片] 应用于 [新疗法]",

"[血管化肠类器官芯片] 应用于 [个性化药物筛选]",

"[血管化肠类器官芯片] 评价方法为 [血液流动]",

"[血管化肠类器官芯片] 评价方法为 [流体剪切应力]",

"[血管化肠类器官芯片] 评价方法为 [绒毛样上皮]",

"[血管化肠类器官芯片] 评价方法为 [生理反应]",

"[血管化肠类器官芯片] 采用技术 [制备方法]"

]

}

本发明涉及一种高通量厌氧肠芯片系统及在评价益生菌缓解肠炎功能中的应用,高通量厌氧肠芯片系统包括微流控芯片、流体灌注装置、氧气监测芯片和微型厌氧箱,流体灌注装置能够向微流控芯片中注入培养基,氧气监测芯片设置在微流控芯片上游,微流控芯片设置在微型厌氧箱中,微流控芯片中设有肠细胞,高通量厌氧肠芯片能够模拟肠环境,通过将不同种类益生菌加入到肠芯片中,可通过检测培养所得物,或检测培养后的肠细胞,从而评价益生菌功能；进一步的可将高通量厌氧肠芯片与机器学习结合起来,利用机器学习技术对基于肠芯片的肠炎模型的多维数据特征(基因、蛋白、细胞水平)的分析和处理,以进行全局、整体的综合评价；最终实现高通量、智能化的筛选出功效较好的益生菌菌株。

{

"entities": {

"器官芯片": ["高通量厌氧肠芯片"],

"结构组件": ["微流控芯片", "流体灌注装置", "氧气监测芯片", "微型厌氧箱"],

"应用场景": ["评价益生菌缓解肠炎功能", "模拟肠环境", "筛选功效较好的益生菌菌株"],

"评价指标": ["益生菌功能", "肠环境"],

"技术方法": ["机器学习技术"],

"材料/细胞": ["肠细胞", "培养基"],

"药物": ["益生菌"],

"疾病": ["肠炎"]

},

"relations": [

"[高通量厌氧肠芯片] 包含组件 [微流控芯片]",

"[高通量厌氧肠芯片] 包含组件 [流体灌注装置]",

"[高通量厌氧肠芯片] 包含组件 [氧气监测芯片]",

"[高通量厌氧肠芯片] 包含组件 [微型厌氧箱]",

"[高通量厌氧肠芯片] 应用于 [评价益生菌缓解肠炎功能]",

"[高通量厌氧肠芯片] 应用于 [模拟肠环境]",

"[高通量厌氧肠芯片] 应用于 [筛选功效较好的益生菌菌株]",

"[高通量厌氧肠芯片] 使用材料/细胞 [肠细胞]",

"[高通量厌氧肠芯片] 使用材料/细胞 [培养基]",

"[高通量厌氧肠芯片] 评价方法为 [益生菌功能]",

"[高通量厌氧肠芯片] 评价方法为 [肠环境]",

"[高通量厌氧肠芯片] 采用技术 [机器学习技术]",

"[评价益生菌缓解肠炎功能] 涉及 [益生菌]",

"[评价益生菌缓解肠炎功能] 关联 [肠炎]"

]

}

NOVELTY - Use of cytokine interleukin 1F5 (IL1F5) in the preparation of products for detection, prevention and/or treatment of tumors, and/or in the preparation of tumor detection reagents, is claimed. USE - The IL1F5 is useful in the preparation of products for detection, prevention and/or treatment of tumors, in the preparation of tumor detection reagents, and in the preparation of chips or kits for tumor detection, where the tumors include liver cancer, lung cancer, squamous cancer, breast cancer, cervical cancer, colorectal cancer, and adenocarcinoma, preferably lung cancer or colorectal cancer (all claimed). DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:(1) use of the cytokine IL1F5, or a nucleotide sequence encoding the IL1F5, or a vector containing the nucleotide sequence encoding the IL1F5, or a recombinant protein produced by introducing or transfecting the vector containing the nucleotide sequence encoding the IL1F5 into the host, or the vector or virus that overexpresses IL1F5 in the preparation of anti-tumor drugs; and(2) a kit comprising the cytokine IL1F5.

{

"entities": {

"器官芯片": ["chips for tumor detection"],

"结构组件": [],

"应用场景": ["detection of tumors", "prevention of tumors", "treatment of tumors", "preparation of tumor detection reagents"],

"评价指标": [],

"技术方法": ["preparation of anti-tumor drugs"],

"材料/细胞": [],

"药物": ["IL1F5"],

"疾病": ["tumors", "liver cancer", "lung cancer", "squamous cancer", "breast cancer", "cervical cancer", "colorectal cancer", "adenocarcinoma"]

},

"relations": [

"[chips for tumor detection] 应用于 [detection of tumors]",

"[chips for tumor detection] 应用于 [prevention of tumors]",

"[chips for tumor detection] 应用于 [treatment of tumors]",

"[chips for tumor detection] 应用于 [preparation of tumor detection reagents]",

"[chips for tumor detection] 采用技术 [preparation of anti-tumor drugs]",

"[detection of tumors] 涉及 [IL1F5]",

"[detection of tumors] 关联 [tumors]",

"[detection of tumors] 关联 [liver cancer]",

"[detection of tumors] 关联 [lung cancer]",

"[detection of tumors] 关联 [squamous cancer]",

"[detection of tumors] 关联 [breast cancer]",

"[detection of tumors] 关联 [cervical cancer]",

"[detection of tumors] 关联 [colorectal cancer]",

"[detection of tumors] 关联 [adenocarcinoma]"

]

}

NOVELTY - Biomarker composition comprising biomarkers including lysophosphatidylcholine, histidine-rich glycoprotein, and/or osteopontin. The biomarker is extracted from blood, in which the blood is whole blood, plasma or serum. The lysophosphatidylcholine (LPC) is lysophosphatidylcholine 16:0 or lysophosphatidylcholine 18:0, is new. USE - The biomarker composition is useful in kit for diagnosing cancer including lung cancer and liver cancer (all claimed). ADVANTAGE - The biomarker composition shows pattern different from that of normal people when lysophosphatidylcholine, histidine-rich glycoprotein and osteopontin are combined, and has improved diagnostic ability of various cancers. DETAILED DESCRIPTION - INDEPENDENT CLAIMS are also included for:(1) composition comprising an agent for measuring the blood level of the biomarker composition; and(2) providing information, comprising (a) measuring the level of lysophosphatidylcholine, histidine-rich glycoprotein, and/or osteopontin through protein chip analysis, immunoassay, ligand binding assay, matrix desorption/ionization time of flight mass spectrometry analysis, radioimmunoassay, radioimmunodiffusion method, octeroni immunodiffusion method, rocket immunoelectrophoresis, tissue immunostaining, complement fixation assay, two-dimensional electrophoresis analysis, liquid chromatography-mass spectrometry (LC-MS), liquid chromatography-mass spectrometry/mass spectrometry (LCMS/MS), Western blot and/or enzyme linked immunosorbent assay, and (b) comparing the level of the biomarker with a normal control sample.

{

"entities": {

"器官芯片": ["protein chip"],

"结构组件": [],

"应用场景": ["diagnosing cancer"],

"评价指标": ["diagnostic ability"],

"技术方法": ["protein chip analysis", "immunoassay", "ligand binding assay", "matrix desorption/ionization time of flight mass spectrometry analysis", "liquid chromatography-mass spectrometry (LC-MS)"],

"材料/细胞": ["lysophosphatidylcholine", "histidine-rich glycoprotein", "osteopontin", "blood"],

"药物": [],

"疾病": ["cancer", "lung cancer", "liver cancer"]

},

"relations": [

"[protein chip] 应用于 [diagnosing cancer]",

"[protein chip] 评价方法为 [diagnostic ability]",

"[protein chip] 采用技术 [protein chip analysis]",

"[protein chip] 采用技术 [immunoassay]",

"[protein chip] 采用技术 [ligand binding assay]",

"[protein chip] 采用技术 [matrix desorption/ionization time of flight mass spectrometry analysis]",

"[protein chip] 采用技术 [liquid chromatography-mass spectrometry (LC-MS)]",

"[protein chip] 使用材料/细胞 [lysophosphatidylcholine]",

"[protein chip] 使用材料/细胞 [histidine-rich glycoprotein]",

"[protein chip] 使用材料/细胞 [osteopontin]",

"[protein chip] 使用材料/细胞 [blood]",

"[diagnosing cancer] 关联 [cancer]",

"[diagnosing cancer] 关联 [lung cancer]",

"[diagnosing cancer] 关联 [liver cancer]"

]

}

NOVELTY - Screening method for targeting GRB2 SH2 domain polypeptides involves (a) selecting peptides comprising phosphorylated tyrosine, (b) constructing a microarray comprising the phosphorylated tyrosine polypeptide, immobilizing the polypeptide on a microarray chip by a high affinity action of biotin tag and streptavidin, (c) applying single spot microarray, two-color strategy microarray, and microarray dynamic analysis based on concentration gradient to the high-affinity peptide screening of GRB2 SH2 domain, and (d) according to the interaction between the phosphorylated tyrosine polypeptide and the GRB2 SH2 domain on the microarray, identifying the polypeptide that interacts with the GRB2SH2 domain to target the GRB2 SH2 domain polypeptide. USE - The polypeptides are useful for preparing reagents for diagnosing and treating diseases mediated by GRB2 protein, preferably tumor disease including liver cancer (all claimed). ADVANTAGE - The polypeptides have high affinity and specificity. DETAILED DESCRIPTION - INDEPENDENT CLAIMS are included for the following:(1) a GRB2 SH2 domain polypeptide screened by the above method comprising one of 7 (11) amino acid sequences fully defined in the specification; and(2) an agent for diagnosis or treatment of tumors comprising the polypeptide.

{

"entities": {

"器官芯片": ["microarray chip"],

"结构组件": [],

"应用场景": ["diagnosing diseases mediated by GRB2 protein", "treatment of diseases mediated by GRB2 protein"],

"评价指标": ["high affinity", "specificity"],

"技术方法": ["selecting peptides", "constructing a microarray", "high affinity action of biotin tag and streptavidin", "single spot microarray", "two-color strategy microarray", "microarray dynamic analysis based on concentration gradient"],

"材料/细胞": ["phosphorylated tyrosine polypeptide", "GRB2 SH2 domain"],

"药物": [],

"疾病": ["tumor disease", "liver cancer"]

},

"relations": [

"[microarray chip] 应用于 [diagnosing diseases mediated by GRB2 protein]",

"[microarray chip] 应用于 [treatment of diseases mediated by GRB2 protein]",

"[microarray chip] 评价方法为 [high affinity]",

"[microarray chip] 评价方法为 [specificity]",

"[microarray chip] 采用技术 [selecting peptides]",

"[microarray chip] 采用技术 [constructing a microarray]",

"[microarray chip] 采用技术 [high affinity action of biotin tag and streptavidin]",

"[microarray chip] 采用技术 [single spot microarray]",

"[microarray chip] 采用技术 [two-color strategy microarray]",

"[microarray chip] 采用技术 [microarray dynamic analysis based on concentration gradient]",

"[microarray chip] 使用材料/细胞 [phosphorylated tyrosine polypeptide]",

"[microarray chip] 使用材料/细胞 [GRB2 SH2 domain]",

"[diagnosing diseases mediated by GRB2 protein] 关联 [tumor disease]",

"[diagnosing diseases mediated by GRB2 protein] 关联 [liver cancer]"

]

}