spectroscopy in rapid detection of water pollution, *Desal. Water Treat.* 2018; 122: 1-4.

Correspondence Author: Yu Qing: The Department of Endocrinology and Metabolism, the Affiliated Hospital of Qingdao University, Qingdao, China.

075 | Dynamic Glucose Prediction and Health Management of Diabetes Mellitus Based on Deep Learning

Jiarui Si[1,2]; Lingmin Lin[1]; Hengle Chen[1]; Jiawen Zhang[1]; Chuanyi Huang[1]; Yuan Yin[1]; Jing Li[3]

[1]Tianjin Medical University, Tianjin 300070, China; [2]School of Public Health, Tianjin Medical University, Tianjin 300070, China; [3]NHC Key Laboratory of Hormones and Development, Tianjin Key Laboratory of Metabolic Diseases, Chu Hsien-I Memorial Hospital & Tianjin Institute of Endocrinology, Tianjin Medical University, Tianjin 300134, China

Objectives: This research monitored the continuous blood glucose of patients with type 2 diabetes (with stable blood glucose in the early stage and no serious complications) for 14 days, to predict the changes of blood glucose in the patients within the next 2 hours accurately, which can give the individualized sugar control scheme of diet and exercise, and give early warning of the occurrence of nocturnal hypoglycemia.

Methods: (1) Blood glucose data of patients with type 2 diabetes were collected by the FreeStyle Libre flash glucose monitoring system (approved by FDA in May 2017). (2) The R3 movement bracelet was used to obtain the patients' movement data and sleep quality. (3) According to the photos of three meals a day taken by the patients, an application called Bohe (calorie calculation data from 'Chinese food ingredients list 2019') was used to obtain the daily intake of calories.(4) LSTM was used to conduct deep learning on the continuous blood glucose data of the patient and predict the upcoming blood glucose changes of the patients.

Results: (1) Blood glucose data, walking steps and sleep duration of 15 patients were obtained for 14 consecutive days. (2) The corresponding relation was calculated between the food intake (calories) and the ascent of blood glucose values in two hours of each patient. And the corresponding relation between the consumption of exercise (calories) and the descent of blood glucose values in two hours of each patient were also calculated.(3) The long short-term memory neural network (LSTM) model was established. Personal sugar-control advice could be given based on the corresponding relations two hours before the expected blood glucose values of the patient is about to go beyond critical glycemic value. The correlation coefficients was all within the 95% confidence interval near the origin, and the root-mean-square error is 0.937, indicating that the prediction effect of the model was good. (4) The blood glucose changes of patients can be predicted dynamically and the nocturnal hypoglycemia events can be predicted in advance.(5) The absolute difference of 15 patients' blood glucose in daytime during two week was calculated, and the results were (mean ± standard deviation): (12.44±1.84), (10.92±2.46), (11.08±2.13), (9.26±1.4), (9.14±1.4), (9.57±2.01), (9.91±2.05), (8.68±1.45), (8.64±1.54), (8.31±1.76), (8.97±1.13), (8.37±1.37), (8.39±2) and (8.42±1.27). The data indicated that the fluctuation range of blood glucose was gradually decreasing.

Conclusions: (1) Continuous blood glucose monitoring device (CGM) can effectively help patients master their own blood glucose fluctuation rules and provide guidance for their own blood glucose management. (2) LSTM has a good prediction effect on blood glucose fluctuations in multiple patients. This deep learning model is suitable for long-term dynamic blood glucose prediction, which with 101 hidden layers and 56 neurons has got the relatively good prediction effect. (3)The diagnosis method based on predicted results is conducive to timely intervention of patients before the occurrence of adverse blood glucose events, and plays a better role in sugar control effect than the traditional lagging intervention measures.

Acknowledgments: The project was supported by National Natural Science Foundation of China (71673199, 71910107004, 91746205, 71904142), China Postdoctoral Science Foundation (2017M621092), Tianjin Science and Technology (18ZXZNSY00280).

Correspondence Author: Jiarui Si, Tianjin Medical University, Tianjin, China.

076 | Effect of Comprehensive Physical and Mental Intervention on Plasma Leptin and Leptin-R Gene Promoter Methylation in Obese Children

Maolin Tian[1]; Xiaodong Li[1]; Zujun Song[2]; Ping Chen[1]

[1]College of Physical Education, Jishou University, Jishou, China; [2]Smart Health Promotion Laboratory, Huaihua University, Huaihua, China

Objectives: Obese children are one of the most important issues in the world. It is the focus of scientists to explore the mechanism of comprehensive physical and mental intervention. From the DNA methylation link in the promoter region of genes, the epigenetic regulation mechanism of plasma and Leptin and Leptin-R expression in obese children was investigated by comprehensive physical and mental intervention. Providing theoretical support for obese children to lose weight.