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Mini Review

Stimulators and Simulation Models of the Brain from Viewpoints of Diabetes Disease and its Control (GH-Method: Math-Physical Medicine)

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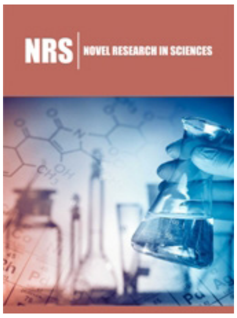

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Introduction

This paper describes stimulators and simulation models of the human brain from viewpoints of diabetes disease conditions and its control. The author has utilized GH-method: math-physical medicine approach to conduct this research.

Methods

This section describes the author's progressive research during the past 4.5 years, from 2015 to 2019. He has verified his various hypotheses regarding the brain's ability and function of cognition, analyzing, decision-making, and order-issuing to internal organs that is various simulation models of the brain.

The author spent 24,000 hours over the past 9-years, from 2010 – 2019, to conduct diabetes research by using his GH-Method: math-physical medicine (MPM) methodology. As he delved deeper into diabetes, he realized the significant role the brain played in this disease. Actually, his application of various research tools, including physics, mathematics, engineering modeling, computer science, and artificial intelligence (AI) all use the analysis part of the brain in relation to another section of the brain within the body's biological operations. Now, he is trying to interpret his research findings and conclusions from viewpoints of stimulator identification and simulation model definition of the brain function.

One of the most prominent bio-marks of the diabetes conditions is HbA1C (A1C) level which has two major physical components: postprandial plasma glucose (PPG contributes ~70%-80% of A1C) and fasting plasma glucose (FPG contributes ~20%-30% of A1C).

During sleep hours, there are no energy exchange activities from either food or exercise. However, it is the author's hypothesis that the glucose production level by the liver is overseen by the brain. The brain makes the decision and then gives the marching order to the liver regarding the glucose production level. But which stimulator causes the brain to decide how much glucose is produced? The answer lies in the information of FPG from body weight. It took 9-months of research for the author to discover the fact that 85% correlation between FPG and body weight [1].

During the daytime, glucose value fluctuates. By using wave theory and signal processing techniques, the author has decomposed a measured PPG waveform over ~1,600 days into 19 sub-waves (a "macro-study"). He then re-integrated them back into one combined waveform (the predicted PPG wave). Furthermore, through a "micro-study" of more than 1,000 PPG detailed waveforms (each collected 12 data points within 3-hours after each meal), he was able to re-categorize them into three distinctive shapes: Himalayas, Grand Canyon, and Twin Peaks (see reference paper). Information of food and meal, especially carbs/sugar, enters into the stomach which stimulates the brain to process and analyze the relevant information and then decide how much glucose (PPG's height) to be produced by the liver. This glucose amount determines the maximum height (amplitude) of the three distinctive waveforms mentioned above. Actually, through his 5-year research, the author identified that about 1.8-2.2 mg/dL of PPG produced by each gram of carbs/sugar intake.

Within 30 minutes after the first bite of food, following digestion, the physical activity information (another stimulator) provides stimulation effect to the brain for making decisions on the glucose wave's decaying speed. Again, through his 5-year research work, he identified about 20-30 mg/dL of PPG decaying per hour due to post-meal walking at 4,000-6,000 steps per hour (about 40 to 60 minutes of walking) [2].

There is a secondary factor, ambient weather temperature (the third stimulator), which also impacts the glucose level but at a lesser degree. The author was able to identify this secondary stimulator by using the same analytical approach. He developed two hypotheses regarding the temperature effect. First hypothesis is that hot weather would increase PPG level by 0.9 mg/dL per degree when ambient weather temperature is above 77 degrees Fahrenheit due to increased metabolism demand (stimulator and simulation). Second hypothesis is that cold weather would decrease FPG level by 0.3 mg/dL per degree when ambient weather temperature is below 67 degrees Fahrenheit due to the hibernation effect (stimulator and simulation). It is still the power and work of the brain that causes the glucose variances. A similar observation of glucose rising from taking a hot shower is due to the stimulation of ambient temperature on our body surface to the brain [3].

Other findings can also be found in correlation studies between glucose and blood pressure (BP). Some medical professionals argue that blood pressure is caused by the elastic conditions of the blood vessels and has nothing to do with glucose (a pure structure mechanics view). If so, then how can we explain the high correlation existing between glucose and BP for some or most of the patients? The author believes that the brain knows far more things and is more capable than what we can analyze and identify today [4].

Even under the case of medication, it is the brain which decides the chemical compound's effectiveness on glucose control (e.g. x grams of certain drug dosage input causes y mg/dL of glucose control output). Medical doctors and pharmacologists are doing similar tasks as the author, except they are using bio-chemical medicine (BCM) approach instead of author's math-physical medicine (MPM) approach. Existing medical community is just trying to identify which drug and how much dosage (stimulator) would cause what degree of disease condition control via medication intervention which is just another form of simulation model.

The author also developed an AI-based Glucometer with eight influential factors to predict both FPG and PPG and achieved 95% to 99% prediction accuracy. This effort is also another brain simulation model based on the same group of stimulators but utilizing optical physics and AI to develop the simulation model.

All of these data-processing and data-analyzing tasks are performed by the brain. The author is merely discovering facts and proving his hypotheses through relevant data collection, physical phenomena observation, statistical calculation, appropriate mathematical equations derivation, and vital output's prediction. It is the brain doing the actual important analysis work and decision-making tasks regarding glucose productions. The author is trying to understand different brain stimulators, develop corresponding simulation models, and then discover some hidden physical characteristics and behavior patterns which are managed and produced by our brain in its natural biological way [5].

Results

Based on research in stimulators and simulation models of the brain involving diabetes disease and its control, the author has achieved significant accomplishments on his diabetes control.

Year 2010

Weight: 220 lbs.

Waistline: 44 inches

FPG: 180 mg/dL

PPG: 310 mg/dL

Daily Glucose: 280mg/dL

A1C: >10%

Year 2019

Weight: 172 lbs.

Waistline: 33 inches

FPG: 114 mg/dL

PPG: 116 mg/dL

Daily Glucose: 116 mg/dL

A1C: ~6.5%

Conclusion

Both traditional biochemical medicine (BCM) and the author's math-physical medicine (MPM) are two different simulation methods of the human brain, which can be used to understand brain's various functions, multiple activities, and complicated albeit effective decision-making process. Through distinct and hopefully complimentary research methodologies, cross disciplinary trainings, and the use of different but practical approximation tools, the author anticipates that we will eventually be able to better understand the brain's stimulators and its diverse simulation models.

This article is not analyzing the brain from the viewpoints of traditional neuroscience or neurology, it is rather emphasizing either BCM or MPM approaches as different yet having the same goals to understand the brain stimulators and various brain simulation models.

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