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USING WAVE AND ENERGY THEORIES ON FINE-TUNING FOOD AND EXERCISE TO CONTROL PPG (MATH-PHYSICAL MEDICINE)

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Introduction: The author conduct big data analytics of food exercise and derived practical tips for controlling postprandial plasma glucose wave.

Methods: He used both optical physics and signal processing techniques to develop PPG prediction model. He realized weight is merely a physical representation of internal energy exchange in human body. The energy infusion comes mainly from food, whereas energy diffusion mainly via exercise and activities. We should avoid having energy imbalance (disequilibrium); otherwise, the excessive (left-over) energy will damage our internal organs. In addition to his collected ~1.5M metabolism data and ~8M food/meal data, he further collected additional 14,400 glucose data during 174 days (5/5/2018-10/25/2018 with 80 measurements / day). He observed and analyzed these glucose waveforms and phenomena in detail using wave and energy theories from physics and engineering and also calculated their associated energy levels. Finally, he identified some practical ways to either avoid the building-up of ultrahigh amplitude of glucose wave or wearing off its cumulative energy quickly.

Results: He developed a few computational formulas and practical tips as stated below to "fine-tune" both energy infusions by food and energy diffusion through exercise in order to "wear-off" the excessive energy generated by glucose. He also identified a reasonable energy perturbation range (-7% to +17%); Predict PPG level before eating meal; don't eat >30 grams of carbs/sugar each meal. It can push PPG peak above 160 mg/dL; walk minimum 1500 steps after each meal, 4,000 steps for severe diabetes patients. More rigorous exercise can bring down PPG peak value, but stretch walking period can wear off energy to make glucose waveform look like a "Grand Canyon" shape which still has a high amplitude but contains much less energy; don't eat snacks too close to next meal to avoid building a glucose waveform similar to "Himalaya Mountain" shape which indicates massive energy.

Conclusion: His method and practical tips can "fine-tune" the energy infusion caused by food and energy diffusion (post-meal walking) and provide guidance to T2D patients for achieving a better PPG control.

BIOGRAPHY

Gerald C Hsu received an honorable PhD in Mathematics and majored in Engineering at MIT. He attended different universities over 17 years and studied seven academic disciplines. He has spent 20,000 hours in T2D research. First, he studied six metabolic diseases and food nutrition during 2010-2013, then conducted research during 2014-2018. His approach is "math-physics and quantitative medicine" based on mathematics, physics, engineering modelling, signal processing, computer science, big data analytics, statistics, machine learning and AI. His main focus is on preventive medicine using prediction tools. He believes that the better the prediction, the more control you have.

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