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FROM ENERGY AND FOOD NUTRITION VIA METABOLISM TO DIABETES CONTROL AND RISK REDUCTION OF COMPLICATIONS

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Introduction: The author uses "math-physics medicine" instead of the traditional biochemical medicine to study the situation of energy imbalance transmitting into metabolic disorders, resulting in chronic diseases and their complications.

Methods: He applied energy theory to study the disequilibrium between energy infusion, as in food nutrition intake, and energy consumption, such as exercise, work, and activities. These energy imbalances are caused by poor lifestyle management and shown as metabolic disorders, involving weight, glucose, blood pressure, and lipids. In 2014, he developed a metabolism equation using structural engineering modeling and various mathematics techniques. During 2015 to 2017, he developed a postprandial glucose (PPG) prediction model by applying optical physics and signal processing techniques. During 2015 to 2016, he developed a fasting plasma glucose (FPG) prediction model by applying energy theory and spatial analysis techniques. Finally, he used big data analytics, machine learning, and artificial intelligence to process and analyze ~1.5 million data associated with four chronic diseases, especially type 2 diabetes and its complications.

Results: The energy theory and spatial analysis identified >80% correlation between FPG and weight (physical representation of human body's internal energy exchange). Both FPG and PPG prediction models have achieved 99.9% linear accuracy. He also identified weight contributing 85% of FPG formation and the combination of carbs/sugar intake and post-meal exercise contributing 80% of PPG formation. Furthermore, by applying hemodynamics with solid mechanics and fluid dynamic, he calculated his risk probability of having a heart attack or stroke reducing from 74% to 26%.

Conclusion: The author has quantitatively proven that, as one of the major energy infusion factors, excessive "left-over" food nutrition combined with inactive lifestyle can cause metabolic disorders which further induce chronic diseases and their complications.

BIOGRAPHY

Gerald C Hsu received an honorary 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, initially studying six metabolic diseases and food nutrition during 2010-2013, then conducting his own diabetes research during 2014-2018. His approach is a "quantitative medicine" based on mathematics, physics, optical and electronics physics, engineering modeling, signal processing, computer science, big data analytics, statistics, machine learning, and artificial intelligence. He named it "math-physical medicine". 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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