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Quantitative analysis of relationship between postprandial plasma glucose and food/meal (math-physical medicine)

Introduction: The author used math-physical medicine to research and identify the quantitative relationship between postprandial plasma glucose (PPG) and food/meal.

Methods: Food is the most important factor of PPG, but it is also difficult to regulate eating habits. He created an artificial intelligent (AI) based software to collect his meal data by utilizing optical physics, signal processing, mathematics, statistics, and machine learning. He then developed a PPG prediction model by combining 6M food nutrition data from the United States Department of Agriculture (USDA) and his ~4,000 meal photos as his food database. Each meal picture links with data, including nation, meal location, food type, menu/dish name, and nutritional ingredients. The system can estimate consumed carbs/sugar amount and then predict PPG value prior to eating.

Results: He selected a period of 1,194 days (6/1/2015-9/7/2018) with 3,721 meals (including snacks) and ~100,000 data for his analysis. There were 86 airline meals consumed during his 94 trips during this period. The summary results are listed by both nation and meal location; then, they were sorted by PPG value with the format of PPG (mg/dL) & carbs/sugar (gram).

Speaker 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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