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Diet-induced postprandial inflammation: Consequences on human health

Statement of the Problem: After ingesting a meal, postprandial inflammation occurs transiently and may have significant negative consequences on human health. Postprandial inflammation is dependent on the food quality and quantity in terms of its energy content and its nutritional value. Minerals and vitamins constitute the nutritional value while carbohydrate, protein and fat are the sources of energy content.

Objective: Since energy content varies significantly between carbohydrates (4 kcal/g) and fats (9 kcal/g), the objective is to assess postprandial inflammation of an isocaloric, isonitrogenous high carbohydrate (66%) and low fat (20%) diet (HC) versus a high fat (56%) and low carbohydrate (30%) diet (HF) by measuring diet-induced postprandial thermogenesis (DIPT) and inflammation.

Methodology: Healthy, never-obese, postmenopausal, Caucasian female subjects (n=12) participated in this study for 3 weeks each in a crossover design. Fat-Free Mass (FFM) and Fat Mass (FM) were measured by under-water weighing before and after each diet exposure. Resting Metabolic Rate (RMR) was assessed fasting and for five 40-minute periods over a 6 hours DIPT after ingesting 14.3 kg/FFM of either HC or HF diet.

Results: A low Respiratory Quotient (RQ) is usually indicative of lipid peroxidation, an important index of inflammation, measured in this study as TBARS (Thiobarbituric Acid Reacting Substances). RQ for HC diet was significantly higher than that of HF in this study. A significant elevation of Free Fatty Acid (FFA) was also observed after ingesting HF diet, which is well-known to be associated in the pathophysiology of Type 2 Diabetes Mellitus (T2DM), a significant risk factor for cardiovascular disease (CVD).

Conclusions & Significance: Postprandial inflammation is also intimately implicated with Glucotoxicity and Lipotoxicity as displayed under the Image are well known to be associated with T2DM and CVD. Significant other related facts and figures will be illustrated in the presentation.

Biography

Kenneth Olson, MD, PhD, is certified in Internal Medicine and in Clinical Nutrition. His PhD is in Nutrition Sciences. He has an active consulting practice of Nutritional Medicine for 30 years in both hospital and outpatient settings. He has taught nutrition to medical students, dental students, postgraduate physicians and to dietitians as well as community groups. He has published within the field of nutrition and in clinical medicine and animal research directed toward clinical applications. He previously presented posters on Nutrition and AIDS at the National Institutes of Health and at similar meeting in Houston, Texas USA. He has collaborated with Mohammad Khaled, PhD, for many years in the areas of diet composition and the functionality of food associated with clinical outcomes especially involving the immune system and inflammatory processes.

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