

WP4: Fructose enriched food products: effect on triglycerides

Background: Fructose is increasingly used as sweetening in food products; however it has been implicated in the increasing frequency of diabetes as ingested fructose because of the unlimited uptake in the liver is a key player in building triglycerides in the liver. Carried by LDL cholesterol these triglycerides will appear in the bloodstream where they can deposit in the artery walls. The transport involves intestinal lipoprotein (ApoB48) that is involved in insulin resistance [21]. ApoB48 and ApoB100 - the primary apolipoproteins of chylomicrons and low-density lipoproteins - the later commonly known by the misnomer "bad cholesterol". Fructose feeding can result in overproduction of ApoB48 followed by hypertriglyceridemia [22]. Additionally, leucine promotes glyconeogenesis and fat oxidation in the liver and is found to protect the liver against fructose-induced fat accumulation. Some effects of humans drinking fructose enriched beverages was clearly demonstrated in one of our prior studies[23].

Objectives: To compare the effect on de-novo lipogenesis in the liver following glucose versus fructose feeding in rodents; → To compare glycolytic flux in humans on beverages with exclusive high fructose content with those with sweeteners; →To study the effect of leucine enriched diets on liver fat resulting from high fructose intake in rodents.

Method: Based on the [1-13C]pyruvate bio-probe liver, kidneys and muscle in healthy persons and in rodents are DNP-scanned following various levels of fructose intake; in both species the DNP measurements will be supplemented with 1H spectroscopy to quantify liver, muscle and bone marrow lipids (see publication list for already achieved results).

Outcome: Documentation of further metabolic effects of fructose enriched food products.

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