EPA PREVENTS INSULIN RESISTANCE AND GLUCOSE INTOLERANCE IN MICE FED A HIGH FAT-HIGH SUCROSE DIET

TEAM: CONTROL OF LIPIDO-ENERGETIC HOMEOSTASIS AND OBESITY

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Introduction:
Insulin resistance (IR) is a key feature of obesity. IR favors the progression of metabolic syndrome (MetS), increases the risk of type 2 diabetes and cardiovascular diseases. IR results from metabolic dysfunctions caused by ectopic fat deposits in the liver and skeletal muscle when adipose tissue storage capacity is exceeded. Nutritional strategies using n-3 PUFA were proposed to prevent IR and MetS associated to obesity by unclear mechanisms.

Objectives:
The aim of the present work was to compare the effect of ALA, EPA and DHA on insulin resistance and metabolic dysfunctions during a high fat (HF)-high sucrose (HS) challenge.

Materials & Methods:
C57BL/6 and Ob/Ob mice were fed a HF (45% energy)-HS (17% energy) diet without or with 1% energy replaced by ALA, EPA or DHA for 16 and 6 weeks respectively. IR was evaluated by intraperitoneal (ip) injection of insulin followed by monitoring of glycaemia over 2 hours. Glucose tolerance was similarly assessed using glucose injection. Fatty acid composition of tissues was determined by gas chromatography.

Results:

Figure 1. Body weight of mice during HF/HS diet

Figure 2. ip-insulin tolerance test.

Figure 3. ip-Glucose tolerance test.

Table 1. plasma concentration of cholesterol (Chol) and non esterified fatty acids (NEFA)

Table 2. n-3 PUFA incorporation into plasma (% of total fatty acids)

Conclusion:
Long chain omega 3 fatty acids have distinct effects on IR and glucose tolerance. By contrast with ALA and DHA, EPA has interesting protective effect against several key parameters of MetS.