Soy Beans, Fish Oil and Obesity

written by Tim Jennings, M.D. | December 13, 2012

Over the last 100 years dietary patterns in many westernized countries have changed. In the US, there has been a significant shift in the percentages of dietary oils ingested, away from healthy oils to more obesity promoting fats. Historically, the human diet containing no more than 1% of an oil known as linoleic acid (LA), which is an omega 6 fatty acid found in a variety of foods, but is highly concentrated in soy bean oil. Over the past century the US dietary intake of LA has increased from 1% to 8% of daily caloric intake.

Recent research has demonstrated that LA is a precursor to two brain derived marijuana like compounds known as “endocannabinoids.” These compounds are active in the brain region that controls appetite, caloric intake and satiety. Increasing activity in this brain region triggers increased appetite and is associated with increasing obesity.[1]

Remarkably, in animal studies conducted to evaluate the impact of increasing LA in the diet revealed those fed diets composed of 35% fat and 8% LA had significantly greater obesity than animals fed 60% fat diets and only 1% LA. This indicates that the LA trigger of the endocannabinoid receptors mediates obesity, and even if one lowers the amount of fat in the diet, if the diet retains a high percentage of LA, then obesity increases.

However, supplementing the 8% LA diet with 1% omega 3 fatty acids from fish oil, (EPA and DHA) reversed the elevations of endocannabinoids and decreased both food consumption and obesity.

Further, insulin levels were not altered in either group, meaning the obesity was occurring before diabetic metabolic dysregulation occurs, and was not caused by insulin resistance.

Soy bean oil is about 50% LA by weight and is the single greatest contributor to the increase in LA in the American diet over the last century. Combine this with the reduction in DHA and EPA either through less fish consumed, or increased farm raised fish, which are generally devoid of EPA and DHA, and we have a dietary set up for increased obesity. This dietary change corresponds with the increase in obesity seen in the US.

A diet low in DHA and EPA, and high is LA is associated not only with increased obesity, but increased risk for mental health related problems to included, psychosis, mood disorders and dementia. Therefore reducing LA and increasing DHA and EPA in the diet has been shown to be healthy for the brain.

Foods high in omega 3's (EPA and DHA) include wild sardines, salmon, mackerel, tuna, and trout. Fresh water fish have significantly less DHA/EPA than cold water ocean fish. DHA and EPA are not produced in plants, with the exception of some sea algae and seaweed. Therefore, vegans are encouraged to find a seaweed supplement high in DHA and EPA. Flax seed is high in omega 3 ALA, which is poorly converted in the body to the form the brain needs, with approximately 8% converted to EPA and less than 1% converted to DHA. Therefore, flax seed supplement is not recommended as a substitute for DHA and EPA.

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[1]Alvheim, A., et al, Dietary Linoleic Acid Elevates Endogenous 2-AG and Anandamide and Induces Obesity. *Obesity* (2012); 20 10, 1984–1994.