

Regulation of Elovl and fatty acid metabolism in different dietary conditions

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Lipids are essential for life; they are involved in cellular functions. Fats, oils and waxes are all examples of lipids, which are necessary for the survival of all living organisms. Lipids are the primary means of storing energy for later use in the cells and they serve as structural components of the membranes in order to form a protective coating on many organisms.

Fatty acids function as signaling molecules which play a role in biological function such as self-regulation of fatty acid metabolism. These fatty acids are produced directly from day to day diet or can be synthesized endogenously. Endogenous synthesis takes place in cytosol with the help of elongase enzymes which synthesize into elongation of very long chain fatty acids (ELOVLs). Very long chain fatty acids are essential lipids which are functionally diverse. The variation in chain lengths which makes it possible variation in the chain length and degree of saturation. If any error occurred during the synthesis of fatty acid metabolism due to genetic disorder like mutation, enzymatic defects affect the ability of the body to synthesize fatty acid in order to accumulation of fatty acids within liver or other cell types.

The fatty acid elongase ELOVL2 has been previously identified as a key enzyme in the production of C22 Polyunsaturated fatty acids in mice. Mice which have a mutated ELOVL2 show impaired fertility as well as resistance to diet induced obesity and fatty liver (hepatic steatosis). In this study I have done a survey on the effects of dietary fatty acids on the relationship between fatty acid and disease risks in mice. I showed that there is an increase of mRNA level in early lipogenic genes in Elovl2 knockout under the influence of high-fat diet and there is a down-regulation of mRNA level of transcription factor involved in lipogenesis in wild-type compared to knockout in high-fat diet conditions. From further study we will understand more about the role of elongase in fatty acid synthesis. High fat diet studies also give insight into the fatty acid biosynthesis in gaining weight, obesity and insulin resistance condition.

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