

Effect of Dietary Stearate and Oleate on Expression of Fatty Acid Desaturases and Elongases in the Heart

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Long-chain fatty acids are a major fuel source used to sustain contractile function in the heart. Elongases and desaturases play crucial role in regulating the length and degree of unsaturation of fatty acids and thereby their functions and metabolic fates. Therefore, altered expression of elongases and desaturases have consequences in cardiac fatty acid composition and lipid content and may lead to cardiac steatosis and impaired heart function. The aim of the present study was to determine effects of dietary stearate and oleate on the myocardial fatty acid metabolism. Male Wistar rats were placed for 16 weeks on the diets supplemented with 20% by weight of tristearin (TS) or triolein (TO). The control group was fed the standard chow diet. The levels of the triglyceride were significantly increased in both TO-fed (more than two-fold) and TS-fed (by 50%) rats when compared to the chow-fed group. The heart free fatty acid content was decreased in TS-fed rats when compared with chow and TO groups, whereas phospholipids content decreased after TO feeding. Diacylglycerols content was similar in all groups studied. mRNA levels of stearoyl-CoA desaturase (SCD)-1 and SCD2 were significantly increased after TS feeding, whereas TO feeding did not affect the desaturases expression. mRNA levels of fatty acid desaturases (FADS)-1 ($\Delta 5$) and FADS2 ($\Delta 6$) and the expression of fatty acid elongase (ELOVL)-1 were increased in both TO-and TSfed rats when compared to the chow-fed group. In contrast mRNA levels of ELOVL5 and ELOVL6 were decreased after TS and TO feeding. In accordance with increased SCD1 and SCD2 expressions in the heart of TS-and TO-fed rats $\Delta 9$ -desaturation index (16:1/16:0) was elevated in the myocardium of these rats, whereas increased mRNA levels of ELOVL1 corresponded with 18:1 n-7/16:1 and 18:0/16:0 ratios. Obtained results show that dietary stearate and oleate have significant impact on both fatty acid desaturation and elongation and overall lipid content in the heart.

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