

Opposite Effects of Vaccenic and Elaidic Acids on Stearoyl-CoA desaturase 1 Expression - A Marker of Atherosclerosis Development- in Human Aortic Smooth Muscle Cells.

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Most of dietary trans fatty acids (TFA) are from hydrogenated fats rich in elaidic acid, but dairy products also contain naturally TFA such as vaccenic acid. Consumption of TFA is positively correlated with cardiovascular diseases and with atherogenic risk factors. TFA might play their atherogenic effects through lipid metabolism alteration of vascular cells, leading to lipid accumulation. Our purpose in this study was to compare in human aortic smooth muscle cells (HASMC) the effects of elaidic acid and vaccenic acid on the regulation of Stearoyl-CoA desaturase 1 (scd1), enzyme which catalyses the production of monounsaturated fatty acids (e.g. oleic acid) and thereby can be associated with lipogenesis induction and atherosclerosis development. We showed that treatment of HASMC with these C18:1 fatty acid isomers for 48 h at 100 μ M led to differential effects on delta-9 desaturation : Trans-11 vaccenic acid repressed the delta-9 desaturation rate, whereas trans-9 elaidic acid increased it. We then correlated the delta-9 desaturation rate with the expression of scd1 protein and mRNA. C18:1 fatty acids controlled the expression of scd1 at the transcriptional level in HASMC, leading to an increase in scd1 mRNA content by trans-9 elaidic acid treatment, whereas a decrease in scd1 mRNA content was observed with trans-11 vaccenic acid treatments. Altogether, this work highlights a differential capability of these two C18:1 trans fatty acid isomers to control scd1 gene expression, which presumes of different consequent effects on cell functions and atherosclerosis development. Then, it is clear from the present study that the generalization that all TFA contribute to cardiovascular disease warrants further investigation. These data may be of importance for the dairy industry, as many dairy products contain nontrivial amounts of vaccenic acid.