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Ninth Conference

"Diversity in Biochemistry"

Proceedings

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Fructose consumption affects glucocorticoid receptor signaling and increases lipogenesis in the liver of young female rats

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The effects of early-life fructose consumption and their relation to metabolic diseases risk in adulthood are not yet elucidated. This study explored the direct effects of a diet regime characterized by fructose enrichment on glucocorticoid receptor signaling in the liver of female rats immediately after weaning. 21 day-old female Wistar rats were subjected to a 9 week-long diet regime involving standard chow in combination with either the 10% fructose solution or tap water. Glucocorticoid receptor hormone binding parameters, intracellular distribution of this molecule as well as the expression of its target genes involved in lipid metabolism (most notably Lipin-1) and glucose metabolism (PEPCK), were measured. An increase in the hepatic glucocorticoid receptor hormone binding activity as well as an elevated nuclear translocation of the receptor, in concert with the increased protein levels of Lipin-1 were observed after fructose enriched diet. This was preceeded by a hepatic elevation in Glut-2 fructose transporter expression. Fructose-enriched diet starting immediately after weaning enhanced hepatic glucocorticoid signaling in young female rats and promoted lypogenesis as evidenced not only by the lipin-1 increase but also by FAS, ACC and SCREBP-1 expression elevations contributing to hypertriglyceridemia and the expansion of the visceral adipose tissue [1], with no effect on the hepatic gluconeogenesis. These results imply that while most parameters remained within physiological reactivity, prolonged treatment might ultimately lead to more pronounced metabolic disturbances.

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