

Serbian Biochemical Society

Eleventh Conference

Scientific meeting of an international character

September 22nd and 23rd, 2022, Novi Sad, Serbia

“Amazing Biochemistry”

Improvement of lipid metabolism regulation by low-intensity exercise in fructose-fed rats

Milan Kostić*, Goran Korićanac, Snežana Tepavčević, Tijana Čulafić, Snježana Romić, Jelena Stanišić, Tamara Ivković, Marija Pantelić, Mojca Stojiljković

Laboratory for Molecular Biology and Endocrinology, Institute of Nuclear Sciences “Vinča”, Institute of National Significance for Republic of Serbia, University of Belgrade, Belgrade, Serbia

*e-mail: milankostic@vin.bg.ac.rs

Excessive dietary fructose consumption in parallel with limited physical activity contributes to the global increase in prevalence of metabolic disorders. Metabolic syndrome represents a collection of cardiometabolic risk factors that includes obesity, insulin resistance, hypertension, and dyslipidemia, and it is undoubtedly linked to increased risk for two global maladies, type 2 diabetes, and cardiovascular diseases. Fructose-rich diet is accompanied by the development of insulin resistance in the heart, and it could change the use of cardiac energy substrates towards increased fatty acid (FA) uptake, and catabolism. Exercise may be beneficial in prevention and treatment of the metabolic syndrome. The aim of this study was to analyse the impact of low-intensity exercise on protein expression of nuclear transcription factors involved in regulating FA β -oxidation in a heart of fructose fed rats. Male Wistar rats were divided into control group, and two groups that received 10% fructose for 9 weeks, one which was sedentary and one which was additionally exposed to low intensity exercise. The protein expression of important transcriptional regulators of fatty acid β -oxidation PPAR α , and FOXO1, and coregulators Lipin1, PGC-1, and SIRT1 are analyzed in cardiac lysate and/or nuclear fraction by Western blot. Gene expression of ACADL, the enzyme that catalyzes the initial step of mitochondrial β -oxidation, was quantified by real-time PCR. Fructose-rich diet decreased nuclear PPAR α compared to control. Exercise increased nuclear PPAR α , nuclear FOXO1, lysate PGC1, and nuclear Lipin1 in fructose-fed rats compared to sedentary fructose-fed rats. Exercise increased lysate PPAR α , lysate and nuclear FOXO1, lysate PGC1, lysate and nuclear SIRT1, and nuclear Lipin1 in fructose-fed rats compared to control. In conclusion, running at low intensity is accompanied by increased expression of key regulators of fatty acid oxidation. The results indicate that exercise achieves its effect by increasing the nuclear content of PPAR α , Lipin1, and FOXO1.

Acknowledgements

This study was supported by the Ministry of Education, Science and Technological Development, Republic of Serbia.

CIP - Каталогизација у публикацији
Народна библиотека Србије, Београд

577.1(048)

SERBIAN Biochemical Society. Scientific meeting of an international character (11 ; 2022 ; Novi Sad)

"Amazing Biochemistry" : [proceedings] / Serbian Biochemical Society, Eleventh Conference, Scientific meeting of an international character, September 22nd and 23rd, 2022, Novi Sad, Serbia ; [editor Ivan Spasojević]. - Belgrade : Faculty of Chemistry : Serbian Biochemical Society, 2022 (Belgrade : Colorgrafx). - 165 str. ; 23 cm

Tiraž 150. - Str. 19: Foreword / Ivan Spasojević. - Bibliografija uz većinu radova.

ISBN 978-86-7220-124-6 (FOC)

а) Биохемија -- Апстракти

COBISS.SR-ID 73285385