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N-linked Glycosylation and Its Potential within Different Rat Strain´S Pharmacology Basic Research

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Abstract

Statement of the Problem: Glycosylation is one of the most common posttranslational modifications of proteins. Altered glycosylation is present in many pathophysiological conditions. Glycomic studies on rat serum have revealed variations in the N-glycans of glycoproteins correlated with disease progress, which is consistent with the findings in human serum. The main goal of our study was to describe the glycoprofiles of different rat strains fed 5 weeks standard diet and to evaluate their differences according to the N-glycan type. Methodology & Theoretical Orientation: For our observation we used Wistar rats (W), the general multipurpose model strain. Then spontaneously hypertensive rats (SHR) were used, developed as animal models for human essential (idiopathic or primary) hypertensions. Finally, hereditary hypertriglyceridemic rats (hHTG) were also included, regarded as suitable animal model of cardiovascular disease and metabolic syndrome. The analysis of serum N-glycoprofilewas done by mass spectrometry analytics on MALDI-TOF/TOF instrumentation. Analyzed data were processed by FlexAnalysis (Bruker Daltonics) and GlycoWork Bench software. Findings: The cluster of 22 N-glycanswas appointed and sorted with special impact on their structural type. The changes in relative intensities of N-glycans were not significant, however, there were observed some trends in its remodelation within different rats strains. In W group there was detected higher percentage of high-manose N-glycan type. In SHR group was higher portion of complex-bi-antennary N-glycans with fucose and in hHTG group higher portion of complex-bi-antennary and complex-bi-antennary N-glycans with fucose.Conclusion & Significance: These data of blood sera glycoprofiling in different rat strains might assume as a possible tool for basic research to test therapeutic perspectives within various civilization and metabolic diseases. Further impact on clinical studies tendencies might be considered. Acknowledgements:This work supported by grants: EU project ITMS2014+313021Y920, APVV-18-0336, VEGA 2/0104/21 and Ministry of Health´s SR project No. 2019/7-CHUSAV-4.

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Biochemistry is both life science and a chemical science - it explores the chemistry of living organisms and the molecular basis for the changes occurring in living cells. It uses the methods of chemistry,

"Biochemistry has become the foundation for understanding all biological processes. It has provided explanations for the causes of many diseases in humans, animals and plants."

physics, molecular biology, and immunology to study the structure and behaviour of the complex molecules found in biological material and the ways these molecules interact to form cells, tissues, and whole organisms.

Biochemists are interested, for example, in mechanisms of brain function, cellular multiplication and differentiation, communication within and between cells and organs, and the chemical bases of inheritance and disease. The biochemist seeks to determine how specific molecules such as proteins, nucleic acids, lipids, vitamins, and hormones function in such processes. Particular emphasis is placed on the regulation of chemical reactions in living cells.