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Mass-spectrometry of extracts of young rats' hearts via MALDI-ToF

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Currently the method of time-of-flight matrix-assisted laser desorption/ionization (MALDI-ToF) is widely used for analysis of the peptidic nature substances (PNS). This method provides the qualitative characteristics of the investigated samples and it is irreplaceable when studying the solutions of mono- as well as poly-component composition [1].

The research aim was the investigation by the mass-spectrometry method of the extracts of hearts of young rats in norm.

In the research it was used hearts of 18 white outbred female rats aged 1 month without identified pathologies. Hearts of animals were obtained in operating room of the vivarium, grinded into 2-5 mg fragments and washed with physiological solution from blood. Extracts were obtained by incubation of the fragments for 60 min in physiological solution and subsequent removing of thermolabile proteins. Prepared extracts were placed into vials, frozen and kept under temperature of liquid nitrogen. Initial concentration of PNS in extracts was 100 µg per mL. Mass-spectrometric investigations were performed within the range of m/z 4,000 - 40,000 using the device MALDI Autoflex II (Bruker Daltonics GmbH, Germany). For extracts investigation the matrix based on sinapinic acid was used. Spectra of positive ions were recorded in linear scanning mode by accumulation of 300 single spectra.

It has been established that the extracts of rats' hearts in norm have a number of common peaks on the mass-spectra, in particular: at m/z 4,969; 7,609; 15,218; 17,046 and some others. At the same time there were recorded both one- and double-charged molecular ions. So, for example, one-charged molecular ion $[M]^+$ was recorded at m/z 15,218 and there was it a double-charged molecular ion at m/z 7,609. The extracts of hearts of young rats have relatively stable composition of PNS. More than 70% of the found ions were present on each spectrum of individual extract.

Obtained mass-spectra may be applied in further comparative study of the composition of extracts of rats' hearts with pathologies or age-related changes of heart. Data about main molecular ions of PNS in native extracts of rats' hearts can be used when obtaining natural markers [2].

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[2] I. Wittig, T. Beckhaus, Z. Wumaier, M. Karas, H. Shägger, *Molecular and Cellular Proteomics*, 9, 2149 (2010).