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Qualitative and quantitative changes in phospholipids and proteins investigated by spectroscopic techniques in olfactory bulbectomy animal depression model

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Highlights:

1. Removed olfactory bulbs changes in the phospholipid-proteins balance in blood serum of animal depression model.
2. The FTIR spectra, calculated second derivative of the FTIR spectrum and UV-Vis spectra show a structural changes in protein and phospholipid fraction.
3. Raman, FTIR and UV-Vis spectroscopy showed that amitriptyline causes increase of the protein fraction in blood serum of rats.
4. Chronic use of amitriptyline in control group of rats will decrease in the amount of phospholipids or damage their structure.

Abstract

Depression becomes nowadays a high mortality civilization disease with one of the potential causes being impaired smell. In this study Raman, Fourier Transform Infra Red (FTIR) and Ultraviolet-Visible (UV-VIS) spectroscopies were used to determine the changes in the quantity and structure of phospholipids and proteins in the blood serum of bulbectomized rats (OB_NaCl), which is a common animal depression model. The efficiency of amitriptyline (AMI) treatment was also evaluated. The obtained results show a significant decrease in the phospholipid and protein fractions (as well as changes in their secondary structures) in blood serum of bulbectomized rats. AMI treatment in bulbectomized rats increased protein level and did not affect the level of phospholipids. Structural information from phospholipids and proteins was obtained from UV-VIS spectroscopy combined with the second derivative of the FTIR spectra. Indeed, the structure of proteins in blood serum of bulbectomized rats was normalized after amitriptyline therapy, while the damaged structure of phospholipids remained unaffected. These findings strongly suggest that impaired smell could

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