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The search of blood-based biomarkers for schizophrenia by proteomics methods

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Motivation and Aim: Schizophrenia is a complex neuropsychiatric disorder whose symptoms lead to significant disability throughout life, causing a massive personal and social burden. Understanding pathogenesis of schizophrenia requires studies of not only gene expression and DNA variations, but also studies, of the abundance and modifications of various proteins, and their distribution at anatomical, cellular, and subcellular levels. Proteomic studies of proteins of this disease may contribute to the understanding of the molecular mechanisms of schizophrenia. They may also indicate pathological changes in brain cell's in patients with schizophrenia.
Methods and Algorithms: For the research we used the serum of 20 healthy and 30 patients with schizophrenia. Patients were treated in clinics of Mental Health Research Institute, Tomsk, Russia. Diagnostics was carried out in accordance with the current classification ICD-10. Preparation of samples included: purification from serum major proteins by affinity chromatography, separation of proteins by one-dimensional electrophoresis, in-gel tryptic hydrolysis of the separated proteins. LC-MS/MS analysis of the resulting peptides using an ion trap XCT Ultra mass spectrometer (Agilent Technologies). Identification of proteins was carried out using Mascot software Ver. 2.1 («Matrix Science», USA). Statistical analysis was performed using Fisher's exact test with Yates' correction using the program STATISTICA 10.0.
Results: The proteins found in our study are involved mostly in biological processes, such as regulation of nucleic acid metabolism, immune response and also unknown processes. We found Centromere-associated protein E and Bromodomain adjacent to zinc finger domain protein 2B their DNA binding protein function and transcription factor, respectively. Complement factor H-related protein 2 is involved in the regulation of complement activation. Dermisidine protein is involved in the antimicrobial humoral response, but one of the functions is related to the survival of neurons and displays of phosphatase activity.
Conclusion: Identified proteins can be included in a sensitive and specific biomarker panel for diagnosis of schizophrenia, both for diagnosis and for subsequent response to treatment.
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