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¹H-NMR-based serum metabolomics of bipolar disorder patients

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Bipolar disorder (BD) is a mental disorder that causes alteration of mood states including mania, depression, and euthymia and it is ranked as one of the leading causes of disability and premature mortality, with a prevalence of 60 million people worldwide. BD is a heterogenous illness including diverse genetic, environmental, and biochemical factors and its pathophysiology is still largely unknown. Diagnosis of BD exclusively depends on the subjective recognition of symptoms without any objective methods such as a clinical test of biomarker identification, instigating misdiagnosis, inadequate treatments and deficient clinical outcomes. ¹H-NMR-based serum metabolomics of Serbian patients with BD (33) and healthy controls (39) contributed to identification of 22 metabolites for this disease. Threonine, aspartate, gamma-aminobutyric acid, 2-hydroxybutyric acid, serine, and mannose make a unique biomarker set, and were confirmed for the first time in BD Serbian serum samples. Additional six identified metabolites (3-hydroxybutyric acid, arginine, lysine, tyrosine, phenylalanine, and glycerol) are in accordance with the previously determined NMR-based sets of serum BD biomarkers in Brazilian and/or Chinese patient samples, while nine identified metabolites (lactate, alanine, valine, leucine, isoleucine, glutamine, glutamate, glucose, and choline) are the same established biomarkers in three different ethnic and geographic origins (Serbia, Brazil, and China). The same confirmed metabolites are an indicator of the right path in discovery of the universal set of BD biomarkers by NMR.