ION MOBILITY MASS SPECTROMETRY OF GANGLIOSIDES IN HUMAN BRAIN IN HEALTH AND DISEASE

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Abstract

Gangliosides (GGs), a class of glycosphingolipids, are important biomarkers in early diagnosis of CNS pathologies, being in the focus of our research as potential therapeutic targets [1]. A series of neuropsychiatric disorders are characterized by amnesia and disorientation caused by hippocampal atrophy and diminished cholinergic activity. Based on ion mobility separation mass spectrometry (IMS MS) capability for a reliable glycopattern determination, and the occurrence of neuropsychiatric disorders [2,3], we report here on the improvement of novel and high performance IMS MS method for assessing the GG profile in a highly complex mixture extracted from an adult healthy brain region. The IMS separation of GGs based on charge state, carbohydrate chain length and degree of sialylation led to the detection and identification of over 100 species, the larger number of GGs ever reported before in this particular brain region. Moreover, the obtained data supports the concept of GGs cholinergic activity. Furthermore, by applying IMS MS/MS, novel GG species were structurally investigated in details.

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