

3rd Global Summit on **BRAIN DISORDERS AND THERAPEUTICS**

February 15-16, 2023 | Webinar

Mapping and Structural Analysis of Chondroitin/Dermatan Sulfate Domains in Human Brain by Advanced Mass Spectrometric Methods**Alina D. Zamfir***Mass Spectrometry Group, National Institute for Research and Development in Electrochemistry and Condensed Matter, RO-300224, Timisoara, Romania*

Hybrid chondroitin/dermatan sulfate (CS/DS) domains of the human brain are involved in brain development and are correlated with the functional diversity of neurons [1]. Earlier studies have suggested that CS/DS are also implicated in severe brain conditions, including malignant transformation [2-5]. In view of this state-of-the-art, we have developed and introduced in the analysis of brain CS/DS domains, advanced mass spectrometric (MS) methods based on high resolution, ion mobility separation (IMS) and tandem MS (MS/MS) by collision-induced dissociation (CID) for mapping and detailed structure analysis of the motifs expressed in human brain. The purpose of the research was to discover and characterize irregularly sulfated domains that are potentially biologically active. The MS profiling revealed the high structural variability of CS/DS domains in the brain. Over 30 structures were detected, a large part of which being discovered here, for the first time, as associated with the neural tissue. 85% of the species were found to exhibit an irregular sulfation pattern; 40% of the total structures are oversulfated, therefore, possibly biologically active. Among the potentially functional domains, of a particular interest are the long chains of octa- and decasaccharides with an unusually high number of sulfate groups, which were identified by MS screening and characterized by CID MS/MS. Since the interactions of proteoglycans are mostly mediated by the oversulfated CS/DS domains, their detection in neural tissue opens a new research direction towards the elucidation of how the additional sulfation contributes to some physiopathological processes, especially to the invasiveness of malignant brain tumors.

Biography

Alina D. Zamfir has completed her PhD from Babes-Bolyai University of Cluj-Napoca, Romania (2001), postdoctoral studies and habilitation (2006) from the Institute for Medical Physics and Biophysics, School of Medicine, Muenster University, Germany. She is university professor, principal investigator and research group leader at the National Institute for Research and Development in Electrochemistry and Condensed Matter, Timisoara, Romania. Dr. Zamfir has published over 120 papers in renowned impact factor journals, presented her research at over 200 reputed international conferences, received numerous national and international awards and is currently serving as the guest Editor of the journal *Molecules*.