

# 3<sup>rd</sup> International Conference and Exhibition on **Neurology & Therapeutics**

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## How MS analysis in general and innovative imaging MS sheds light on what's happening in traumatic brain injury

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As lipids are the most common biomolecules in the brain after water, we studied brain lipid profiles using mass spectrometric imaging, to follow the molecular progression of Traumatic Brain injury in a mouse model of Blast Induced Traumatic Brain Injury (bTBI) and a rat model of controlled cortical Impact (CCI), in order to find biomarkers for early detection and treatment and the biochemical pathways involved. We developed a new MALDI matrix that allowed us to detect all gangliosides, which only make up 6% of all lipids in the brain. The ganglioside GM2, which is present in the brain at a concentration of 0.08% increased after blast and remained elevated. A surprising finding, as GM2 is only expressed in embryos, between weeks 17 and 21, in cortical and other neurons, during dendritogenesis. The only pathological condition where it is detected is a gangliosidosis due to mutations that lead to hexosaminidase A deficiency. The absence of this hydrolytic enzyme, whose alpha subunit is able to hydrolyze GM2 to GM3 due to a key residue, Arg424 which is essential for binding the N-acetyl-neuraminic acid residue of GM2. In the case of CCI we developed a new technique, where we implanted tissue with silver, and found that in this type of trauma, it's the sphingomyelins that increased, indicating that a different pathway is involved. We are in the process of studying the lipid profiles of the CSF of these animals, to establish a correlation between body fluids and brain tissue profiles. In addition nanoparticulate implantation has allowed us to get perfect reproducibility. We are also testing a peptide drug, which has given promising results.

### Biography

Amina S woods is an investigator at integrative neuroscience branch, structural biology unit, NIDA. She obtained her B.Sc degree in chemistry at Loyola College. After graduation, she joined Department of Pathology and went to University of Maryland Medical School and obtained her M.S. She received a PhD in Pharmacology and Molecular Sciences from Johns Hopkins School of Medicine. She has undergone Post-doctoral training in Oncology Immunology, Johns Hopkins School of Medicine (Advisor Elizabeth Jaffee). She also received "Woman Scientist Achievement Award" from NIDA in 2011.

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