BioSyM Seminar Series 2018

Systems Analysis of Neuroinflammation in Alzheimer's Disease and Traumatic Brain Injury

Dr. Levi Wood

Assistant Professor

Georgia Institute of Technology

Email: levi.wood@me.gatech.edu

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Venue : CREATE Theatrette

Abstract

Neuroinflammation, i.e., activation of astrocytes and microglia, is essential for neuroprotection and clearance of pathogens. Either too little or too much activity can contribute to neurodegenerative diseases. In this talk, I will first discuss the immuno-suppressive effects of hemoglobin and heme, which inhibit the ability of astrocytes and microglia to clear the pathogenic Alzheimer's disease protein, Aβ. The effects of these blood factors are important because the cerebrovasculature becomes leaky early in Alzheimer's disease. Next, I will discuss the relationship between neuroinflammation and cognitive deficit and Aβ pathology in a mouse model of repetitive mild traumatic brain injury (mTBI). Our recent data show that increased MAPK and NFκB signaling in the acute phase after injury correlate with long term cognitive and pathological outcome in mice. Our data emphasize the importance of balanced immune response during neurodegeneration and suggest that targeted therapeutic interventions in pro- and anti-inflammatory signaling have the potential to transform our strategies for treating neurodegenerative diseases.

Short Biography

Dr. Levi Wood is an assistant professor at the Georgia Institute of Technology. He received his PhD in Mechanical Engineering at MIT in 2012 under the mentorship of Profs. H. Harry Asada, Roger Kamm and Doug Lauffenburger. He spent 6 months at SMART-BioSyM in 2010. He completed his postdoctoral fellowship at Massachusetts General Hospital and Harvard Medical School 2012-2015. His research focuses on the role of neuroinflammation in driving neurodegenerative diseases and the use of systems approaches to identify novel therapeutic targets.