

## **Effects of Occupational Nanomaterial Exposure on the Blood Brain Barrier.**

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With the increasing use of carbon nanotubes (CNT) in automobile, aerospace, sport equipment, construction, and plastic industries, concern over negative implications for worker's health is growing. Recent evidence has shown that exposure to CNT can cause inflammation and fibrosis in the lungs and induce vascular dysfunction. Inhalation of CNT may also indirectly perturb the blood brain-barrier resulting in bioactive and potentially neurotoxic molecules crossing into the brain. It has yet to be determined how active biomolecules released in response to the inhalation of CNTs affects the integrity of the blood-brain barrier and induce cognitive deficits or enhance dementia. The focus of this project is to assess if larger bio molecules such as albumin are crossing the barrier and gaining access to the brain as a response to the inhalation of multi-walled CNT. To assess effects on the blood-brain barrier, mice were exposed to different doses of MWCNT by aspiration: 0 µg (vehicle only), 10 µg, and 40 µg. Mouse brains were collected and flash frozen at -80o 4 h after exposure. Brains were then sagittally cryosectioned from the midline and surveyed by immunofluorescence to assess damaged blood vessels. The hippocampus and Thalamus regions showed increased vulnerability to blood vessel damage as compared to other regions. Notably, extravascular albumin within 10 µg sections demonstrated a distinct structure that resembled glial morphology. Future directions will further investigate differential glial response that may be associated with extravascular clean-up that is unique to the 10 µg dose, which may underlie the genesis of a chronic neuroinflammatory response.



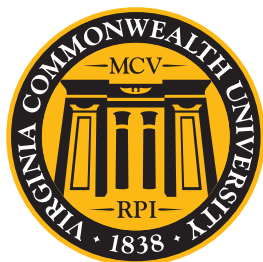
# **3<sup>rd</sup> Annual ASBMB-VA 2016 Undergraduate Research Conference**

**Friday, October 14<sup>th</sup>, 2016  
11:30 am – 5:30 pm**

Hermes A. Kontos Medical Sciences Building Rooms 104-105  
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