ECOTEK
Science at Work!

Ecotek Scientist Studies the Impact of Neurodegenerative Disease on Neuron Physiology at John Hopkins

Above: Amber Young on her first day at John Hopkins School of Medicine

The brain is the central processing unit (CPU) in the human body. It is made up of billons of neurons that receive and transmit electrochemical signals in nanoseconds. When disease or injury strikes the brain the neurons are impacted. Alzheimer disease, a neurodegenerative ailment, causes a decline in neural activity.

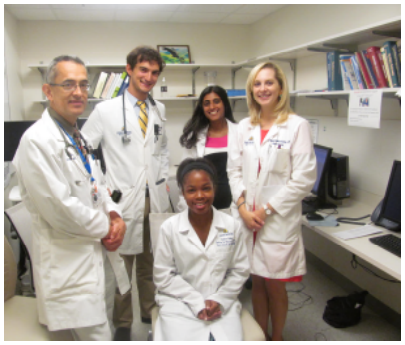
Amber Young, a rising 11th grader at Cranbrook Upper School and a student scientist in Ecotek Lab, spent her summer (June 2014 to August 2014) at John Hopkins Medical School studying the impact of Alzheimer's Disease on neuron physiology. She worked with Dr. Phillip Wong, Professor of Pathology in the Solomon H. Snyder Department of Neuroscience. Amber was accepted into the John Hopkins Brain Science Internship Program after going through an onsite interview and rigorous application review process.

To understand brain physiology and neurodegenerative disease Amber spent many hours extracting, segmenting staining and measuring the surface area of brain tissue taken from mice. She compared the brain tissue taken from diseased mice (carriers of Alzheimer's mutated gene) to brain tissue taken from non-diseased mice. Her tissue samples included the cerebral cortex, hypothalamus, and cerebrum. She used specialized lab equipment (i.e. electron microscope), chemical reagents and MRI imaging software to analyze the brain tissue.

After measuring the surface area of the brain tissue Amber focused her attention on examining the tau protein buildup along the synapse in the neuron. Excessive tau proteins can cause "tangles" that block the transmission of neural signals in the human brain of individuals with Alzheimer's Disease. In addition to doing research in the lab with Dr. Wong Amber spent time doing clinical rotations at the John Hopkins Medical Center with physicians. Her rotations included visiting with patients that were receiving treatment for a variety of neurodegenerative diseases such as Multiple Sclerosis and Parkinson's Disease.

Amber performing a brain extraction from a lab mouse that has Alzheimer's gene

Amber using electron microscope to take images of segmented brain tissue



Amber meeting with physician team at John Hopkins Medical Center after clinical rotation visits with patients

About the Ecotek Science Program

Ecotek is a science research lab program for young inventors and researchers in grades 5 thru 12. Student scientists work on projects aligned with the issues being addressed by world leaders at the United Nations. To learn more about Ecotek Lab go to http://www.ecotek-us.com