

2016 Webb-Waring Biomedical Research Awards Investigator Research Profile



Ethan G. Hughes, Ph.D.



University of Colorado Anschutz Medical Campus

Dr. Hughes is currently an assistant professor in the department of cell and developmental biology at the University of Colorado School of Medicine Anschutz Medical Campus. He completed postdoctoral work in neuroscience at the Johns Hopkins School of Medicine and earned his Ph.D. in neuroscience at the University of Pennsylvania School of Medicine.

Select Honors

Dr. Hughes has been the recipient of an NIH Developmental Biology Training Grant (T32) at the University of Pennsylvania School of Medicine and was a finalist for the Penn Prize for Excellence in Undergraduate Teaching by Graduate Students. He has also been the recipient of a Fine Science Tools Travel Award, an NIH Kirschstein NRSA Individual Predoctoral Fellowship (F31), an Annals of Neurology Annual Prize and an NIH Kirschstein NRSA Individual Postdoctoral Fellowship (F32)

Medical Focus

Multiple sclerosis (MS) is a progressive, degenerative disease that affects the ability of the brain to communicate with the rest of the body. MS affects more than 2.5 million people worldwide and an estimated 1 in 550 people in Colorado. The cause of MS is currently unknown, but factors such as genetic predisposition, environmental factors such as geographic location and viral illness may play a role in developing MS. Common symptoms of MS, such as muscle weakness, fatigue, and emotional and cognitive changes result from damage to myelin, a fatty substance that surrounds nerve fibers and speeds transmission of nerve impulses to and from the brain. Myelin is produced in the central nervous system (CNS) by a specialized cell type called oligodendrocytes. In patients with MS, the body immune system mistakenly attacks oligodendrocytes, resulting in loss of myelin and disrupted transmission of nerve impulses. Drugs used to treat patients with MS have primarily targeted the immune system and only been partially effective. Myelin replacement can result in remission from MS symptoms, and may represent a therapeutic target for progressive MS, but how this process occurs is not clear.

Research Proposal

Dr. Hughes' research program will use advanced microscopy and mouse models of MS to examine how myelin replacement occurs in the brain with the goal of identifying new therapeutic targets to help treat patients with MS. His team has recently developed a novel approach to visualize myelin, oligodendrocytes and their cellular precursors in the intact mouse brain, allowing an unprecedented view into their dynamics and behavior. Results from these studies would, for the first time, begin to give insight into the intrinsic and extrinsic factors controlling the dynamics of cortical remyelination in vivo, and determine whether they represent new therapeutic targets for enhancing cortical remyelination.

The long-term goals of Dr. Hughes' scientific program are to understand how neuron-glia interactions modulate brain function, how glial-cell dysfunction contributes to pathology in neurodegenerative disease and to use this knowledge to develop novel therapeutic targets for treating patients with progressive MS.