



## PAVING THE PATH: FINDING A CURE FOR AUTOIMMUNE DISORDERS

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Multiple Sclerosis, MS, is a debilitating disease that affects more than 2.3 million people globally. Dr. Peter Keyel, assistant professor in the department of Biological Sciences, focuses on developing new treatment options for battling MS.

Scientists are unsure of the direct cause of MS but it is identified as an immune mediated disease. The body's immune system attacks myelin, the layer that surrounds nerve fibers, eventually creating scar tissue. This damage causes the relapsing paralysis seen with multiple sclerosis and other auto immune disorders. Dr. Keyel, with the help of laboratory mice, is searching for new therapy options. "Exactly what initiates MS remains unknown, though we recognize that T cell mediated demyelination is what leads to the degeneration," Dr. Keyel states.

During the disease process, inflammation is initiated by a multiprotein complex called the inflammasome. The inflammasome allows the innate immune system to detect harmful pathogens and trigger inflammation. During autoimmunity, the immune system mistakes the host for a harmful pathogen. Dr. Keyel notes that, "the inflammasome is responsible for damage that occurs during autoimmunity, especially during gout, rheumatoid arthritis and MS." This is where his investigation begins, using gene alteration to search for alternative therapies to treat MS. Dr. Keyel uses different genetic strains of mice to differentiate the roles that the inflammasome proteins have on the disease process. He has identified a new protein involved in the inflammasome, Dnase1L3. By isolating and blocking Dnase1L3, he believes the inflammation seen in autoimmune disorders like MS can be halted. "If elimination of Dnase1L3

*Dr. Peter Keyel graduated with his doctorate from University of Pittsburgh. His research interests concentrate on using basic research to discover new methods and therapies.*

either genetically or using small molecule inhibitors prevents the disease, it will suggest that targeting Dnase1L3 is a viable strategy to pursue against inflammatory diseases,” Dr. Keyel stresses. As MS progresses, the inflammatory response impedes the regeneration of cells. His goal is to aim any new therapies at preventing the disease progression that will then allow “the body a more favorable environment for regeneration,” Dr. Keyel declares.

Though all research has its roadblocks, Dr. Keyel has an innovative approach. “The fruit of all basic research is being able to put it together into a testable hypotheses about real problems and learn something new.” By studying inflammasome pathways and their effect on disease progression coupled with gene selection and modification, Dr. Keyel aspires to find a “better understanding of the disease, so that we can continue optimizing treatment and testing out new potential therapies.”