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West Nile Virus and Pattern Recognition Receptors

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ABSTRACT

West Nile Virus (WNV), RNA virus is a member of the flaviviridae family that causes flu like symptoms in infected individuals, however in 1-2% cases, it causes severe neurological diseases such as encephalitis. There is no antiviral or vaccine approved so far to prevent WNV disease, therefore research to understand immune pathology is very important.

Pattern Recognition Receptors (PRR) are proteins that are expressed by cells to detect virus infection and play an important role in the innate immune system. When a PRR such as Toll-Like Receptors (TLR) and Nod-Like Receptors (NLR) detects a replicating virus, signals are sent out to warn the body and other neighboring cells that there is a foreign presence within the body. These signals include production of antiviral cytokines and interferons (IFN) that recruit the leukocytes to help fight off the infection. However, it has been discovered that different viruses produce unique cell signals that may act as either a positive and/or negative regulator of the cytokine production and the effectiveness of the immune system. My lab works on understanding the function of two novel innate immune molecules, NLRC5 (a member of NLR family) and TREM-1 (amplifier of inflammation). Therefore, this project will involve WNV infection of mouse immune cells from wild-type mouse and mouse deficient with NLRC5 and TREM-1 and compare specific innate immune markers using real-time RT-PCRs. At the end of my training, I will gain understanding of the research conducted in infectious disease area and will also learn several important techniques.

Key Words: West Nile Virus, Pattern Recognition Receptors, Anti-Viral Immunity, Inflammation

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