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Identification of a molecular pathway involved in viral induction of type 1 diabetes

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Abstract

Viruses have long been hypothesized to be involved in the pathogenesis of Type I Diabetes Mellitus (T1DM). Specifically, coxsackievirus B4 (CVB4), cytomegalovirus, and rubella have been implicated in triggering T1DM in genetically susceptible individuals. Viral infection of beta cells initiates disease by direct beta cell damage, beta cell toxicity from the acute antiviral response, or release/induction of beta cell self-antigens triggering autoimmune destruction. A pancreatrophic strain of CVB4, which is associated with the development of T1DM in humans, accelerates the development of T1DM in non-obese diabetic (NOD) mice. Toll-Like Receptor 3 (TLR3) is activated by viral dsRNA and is broadly expressed by NOD mice and human pancreatic beta cells isolated from individuals with new-onset T1DM, suggesting that TLR3 signaling may be important in CVB4 acceleration of T1DM. We used NOD mice deficient in TLR3 and a novel TLR3 signaling inhibitor developed in our laboratory to test the hypothesis that TLR3 signaling is important in CVB4 acceleration of T1DM in NOD mice. Thus, this talk will focus on the mechanisms of viral induction of T1DM from our studies evaluating the role that TLR3 plays in CVB4-acceleration of T1DM in genetically susceptible NOD mice.

Biography

Kelly D. McCall completed her PhD in Molecular and Cellular Biology in 2003 from Ohio University as well as two postdoctoral fellowships with Drs. Leonard Kohn and Frank Schwartz. She is currently an Associate Professor of Endocrinology at the Ohio University Heritage College of Osteopathic Medicine specializing in autoimmune/inflammatory diseases. She has published more than 34 peer-reviewed scientific manuscripts, chapters, and abstracts, is an active member of multiple eminent Associations and Societies, and serves as a reviewer for various distinguished scientific journals. She was recently honored by TechGrowth Ohio as the 2013 recipient of the Outstanding Woman in Innovation Award.