Manipulating the immune response to inhibit emerging virus infection

Emerging or re-emerging virological threat represents a major public health problem. Pathogenic virus infection is controlled in large part by the host antiviral immune response. The innate immune response to virus infection plays a critical role in limiting virus multiplication and pathogenesis. Central to the innate antiviral response is the rapid induction of type I interferon (IFN) expression; IFN gene expression is tightly regulated by the recognition of extra- and intra-cellular signals, generated during primary infection. The viral genome or viral replicative intermediates containing 5’triphosphate (5’ppp) RNA binds to RIG-I and ultimately leads to the production of pro-inflammatory cytokines and anti-viral factors, as well as type I interferons (IFNs) that amplifies the antiviral immune response. Given that viral RNA-RIG-I interaction is the initial trigger of the innate and adaptive immune response, an attractive strategy for the development of an efficient and broad-spectrum antiviral therapy to inhibit virus replication involves the use of RIG-I agonist that mimic viral RNA to activate the host defense. Our recent work demonstrated that the RIG-I agonist molecules we have designed in-house have potent antiviral activity against a range of RNA and DNA viruses in-vitro and confer protection against Influenza H1N1 and HSV-1 virus infection in-vivo in the murine model. Our ongoing study demonstrated that RIG-I agonist also has potent antiviral activity against Ebola viruses in-vitro and in-vivo in the murine model. We seek to investigate the potential of 5’pppRNA as a prophylactic and therapeutic antiviral agent against Ebola virus and the mechanisms responsible for the observed protective effect.

Biography

Rongtuan Lin has completed his PhD from Concordia University and Post-doctoral training at the Lady Davis Institute for Medical Research. He is an Associate Professor in the Department of Medicine, McGill University and a Senior Investigator at the Lady Davis Institute for Medical Research. He has authored more than 130 publications and has served on several grant review panels. His research focuses on the molecular understanding of the positive and negative regulation of antiviral immunity and to manipulate the innate immune response as a therapeutic strategy to control virus infection and cancer. His current interests include the use of small molecules that mimic viral RNA to inhibit Pathogenic virus infection.

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