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Differential innate immune activation following Puumala virus infection of human or reservoir host cells

Inhalt

Hantaviruses maintain persistent and asymptomatic infections in their mammalian reservoir hosts but can cause severe disease when transmitted to humans. In Europe, Puumala virus (PUUV) is the most important cause of human hantavirus infections. To investigate if hantavirus disease in humans is driven by an over-reactive immune response, we aimed to compare PUUV replication and innate immune responses in human cells and cells of its natural host, the bank vole (*Myodes glareolus*).
Bank vole MGN-2-R cells and human A549 cells were initially shown to mount a comparable immune response after stimulation with double-stranded (ds)RNA. Following PUUV infection, the expression of interferon-induced MX1 and the viral nucleocapsid protein were quantified to monitor the dynamics of the innate immune response and viral replication. While PUUV replication was relatively strong in MGN-2-R cells, the immune response remained remarkably weak, despite a high viral load. In contrast, we observed a lower rate of PUUV replication and a much stronger induction of innate immunity in the human A549 cells. These profound differences were neither caused by lower amounts of viral dsRNA in MGN-2-R cells nor by PUUV-induced inhibition of the type I interferon signaling pathway.
These observed differences between PUUV infections in human and reservoir host cells could provide a possible explanation for the mostly asymptomatic course of the disease in the reservoir host and the pathogenicity in humans.

Keywords

Hantavirus, innate immunity, reservoir host

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No, I am not a Junior Scientist.

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