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The bat-derived influenza A viruses H18N11 infects and replicates in leukocytes

Inhalt

All known conventional influenza A viruses (IAVs) circulating in birds, pigs and humans infect cells by binding to sialic acid receptors on host membrane glycoproteins. Natural infections usually affect the intestinal or respiratory epithelia and only exceptionally other cell types. In contrast, the bat-derived IAV H18N11 utilizes major histocompatibility complex class II (MHC-II) molecules for cell entry. We have previously found that H18N11 replicates in the tonsils and intestinal Peyer's patches of its reservoir species, the Jamaican fruit bat. However, it has been unclear whether viral replication is restricted to epithelial cells or whether other MHC-II-expressing cells of these lymphoid tissues are similarly susceptible to infection. To identify the cellular tropism of H18N11 in Jamaican fruit bats and determine the induced immune response to infection we performed single-cell RNA sequencing, immunohistochemistry and RNAscope. We show that H18N11 preferentially manifests infection in a range of leukocytes, including macrophages, B cells and NK/T cells and less frequently in intestinal epithelial cells. Furthermore, while infection with H18N11 leads to a moderate induction of interferon-stimulated genes, we observe no detectable expression of interferons and pro-inflammatory cytokines. We also determine the capacity of H18N11 to infect human leukocytes. Interestingly, H18N11 is able to infect myeloid and lymphoid cells, and replicates efficiently in human macrophages.

Keywords

bat-derived H18N11, single cell RNA-Sequencing, bat infection model, leukocyte infection

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Professional Status of the Speaker

PhD Student

Junior Scientist Status

Yes, I am a Junior Scientist.

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