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Distinct responses to Marburg and Sudan viruses in Egyptian rousette bat macrophages reveal co-adapted immunological features

Inhalt

Egyptian rousette bats (ERBs) are natural reservoirs of Marburg virus (MARV, family Filoviridae) –etiologic agent of viral hemorrhagic fever with high mortality rates in humans and non-human primates. Recent studies have sought to better understand the immune-related features that grant bats the ability to asymptotically harbor zoonotic viruses. To elucidate mechanisms of MARV co-adaptation in ERBs, we generated bone marrow-derived macrophages (bmMs) and compared their responses to MARV and Sudan virus (SUDV), a related filovirus not harbored by these bats. Infection with SUDV resulted in higher intracellular viral RNA levels than MARV. Viral progeny in cell supernatants decreased over time for SUDV, but not MARV-infected cells, highlighting differential viral replication. Transcriptional gene expression analysis demonstrated clear differences in filovirus-induced responses. SUDV induced the differential expression of significantly more genes than MARV, including various Type I and III interferons, cytokines and chemokines, contrasting a muted response to MARV. Pathogen-induced signaling pathway analysis indicated differential regulation of downstream immune responses to MARV and SUDV. We show for the first time that ERB innate immune cells experience differential viral replication and display clear pathogen-specific responses to two distinct filoviruses, corroborating growing evidence of highly specific one virus-one bat coevolutionary relationships.

Keywords

bats, natural reservoir, immune response, Marburg virus, Sudan virus, filovirus, coevolution

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Professional Status of the Speaker

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Junior Scientist Status

No, I am not a Junior Scientist.

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