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Linking bat ecophysiology and viral dynamics

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In recent years, bats have attracted significant attention due to their ability to harbor a variety of high-impact viruses like Marburg, Ebola and SARS-related coronaviruses. However, factors that influence viral transmission within bat populations and potential spillover to humans are largely unknown. Integrating environmental, ecological, virological and immunological data could generate a multi-factorial model of viral shedding from bats. In this study, we are sampling Egyptian fruit bats (Rousettus aegyptiacus) from a wild maternity colony in South Africa and analyze their health, physiology, stress, and levels of viral shedding. Current infections are probed by PCR on rectal swabs, and blood samples are taken for the detection of previous infections by a multiplex immunoassay as well as for the determination of systemic immune fingerprints based on RNA sequencing and mass spectrometry with prior enrichment of low-abundance serum proteins. In these analyses, particular focus will be on establishing the effect of pregnancy on antiviral defense and virus shedding. Finally, environmental data will be integrated to generate a model that correlates the bat viral status and shedding with climate and vegetation factors, along with bat health and immune profile, as well as reproductive state. Thus, we hope to derive predictors of viral shedding to help prevent transmission of viral pathogens from animal reservoir hosts to humans.

Keywords

Egyptian rousette bats, viral infection, viral defence, virus shedding, immune fingerprint, RNA sequencing

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No, I am not a Junior Scientist.

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