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Crimean-Congo hemorrhagic fever virus nucleocapsid protein augments mRNA translation

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Crimean-Congo hemorrhagic fever virus (CCHFV) is a tick-borne nairovirus of the Bunyaviridae family, causing severe illness with high mortality rates in humans. Here, we demonstrate that CCHFV nucleocapsid protein (CCHFV-NP) augments mRNA translation. CCHFV-NP binds to the viral mRNA 5' untranslated region (UTR) with high affinity. It facilitates the translation of reporter mRNA both *in vivo* and *in vitro* with the assistance of the viral mRNA 5' UTR. CCHFV-NP equally favors the translation of both capped and uncapped mRNAs, demonstrating the independence of this translation strategy on the 5' cap. Unlike the canonical host translation machinery, inhibition of eIF4F complex, an amalgam of three initiation factors, eIF4A, eIF4G, and eIF4E, by the chemical inhibitor 4E1RCat did not impact the CCHFV-NP-mediated translation mechanism. However, the proteolytic degradation of eIF4G alone by the human Rhinovirus 2A protease abrogated this translation strategy. Our results demonstrate that eIF4F complex formation is not required but eIF4G plays a critical role in this translation mechanism. Our results suggest that CCHFV has adopted a unique translation mechanism to facilitate the translation of viral mRNAs in the host cell cytoplasm where cellular transcripts are competing for the same translation apparatus.

Biography

Mohammad A Mir has completed his PhD from Saha Institute of Nuclear Physics, Department of Atomic Energy of India. He then moved to University of New Mexico for his Post-doctoral training in Virology, where he worked with hemorrhagic fever viruses. He then joined the University of Kansas, School of Medicine as Assistant Professor in Virology. He worked as Associate Professor in Virology in the Western University of Health Sciences, California. His research program at Western University is focused on replication and therapeutic intervention of emerging negative strand RNA viruses.

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