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Finding human proteins that bind to a Lassa Virus protein

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ABSTRACT

Viral hemorrhagic fevers are severe illnesses caused by many different viruses. Lassa Virus is one of these important pathogens in Western Africa, causing hemorrhagic fever and eventually death without early medical treatment. There is no vaccine and there is little information on host-pathogen interactions. Therefore, the interaction between viral proteins and host targets is useful to understand Lassa virus's lifecycle and pathology, and to develop ways to prevent infection. In this project, we study the nucleoprotein of Lassa virus (NP), which has been reported to have anti-interferon (IFN) activity through elimination of double stranded RNA (dsRNA). These features could be shared with other hemorrhagic viruses which have proteins with similar structures. This is important to understand because conserved viral characteristics across biological systems could lead to broad spectrum antiviral therapies. In this study we used the yeast two-hybrid assay to identify viral-host cell protein interactions. This assay involves two proteins which create a functional transcription factor if they interact. This transcription factor will then allow for the expression of auxotrophic reporter genes. The NP gene was cloned into the yeast two-hybrid DNA binding domain plasmid, sequenced, and screened against libraries of human genes from liver, macrophages and interferon treated macrophages. We identified viral-host protein interactions that will give insight into host proteins targeted during Lassa infection. Similar interactions may be observed in Crimean Congo virus Nucleoprotein (N), which has a very similar structure. Additional studies in mammalian cells are needed to confirm interactions and to explore biochemical effects on viral protein functions.

KEYWORDS

Hemorrhagic fever, Lassa virus, Nucleoprotein, yeast two-hybrid, protein-protein interactions