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Further Characterization of Rio Grande Virus and Potential for Serological Cross Reactivity with other Phleboviruses

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Abstract

Members of the genus Phlebovirus (family Bunyaviridae) are new and emerging disease pathogens of humans and animals. Newly identified viruses include Heartland virus (HRTV), Lone Star virus in the USA, and Severe Fever with Thrombocytopenia Syndrome virus in Asia. Assays to support surveillance, epidemiologic studies, and diagnosis of these viruses may also detect related viruses within the genus, confounding interpretation. Rio Grande virus (RGV) was isolated in 1973 from southern plains woodrats (Neotoma micropus) in the United States and has been preliminarily identified as a phlebovirus transmitted by the sand fly Lutzomyia anthophora. RGV is not known to cause disease in humans, but it could be detected by assays designed for HRTV or other phleboviruses. The goal of this study was to determine antigenic cross-reaction between RGV and other phleboviruses. A commercially available ELISA based sand fly fever antigen detection kit was tested for the ability to detect RGV and other New and Old-World phleboviruses, including attenuated Rift valley fever virus (RVFV) strain MP12, Punta Toro virus (PTV), Toscana virus, Aguacate virus, Anhanga virus, Arumowot virus, and Chagres virus. Immunocytochemistry and Western blotting were used to detect cross reactions between RGV, MP12, and PTV using rabbit anti-RVFV nucleocapsid protein and glycoproteins GC and GN, mouse monoclonal anti-PTV, and sheep polyclonal anti-MP12.

Keywords:

The ELISA test detected cross reactivity for all phleboviruses excluding RGV but Western blotting detected the presumed RGV nucleocapsid protein (N) using rabbit anti RVFV N serum RGV thus further characterization of the molecular targets of the cross reaction is required for proper inte