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Researchers develop successful new treatment against the deadly Junin virus

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Senior author Thomas Geisbert. Credit: The University of Texas Medical Branch at Galveston

A team of researchers have made a discovery that could lead to the development of treatment for a deadly virus spread by rodents.

An interdisciplinary research team from The University of Texas Medical Branch at Galveston, Mapp Biopharmaceutical Inc.; the University of Natural Resources and Applied Life Sciences in Austria, the U.S. Army Medical Research Institute of Infectious Diseases, Integrated BioTherapeutics, Inc. and the Instituto Nacional de Enfermedades Virales Humanas in Argentina reports that a laboratory-engineered antibody provided complete protection against the deadly Junin virus.

Junin virus, the infectious agent responsible for Argentine hemorrhagic fever, is a virus spread by rodents that has been identified as a high-priority agent by the U.S. Department of Homeland Security. The virus is also considered a Category A Priority Pathogen by the Centers for Disease Control and Prevention and National Institute of Allergy and Infectious Diseases Biodefense. Category A pathogens pose the highest risk to national security and public health.

There are no FDA-approved drugs available for preventing or treating this disease, which has a mortality rate of 20 to 30 percent when left untreated. The relatively slow onset of this disease with its unspecific symptoms that may delay diagnosis, coupled with its devastating hemorrhagic phase, make Junin virus a serious threat to public health.

Currently, people infected with the Junin virus are administered plasma from a survivor. Although this plasma treatment can be effective, it is

only available in limited quantities, the quality of the plasma varies and it can pose safety risks such as transfusion-borne diseases.

In a paper appearing in the *Proceedings of the National Academy of Sciences* on April 4th, the group describes the effectiveness of three monoclonal antibodies given to guinea pigs two days after receiving a lethal dose of the Junin virus. All of the animals that received one of the three candidate antibodies survived throughout the study, which extended beyond the time that they would have died without treatment. In a separate group, the most potent monoclonal antibody, J199, protected animals from disease when administered on days six and 10 or on days seven and 11 after Junin exposure. All of the animals that did not receive treatment died within 14 days of infection.

"What makes the study unique is that we observed complete protection against death even when treatment was delayed six days after Junin virus infection when animals were showing signs of disease," said UTMB professor Thomas Geisbert, senior author of the paper. "This recent success of the antibody therapy against Junin virus is a key step in its development as a therapeutic for use in people."

"These results further validate the potential monoclonal antibodies offer for treating infectious diseases," said Larry Zeitlin, president of Mapp Biopharmaceutical, Inc., and lead author of the paper. "With highly potent monoclonal antibodies like J199, dosages, and therefore costs, are reduced. Combined with continuing improvements in manufacturing, it is our hope that antibody therapies will be an affordable solution for a variety of infectious diseases that impact public health."

More information: Monoclonal antibody therapy for Junin virus infection, *PNAS*, www.pnas.org/cgi/doi/10.1073/pnas.1600996113

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