

Euro Virology 2017: Therapeutic intervention of Hantavirus disease - Mohammad Mir - Western University of Health Sciences, USA**Mohammad Mir***Western University of Health Sciences, USA*

Hantaviruses, members of the Bunyaviridae family cause severe illness in humans with high Mortality rates. There is no cure for Hantavirus disease at present. An evolutionarily conserved Sequence at the 5' terminus of hantaviral genomic RNA plays an important role in viral transcription initiation and packaging of the viral genome into viral nucleocapsids. Interaction of viral nucleocapsid protein (N) with this conserved sequence facilitates mRNA translation by a unique N-mediated translation strategy. Whereas this evolutionarily conserved sequence Facilitates virus replication with the assistance of N in eukaryotic hosts having multifaceted Antiviral defence, we demonstrate its interaction with N presents a novel target for therapeutic Intervention of hantavirus disease. Using a high throughput screening approach, we identified Three lead inhibitors that bind and induce structural perturbations in N. The inhibitors interrupt NRNA interaction and abrogate both viral genomic RNA synthesis and N-mediated translation strategy without affecting the canonical translation machinery of the host cell. The inhibitors are well tolerated by cells and inhibit hantavirus replication with the same potency as ribavirin, a Commercially available antiviral. We report the identification of a unique chemical scaffold that Disrupts a critical RNA-protein interaction in Hantaviruses and holds promise for the development Of the first anti-hantaviral therapeutic with broad spectrum antiviral activity.

Hantavirus pulmonary syndrome (HPS) is one of two potentially lethal zoonotic syndromes caused by hantavirus species. These include Black Creek Canal Virus (BCCV), New York orthohantavirus (NYV), Monongahela virus (MGLV), Sin Nombre orthohantavirus (SNV), and several other members of the genera of Hantavirus found in the United States and Canada. HPS initially has a 2-4 week incubation period, where patients remain asymptomatic. Patients will then experience 3-5 days of flu-like symptoms of the prodromal period, including fever, cough, muscle pain, headache, lethargy, shortness of breath, nausea, vomiting and diarrhea. The patient's condition gradually deteriorates in the subsequent 5-7 day cardiopulmonary period into acute respiratory failure, characterized by the sudden

onset of shortness of breath with rapidly developing pulmonary edema, as well as heart failure, with hypotension, tachycardia, and shock. Patients may develop acute respiratory distress syndrome during this process. With mechanical ventilation, and diuretic intervention, it is often fatal. Following the cardiopulmonary phase, patients can enter a 2-3 day diuretic period marked by improved symptoms and diuresis. Later convalescence can last months to years. Overall, HPS patient mortality is 36%. The virus can be transmitted from a natural reservoir rodent to humans through a direct bite or inhalation of aerosolized virus, released from blood, urine or saliva. In general, movement of droplet and/or fomite was not shown in either the pulmonary or hemorrhagic types of hantaviruses. Rodent control in and around the home or residences remains the key method of prevention, as well as the reduction of rodent activity in the workplace and campsites. Closed sheds and cabins are also suitable sites for rodent infestations. It is recommended that you air out of these spaces before use.

Hantavirus vaccine is a vaccine that protects humans against hantavirus infections that cause hemorrhagic hantavirus fever with renal syndrome (HFRS) or pulmonary hantavirus syndrome (PHS). The vaccine is considered important, as acute hantavirus infections are worldwide responsible for significant morbidity and death. It is estimated that from 1950 to 2007 there were around 1.5 million cases and 46,000 deaths in China. The number of cases in Finland from 2005 to 2010, and in Russia from 1996 to 2006, is estimated at 32,000. The first hantavirus vaccine was initially developed for use against Hantaan River virus in 1990 which causes one of the most severe types of HFRS. It is estimated that approximately two million doses of the rodent brain or cell culture derived vaccine are administered annually in China. The large use of this vaccine may be partly responsible for a substantial reduction in the number of HFRS cases in China to below 20,000 by 2007. Many hantaviruses used for the vaccine include Seoul Virus (SEOV). However, the vaccine, like Puumala (PUUV) and Dobrava-Belgrade (DOBV) viruses, is not thought to be effective against European hantaviruses. Hantavax is the generic trade name for the vaccine. No hantavirus vaccine has been approved for

use in Europe or the USA as of 2012.

A coronavirus is a kind of common virus that causes your nose, sinus or upper throat to become infected. Most coronaviruses aren't harmful. The World Health Organization described SARS-CoV-2 as a new form of coronavirus in early 2020, following an outbreak in China in December 2019. The epidemic spread rapidly across the globe. COVID-19 is a disease caused by SARS-CoV-2 which can induce what doctors call an infection in the respiratory tract. This can impact your upper respiratory tract (sinus, nose, and throat), or lower respiratory tract (windpipe and lungs). This spreads the same way other coronaviruses do, mainly through contact from person to person. Infections range from mild to fatal. SARS-CoV-2 is one of seven types of coronavirus, including those causing serious diseases such as respiratory syndrome (MERS) in the Middle East and sudden acute respiratory syndrome (SARS). The other coronaviruses cause most of the colds in the year that bother us. Changing, or mutating, is common for a virus because it infects people. A Chinese analysis of 103 cases at COVID-19 indicates the virus that causes it to do just that. They found two varieties, called L and S. The type S is older but in early stages of the outbreak the type L was more common. We agree that one will cause more cases of the disease than the other, but they also focus on what it is. It is too early to know how long will the pandemic spread. It relies on many factors, including the work of researchers to learn more about the virus, their hunt for a cure and a vaccine, and the efforts of the public to stop the spread. Over 100 applicants for the vaccine are in different stages of development and research. Normally, the cycle takes years. Researchers are speeding things up as fast as they can but developing a vaccine that works and is effective may still take 12 to 18 months.