CRIMEA FEDERAL UNIVERSITY
Medical Academy named after S.I. Georgievsky of Vernadsky CFU

DEPARTMENT OF MICROBIOLOGY

A PRESENTATION ON THE TOPIC :- Arenaviruses: unique virology. Diseases of the Old World and New World.

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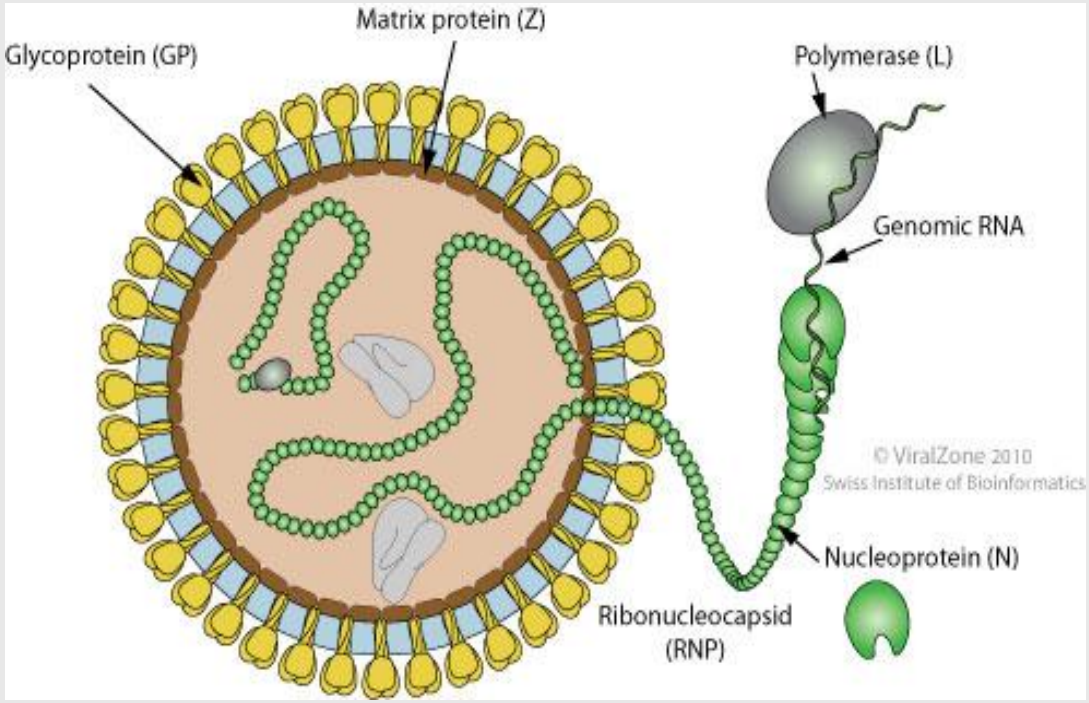
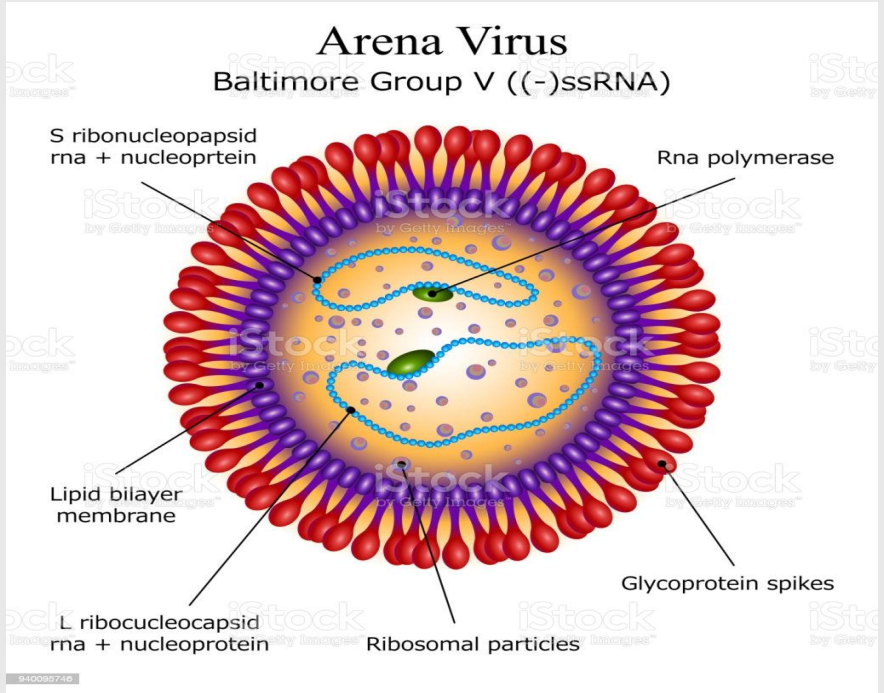
ARENAVIRUSES

An arenavirus is a bisegmented ambisense RNA virus that is a member of the family Arenaviridae.These viruses infect rodents and occasionally humans. A class of novel, highly divergent arenaviruses, properly known as reptarenaviruses, have also been discovered which infect snakes to produce inclusion body disease.

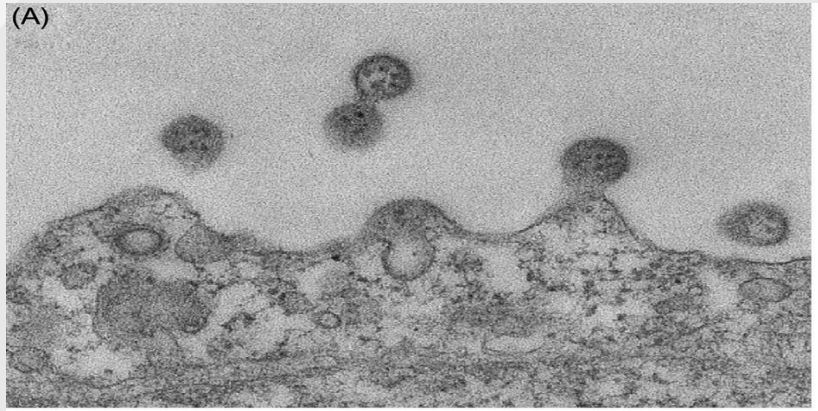


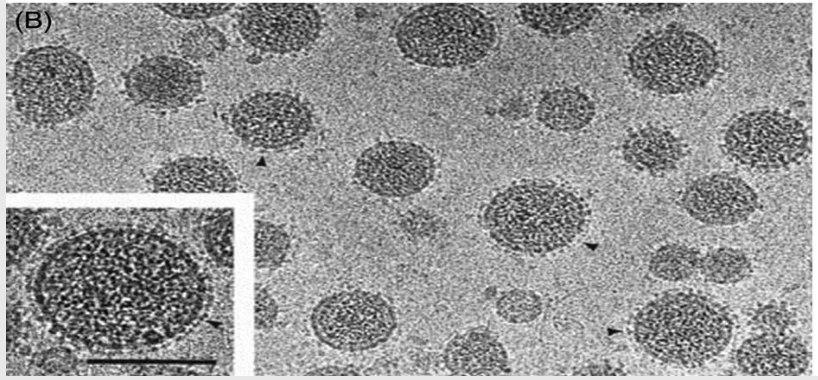


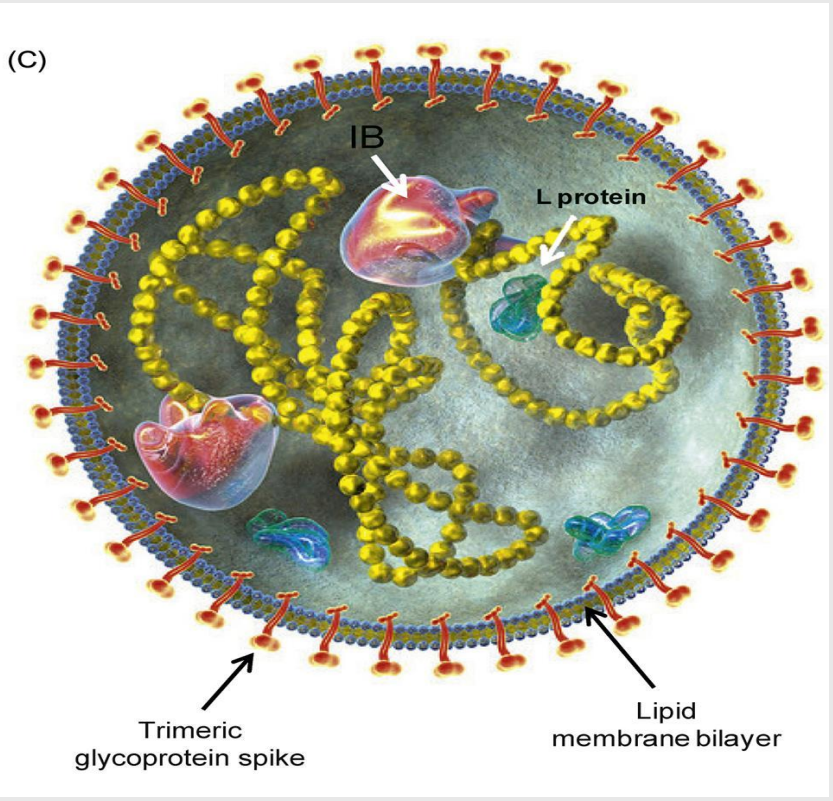
STRUCTURE OF ARENA VIRUS

The virus contains a beaded nucleocapsid with two single-stranded RNA segments. The nucleocapsid consists of a core of nucleic acid enclosed in a protein coat. Although they are categorized as negative-sense viruses, arenaviruses are ambisense.

Arenaviruses contain grainy particles that are ribosomes acquired from their host cells. It is from this characteristic that they acquired the name arena, from the Latin root meaning sand.





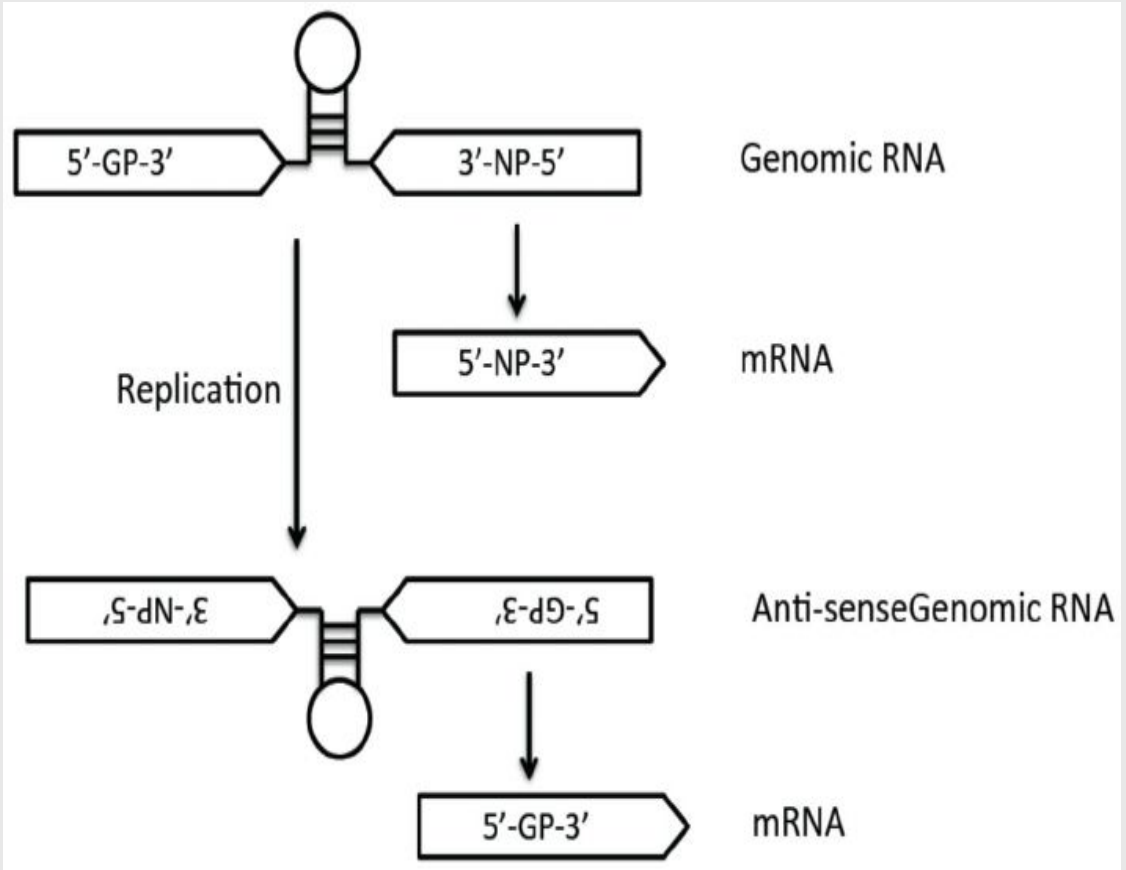


AMBISENSE OF ARENAVIRUS

Arenaviruses have a unique ambisense or bidirectional genomic organization, meaning that a single RNA can direct the synthesis of two polypeptides in opposite orientation.

The genome of arenaviruses consists of two single-stranded RNA segments, large (L) and small (S). Each segment uses an ambisense gene organization to drive expression of two genes in opposite directions.

The L RNA segment (approximately 7.1 kb) encodes the viral RNA–dependent RNA polymerase (L) and a small RING finger protein (Z) that is the arenavirus counterpart of the matrix proteins (M) of negative-sense RNA viruses. The S RNA segment (approximately 3.4 kb) encodes the glycoprotein precursor protein and the nucleoprotein (NP).

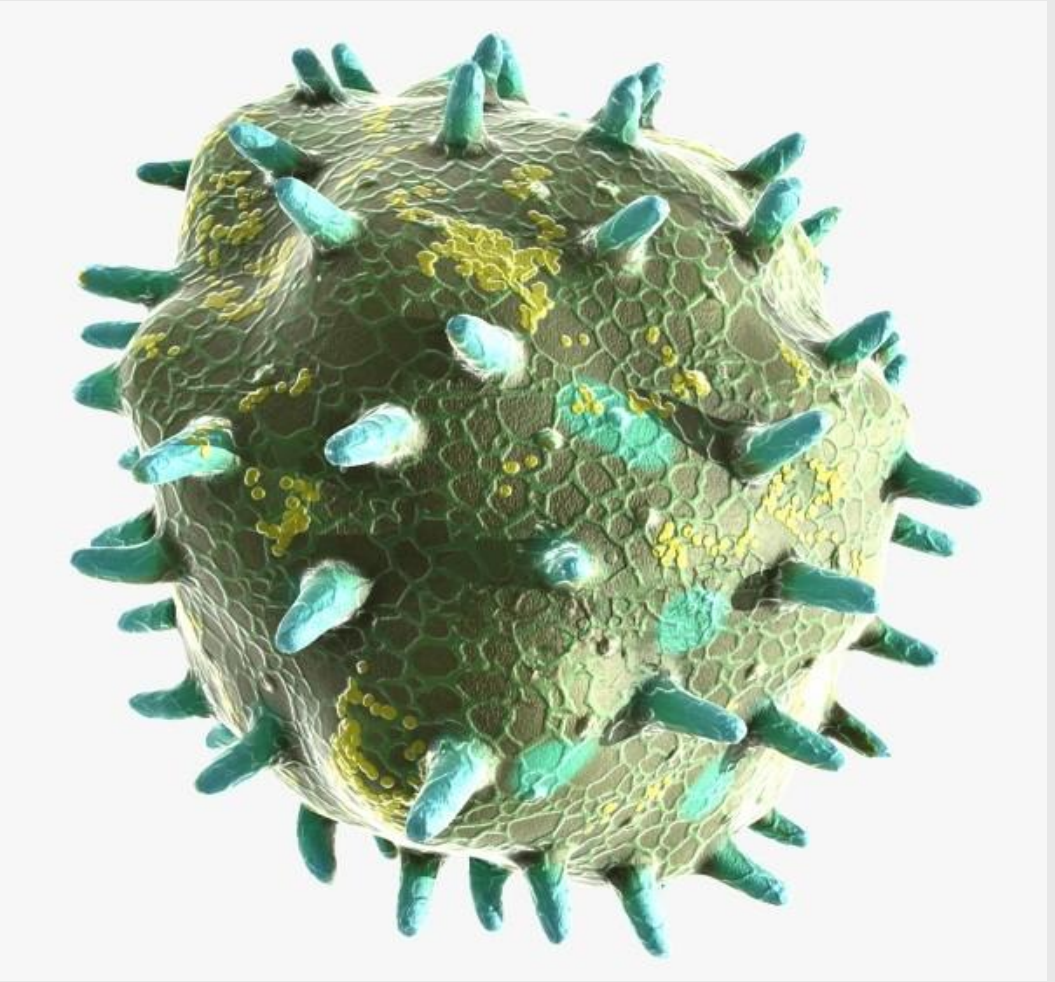


TAXONOMY

Within the family *Arenaviridae*, arenaviruses were formerly all placed in the genus *Arenavirus*, but in 2014 were divided into the genera ***Mammarenavirus*** for those with mammalian hosts and ***Reptarenavirus*** for those infecting snakes

A third genus, ***Hartmanivirus*** has also been established, including other species that infect snakes.

A fourth genus, ***Antennavirus*** has also been established to accommodate two arenaviruses found in striated frogfish (*Antennarius striatus*)



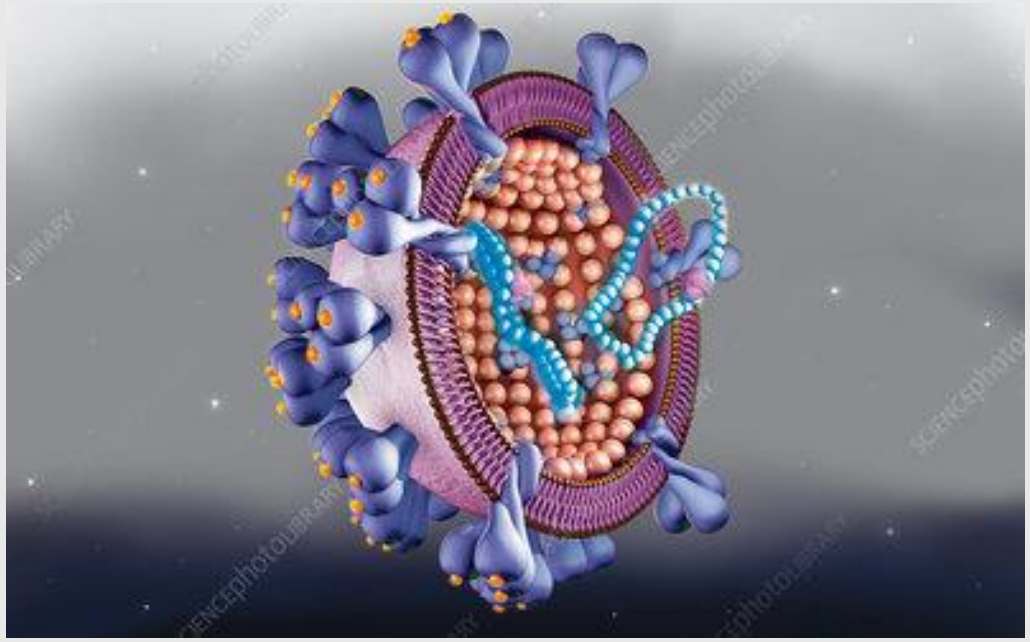
Mammarenaviruses can be divided into two serogroups, which differ genetically and by geographical distribution: When the virus is classified "Old World" this means it was found in the Eastern Hemisphere in places such as Europe, Asia, and Africa. When it is found in the Western Hemisphere, in places such as Argentina, Bolivia, Venezuela, Brazil, and the United States, it is classified "New World"

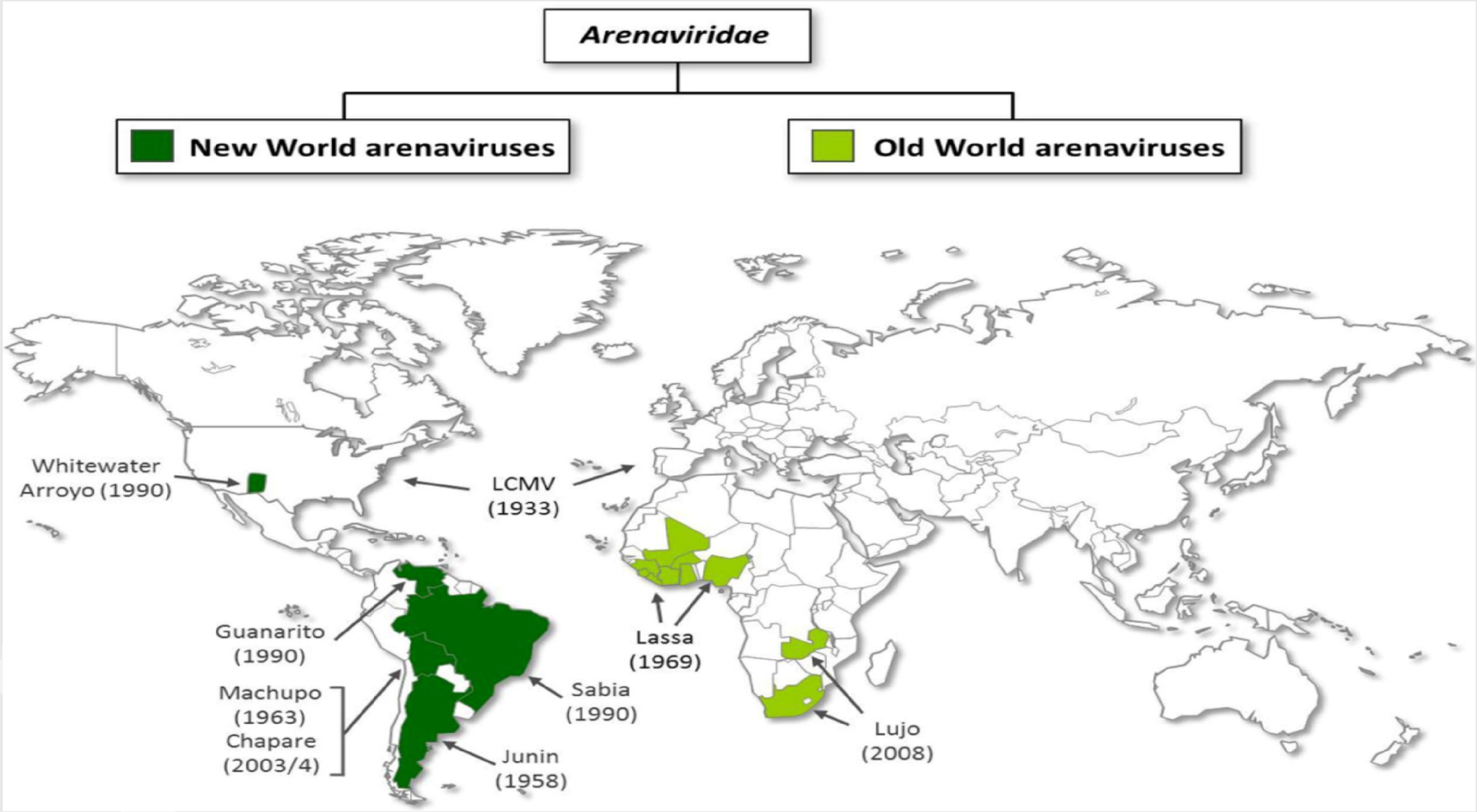
Old world arenavirus

- Ippy virus
- Lassa virus
- Lymphocytic chriomeningitis virus
- Mobala virus
- Mopeia virus
- Morogoro virus
- Lujo virus

New world arenavirus

- Allpahuayo virus
- Amapari virus
- Bear canyon virus
- Chapare virus
- Cupixi virus
- Flexal virus
- Guanarito virus
- Junin virus
- Latino virus
- Machupo virus
- Oliveros virus
- Parana virus
- Pichinde virus
- Pirital virus
- Sabia virus
- Tacaribe virus
- Tamiami virus
- Whitewater Arroyo virus



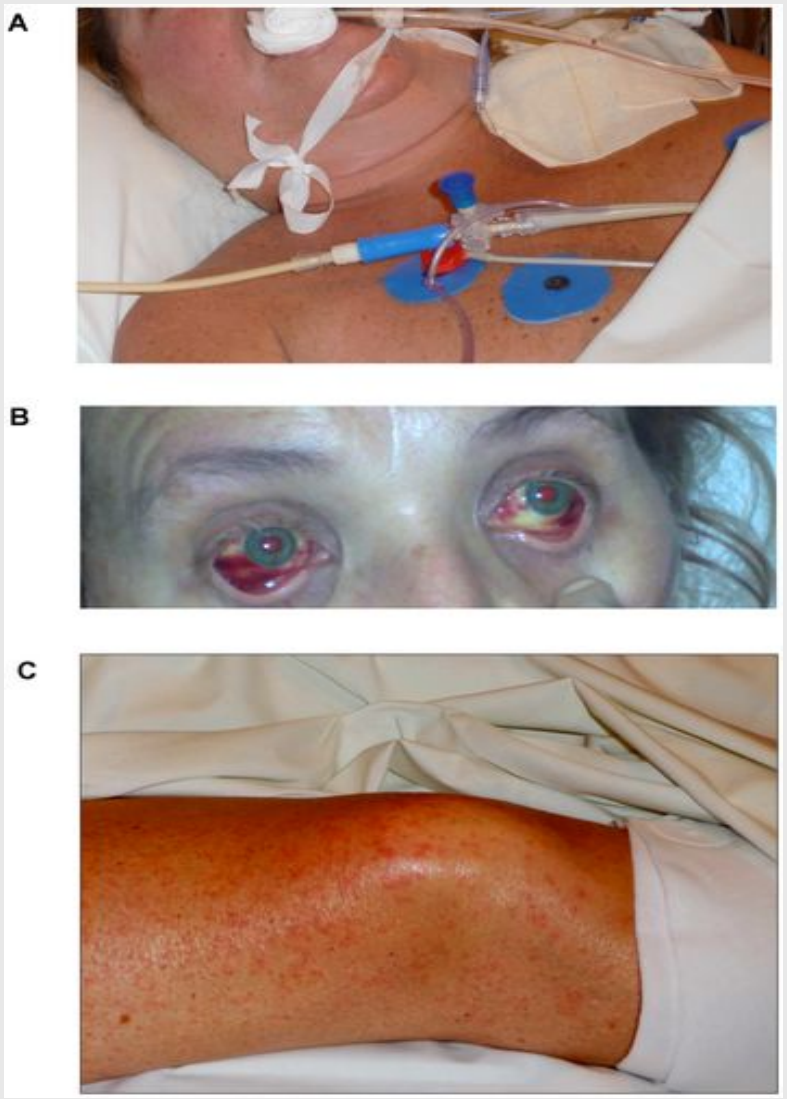


Diseases of the old world

→ Lassa fever (by Lassa virus)

→ Lujo hemorrhagic fever (LUHF) (by Lujo virus)

→ Lymphocytic choriomeningitis(by lymphocytic choriomeningitis mammarenavirus)



World Health Organization

LASSA FEVER

What is Lassa fever?

Lassa fever is a viral illness that typically occurs in West Africa.

How is Lassa fever spread?

The Lassa virus is transmitted to humans mainly through handling rats, food or household items contaminated by rats' urine and faeces.

The virus can spread between people through direct contact with the body fluids of a person infected with Lassa fever, as well as contaminated bedding and clothing.

You cannot get Lassa fever through hugging, shaking hands or sitting near someone.

What are the symptoms of Lassa fever?

Symptoms of Lassa fever typically occur 2-21 days after coming into contact with the virus. Many people who are infected do not show symptoms.

- Fever
- Headache
- Sore throat
- Chest and muscle pain
- Nausea, vomiting and diarrhoea
- Facial swelling
- In severe cases, bleeding from the mouth, nose, vagina or gastro-intestinal tract

Cure for Lassa fever

Ribavirin is an antiviral drug that treats the infection.

➡ **There is no currently available vaccine for Lassa fever.**

Lujo hemorrhagic fever (LUHF)

Transmission

Lujo virus has a rodent host as its reservoir. Humans can get LUHF through contact with an infected rodent. Contact can be direct or through inhalation of aerosolized Lujo virus from the urine or feces of infected rodents. Transmission of arenaviruses, and Lujo virus in particular, is most likely the result of direct contact with the body fluids of an infected person, in the absence of infection control precautions.

Signs ans Symptoms

After an incubation period of 7 to 13 days, the clinical course started by a non-specific febrile illness accompanied by headache and muscle pain.
The disease increases in severity, with:
a morbilliform rash of the face and trunk
face and neck swelling
pharyngitis (sore throat)
diarrhea
Bleeding was not a prominent feature during the illness.
In the fatal cases (4/5 patients), a transient improvement was followed by:
rapid deterioration with respiratory distress
neurological signs and circulatory collapse
Death occurred 10 to 13 days after onset.

LUHF

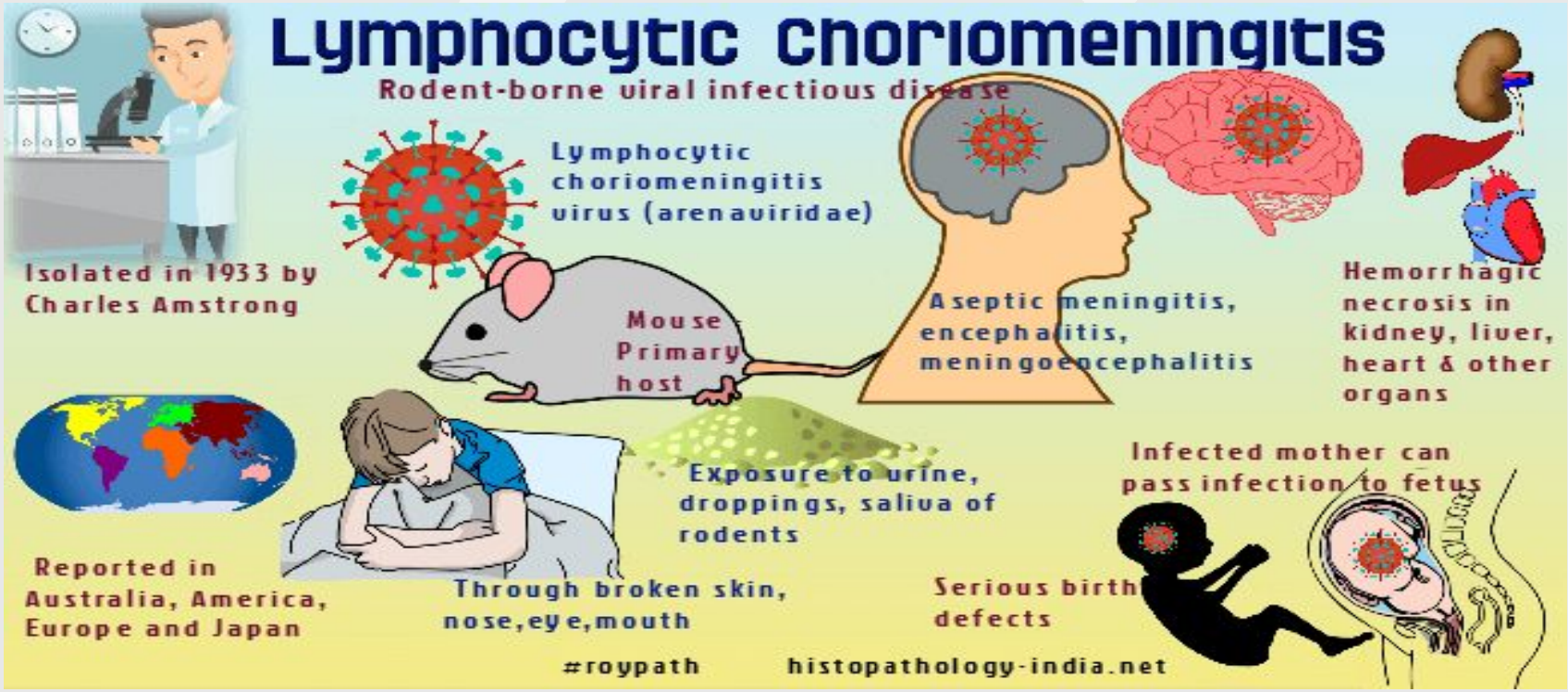
Treatment

Supportive therapy is important in Lujo hemorrhagic fever.
This includes:
maintenance of hydration
management of shock
sedation
pain relief
usual precautions for patients with bleeding disorders
transfusions (when necessary)
Others-
Plasma therapy
Ribavirin

Prevention

Full barrier nursing procedures should be implemented during management of suspected or confirmed LUHF cases (no infection occurred after their implementation in South Africa).

LYMHOCYTIC CHORIOMENINGITIS



CURE

No specific drug treatment is indicated in most cases of LCMV infection. Most patients improve spontaneously within 1-3 weeks with no sequelae. Ribavirin has in vitro activity against LCMV and has been used with success in transplant recipients with severe disease

Diseases of new world

→ Argentine (AHF) (by Junin (JUNV)
→Bolivian Hemorrhagic fever(Machupo (MACV)
→Venezuelan Hemorrhagic fever(Guanarito (GTOV),
→ Brazilian hemorrhagic fever(Sabiá (SBAV) virus)

All cause severe human disease.

Argentine Hemorrhagic Fever

First recognized by an Argentine physician named Arribalzaga in the early 1950s

Caused by Junin Virus (Arinavirus)

Risk factors:

Farm workers

Through cuts and abrasion

Rodent (vesper mouse/ voles - host

Airborne dust

Neurologic and hemorrhagic phase : Convulsion, coma, bleeding from orifices

Mortality rate - 15-30%

Reported in the Las Pampas region of Argentina

Ingestion of contaminated food

Virus infected dust, grain products

#roypath histopathology-india.net

VACCINE AGAINST AHF

The *Candid #1* vaccine for AHF was created in 1985 by Argentine virologist Dr. Julio Barrera Oro. The vaccine was manufactured by the Salk Institute in the United States, and became available in Argentina in 1990. The Junín vaccine has also shown cross-reactivity with Machupo virus and, as such, has been considered as a potential treatment for Bolivian hemorrhagic fever.
Candid #1 has been applied to adult high-risk population and is 95.5% effective


THANK
YOU