



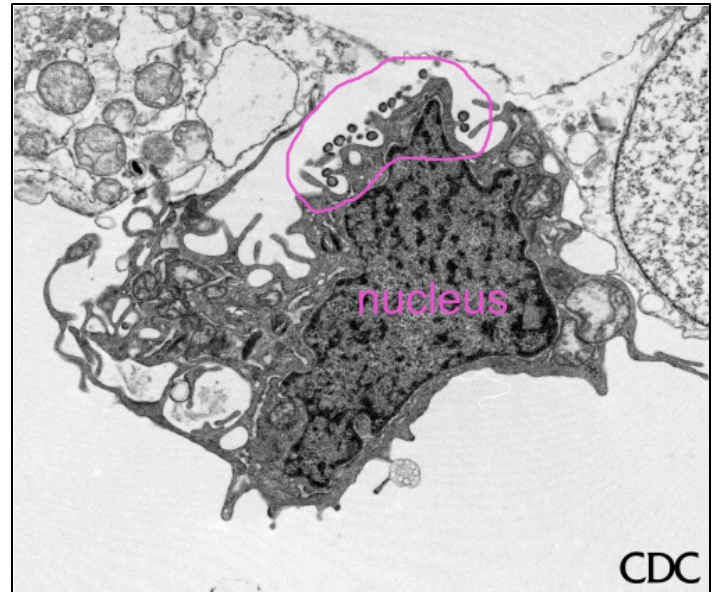
# Arenavirus

## Fact Sheet

### What are the Arenaviridae?

The Arenaviridae are a family of viruses whose members are generally associated with rodent-transmitted disease in humans. Each virus usually is associated with a particular rodent host species in which it is maintained. Arenavirus infections are relatively common in humans in some areas of the world and can cause severe illnesses.

The virus particles are spherical and have an average diameter of 110-130 nanometers. All are enveloped in a lipid (fat) membrane. Viewed in cross-section, they show grainy particles that are ribosomes acquired from their host cells. It is this characteristic that gave them their name, derived from the Latin "arena," which means "sandy." Their genome, or genetic material, is composed of RNA only, and while their replication strategy is not completely understood, we know that new viral particles, called virions, are created by budding from the surface of their hosts' cells.



Image, above: Vero E6 tissue culture cell infected with an arenavirus. Image shows extracellular virus particles budding from the cell surface. Magnification approx. 12,000 times. Image courtesy Cynthia Goldsmith, MS, Infectious Disease Pathology Activity, DVRD, NCID, CDC.

### When were the members of this virus family recognized?

The first arenavirus, lymphocytic choriomeningitis virus (LCMV), was isolated in 1933 during a study of an epidemic of St. Louis encephalitis. Although not the cause of the outbreak, LCMV was found to be a cause of aseptic (nonbacterial) meningitis. By the 1960s, several similar viruses had been discovered and they were classified into the new family Arenaviridae. Since Tacaribe virus was found in 1956, new arenaviruses have been discovered on the average of every one to three years. A number of arenaviruses cause hemorrhagic disease. Junin virus, isolated in 1958, was the first of these to be recognized. This virus causes Argentine hemorrhagic fever in a limited agricultural area of the pampas in Argentina. Several years later, in 1963, in the remote savannas of the Beni province of Bolivia, Machupo virus was isolated. The next member of the virus family to be associated with an outbreak of human illness was Lassa virus in Africa in 1969. Most recently, Guanarito and Sabia viruses were added to this family.

### What viruses are included in the virus family?

The arenaviruses are divided into two groups: the New World or Tacaribe complex and the Old World or LCM/Lassa complex. Viruses in these groups that cause illness in humans are listed below:

Virus	Disease
Lassa virus	Lassa fever
Junin virus	Argentine hemorrhagic fever
Machupo virus	Bolivian hemorrhagic fever
Guanarito virus	Venezuelan hemorrhagic fever
Sabia	Brazilian hemorrhagic fever

### **What kinds of animal hosts do these viruses have?**

These viruses are zoonotic, meaning that, in nature, they are found in animals. Each virus is associated with either one species or a few closely related rodents, which constitute the virus' natural reservoir. Tacaribe complex viruses are generally associated with the New World rats and mice (family Muridae, subfamily Sigmodontinae). The LCM/Lassa complex viruses are associated with the Old World rats and mice (family Muridae, subfamily Murinae). Taken together, these types of rodents are located across the greater proportion of the earth's land mass, including Europe, Asia, Africa, and the Americas. One notable exception is Tacaribe virus, found in Trinidad, which was isolated from a bat.

### **How are arenaviruses spread?**

The rodent hosts of arenaviruses are chronically infected with the viruses; however, the viruses do not appear to cause obvious illness in them. Some Old World arenaviruses appear to be passed from mother rodents to their offspring during pregnancy, and thus remain in the rodent population generation after generation. Some New World arenaviruses are transmitted among adult rodents, likely via fighting and inflicting bites. Only a portion of the rodents in each host species is infected at any one time, and in many cases only in a limited portion of the host's geographical range. The viruses are shed into the environment in the urine or droppings of their infected hosts.

Human infection with arenaviruses is incidental to the natural cycle of the viruses and occurs when an individual comes into contact with the excretions or materials contaminated with the excretions of an infected rodent, such as ingestion of contaminated food, or by direct contact of abraded or broken skin with rodent excrement. Infection can also occur by inhalation of tiny particles soiled with rodent urine or saliva (aerosol transmission). The types of incidental contact depend on the habits of both humans and rodents. For example, where the infected rodent species prefers a field habitat, human infection is associated with agricultural work. In areas where the rodent species' habitat includes human homes or other buildings, infection occurs in domestic settings.

Some arenaviruses, such as Lassa and Machupo viruses, are associated with secondary person-to-person and nosocomial (health-care setting) transmission. This occurs when a person infected by exposure to the virus from the rodent host spreads the virus to other humans. This may occur in a variety of ways. Person-to-person transmission is associated with direct contact with the blood or other excretions, containing virus particles, of infected individuals. Airborne transmission has also been reported in connection with certain viruses. Contact with objects contaminated with these materials, such as medical equipment, is also associated with transmission. In these situations, use of protective clothing and disinfection procedures (together called barrier nursing) help prevent further spread of illness.