

# Rabies

The rabies virus can stay alive in a dead animal depending on the outside temperature. If it is exposed to sun light it will die in a few hours. But in cold or freezing temperature it can be alive for months. So if another animal comes in contact with the dead animal who had rabies, it can be contagious through an open wound or if the dog chews the dead flesh. The best protection against rabies is to get pets vaccinated regularly.

## ***Rhabdoviridae***

### **Vaccination**

### **Zoonotic diseases/Zoonoses**

## **What Is Rabies?**

Because of its devastating effects, rabies has been one of the most feared diseases in the world since it was first described in ancient times. A member of the *Rhabdoviridae* family of viruses causes rabies. In the United States, the virus lives primarily in wild bats, raccoons, skunks, and foxes; it sometimes is found in other animals as well, such as wolves, coyotes, or ferrets. Small animals such as hamsters, squirrels, mice, and rabbits typically do not carry the virus. More than 90 percent of reported rabies cases in animals occur in wild animals. The most common domestic animals that become infected, or "rabid," are cats, dogs, and cattle. Throughout the world most cases of human exposure to rabies are to rabid dogs, but in the United States cases related to dog bites are rare. Indeed, most cases are linked to bats.

When a rabid animal bites a person, the rabies virus, which lives in the animal's saliva, is transmitted through the body, where it can attack the central nervous system (the part of the nervous system that includes the brain and spinal cord), leading to encephalitis \* and death. After symptoms begin, the disease can progress very quickly and can be fatal within a few days.

## **How Common Is Rabies?**

Almost all reported cases of rabies in the United States occur in animals. In the year 2000, 7,369 cases of rabies in animals were reported to the U.S. Centers for Disease

Control and Prevention; 509 of those infections were in domestic animals (pets and farm animals). Only five people were infected with rabies that year, and all of them died. On average, only one or two deaths from rabies are seen in humans each year in the United States.

\* **encephalitis** (en-seh-fuh-LYE-tis) is an inflammation of the brain. usually caused by a viral infection.

## Is Rabies Contagious?

Rabies has not been found to be contagious from person to person. In theory, if a person infected with rabies were to bite someone else, the virus might spread, but no such cases have been recorded. Animal bites are the most common cause of rabies in people.

Rarely, the virus may spread when saliva or tissue from an infected animal enters an open wound or mucous membrane \*, such as when an infected animal licks a person's broken skin. In rare instances, exposure to bats, with no known bite or scratch, causes human rabies.

## What Are the Signs and Symptoms of Rabies?

Once a person has been infected with the rabies virus, symptoms may appear as soon as 10 days or as long as 90 days after exposure. These symptoms typically happen in stages. The first stage may include fever, a general ill feeling, sore throat, loss of appetite, nausea (NAW-zee-uh), vomiting, depression, and headache. If the person has been bitten by an animal, there may be a tingling sensation around the area of the bite. As the disease progresses and attacks the nervous system, a person may have difficulty sleeping and experience anxiety, confusion, aggressiveness, or hallucinations (haloo-sin-AY-shuns, seeing or hearing things that are not really there).

\* **mucous membranes** are the moist linings of the mouth, nose, eyes, and throat.

\* **paralysis** (pah-RAH-luh-sis) is the loss or impairment of the ability to move some part of the body.

\* **seizures** (SEE-zhurs) are sudden bursts of disorganized electrical activity that interrupt the normal functioning of the brain, often leading to uncontrolled movements in the body and sometimes a temporary change in consciousness.

\* **double vision** is a vision problem in which a person sees two images of a single object.

\* **coma** (KO-ma) is an unconscious state in which a person cannot be awakened and cannot move, see, speak, or hear.

\* **delirium** (dih-LEER-e-um) is a condition in which a person is confused, is unable to think clearly, and has a reduced level of consciousness.

## **The Strange Facts in the Case of Edgar Allan Poe**

Edgar Allan Poe, whose name is synonymous with horror and mystery, died as perplexing and shocking a death as any that he concocted in the many suspenseful and macabre tales that he wrote. Poe set out on a trip from Richmond, Virginia, to Philadelphia at the end of September 1849. The next anyone heard of him—about a week after his departure—he had collapsed outside a tavern in Baltimore and was found quivering and raving. Four days later, on October 7, he died in a nearby hospital. For many years it was thought that his symptoms of delirium \*, cold sweat, confusion, memory loss, and difficulty in swallowing could be attributed to severe alcoholism. In 1996, however, R. Michael Benitez, a doctor at the University of Maryland Medical Center, concluded in a review of the historical record that Poe, in fact, might have died of rabies.

Other symptoms of rabies infection include partial paralysis \*, seizures \* or muscle spasms, inability to speak, sensitivity to light or sound, and hydrophobia (hi-druh-FOE-bee-uh), or avoiding drinking water or other liquids due to trouble swallowing. In the final stages, the person may experience double vision \* or find it difficult to swallow saliva (which can make someone appear to be "foaming at the mouth"). The disease can progress to coma \* and death.

## **Making the Diagnosis**

People who may have been exposed to rabies need immediate medical attention. If a person has symptoms of the disease, a doctor will perform a physical examination and ask questions to figure out whether the person might have been exposed to a rabid animal. To diagnose rabies in a human, doctors can perform several laboratory tests, including examination of blood and spinal fluid for antibodies \* to the rabies virus. Skin biopsies \* and saliva tests also may be done to search for signs of the infection. One of the best diagnostic tests is done on brain tissue from the potentially infected animal. The results can tell doctors whether the animal was rabid. Animals with less risk of being infected (such as a pet dog) can be isolated and observed by the local health department to see whether any signs of rabies develop.

## **How Do Doctors Treat Rabies?**

It is recommended that someone who might have been exposed to rabies wash the site thoroughly with warm, soapy water. A person who has been bitten by or who has come into direct contact with an animal that may be rabid can receive immediate treatment by a doctor to prevent the disease from developing. This is called postexposure prophylaxis \*. The person receives one dose of rabies immune globulin \*, which provides the body with antibodies against rabies, followed by five doses of rabies vaccine \* given over a period of 28 days. This treatment has proved to be very effective in preventing the development of rabies when it is started within a day of exposure. Once a person has symptoms of rabies, treatment typically is limited to life support in the hospital. Approximately 40,000 people in the United States and an estimated 10 million people throughout the world are treated as a precaution each year after having been exposed to animals suspected of being rabid.

## **How Long Does the Disease Last and What Are the Complications?**

Once symptoms have appeared the disease can progress very quickly to coma and death, generally within 1 to 3 weeks. Rabies infection that is not treated immediately almost

always causes death. In rare cases where people have survived, they often have severe and permanent brain damage.

\* **antibodies** (AN-tih-bah-deez) are protein molecules produced by the body's immune system to help fight specific infections caused by microorganisms, such as bacteria and viruses.

\* **biopsies** (BI-op-seez) are tests in which small samples of skin or other body tissue are removed and examined for signs of disease.

\* **prophylaxis** (pro-fih-LAK-sis) means taking specific measures, such as using medication or a device (such as a condom), to help prevent infection, illness, or pregnancy.

\* **immune globulin** (ih-MYOON GLAH-byoo-lin). also called gamma globulin, is the protein material that contains antibodies.

\* **vaccine** (vak-SEEN) is a preparation of killed or weakened germs, or a part of a germ or product it produces, given to prevent or lessen the severity of the disease that can result if a person is exposed to the germ itself. Use of vaccines for this purpose is called immunization.

## Can Rabies Be Prevented?

Vaccinating household pets against rabies is very important in preventing the spread of the disease. This method has dramatically limited the number of rabies cases seen in domestic animals in the United States. People who are at greatest risk of exposure, such as veterinarians, travelers to areas of the world where rabid animals are common, and laboratory workers who handle material that may contain the rabies virus, often are immunized (vaccinated) against the disease. Taking these safety measures also can help prevent rabies:

- avoiding contact with unfamiliar or wild animals, especially bats and raccoons
- never feeding or handling a wild or unknown animal
- keeping trash that is stored outside carefully sealed, to avoid attracting raccoons and other animals

- consulting a doctor for advice about receiving the rabies vaccine before traveling to an area where rabies is more common, such as Asia or Africa

## **Louis Pasteur's Vaccine Breakthrough**

In 1885, Louis Pasteur (1822-1895), a French scientist known for his remarkable contributions to modern medicine, developed a vaccine that can prevent rabies in humans who have been exposed to the virus. This breakthrough led to the creation of the Pasteur Institute, a medical research organization dedicated to the understanding and prevention of infectious diseases, where Pasteur continued his important work for the last years of his life.

## **Resources**

### ***Organization***

U.S. Centers for Disease Control and Prevention (CDC), 1600 Clifton Road, Atlanta, GA 30333. The CDC tracks outbreaks of rabies in the United States and publishes information about the disease at its website.

Telephone 800-311-3435

<http://www.cdc.gov>

### ***Website***

[KidsHealth.org](http://www.KidsHealth.org). KidsHealth is a website created by the medical experts of the Nemours Foundation and is devoted to issues of children's health. It contains articles on a variety of health topics, including rabies.

<http://www.KidsHealth.org>

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