


Collection of Samples For Diagnosis of Rabies in Humans

State health departments should be the primary contact for physicians during consultation about possible human rabies cases. After consultation with physicians, it may be deemed necessary to send human samples for rabies testing to the Rabies Laboratory at the Centers for Disease Control and Prevention (CDC). Any questions regarding likelihood of a case, sampling techniques and shipping can be answered by calling the Rabies Section at the CDC at (404)-639-1050.

[Additional Resources](#)

1. **Patient History**

Please make sure physicians complete associated form detailing the clinical history of the patient and provide the name and phone number of the physician who should be contacted with the test results in addition to state health department authorities. This form must accompany any samples sent to the Rabies Laboratory at the CDC. ( [Possible Human Rabies --Patient Information Form](#) [PDF – 347 KB])

2. **Sample Shipment**

All samples should be considered as potentially infectious. Test tubes and other sample containers must be securely sealed (tape around the cap will insure that the containers do not open during transit). If immediate shipment is not possible, samples should be stored frozen at -20oC or below. Samples should be shipped frozen on dry ice by an overnight courier in water-tight primary containers and leak-proof secondary containers that meet the guidelines of the International Air Transport Association. The rabies laboratory at CDC should be telephoned (404-639-1050) at the time of shipment and given information on the mode of shipment, expected arrival time, and courier tracking number. Shipment address is as follows:

Rabies Laboratory
DASH, Bldg 18, Room SSB218
Centers for Disease Control and Prevention
1600 Clifton Road, NE
Atlanta, GA 30333

3. **Sample Collection**

a. **Saliva**

Using a sterile eyedropper pipette, collect saliva and place in a small sterile container which can be sealed securely. No preservatives or additional material should be added. Laboratory tests to be performed include detection of rabies RNA (by reverse transcription and polymerase chain reaction, RT/PCR, of extracted nucleic acids) and isolation of infectious virus in cell culture. Tracheal aspirates and sputum are not suitable for rabies tests.

b. **Neck Biopsy**

A section of skin 5 to 6 mm in diameter should be taken from the posterior region of the neck at the hairline. The biopsy specimen should contain a minimum of 10 hair follicles and be of sufficient depth to include the cutaneous nerves at the base of the follicle. Place the specimen on a piece of sterile gauze moistened with sterile water and place in a sealed container. Do not add preservatives or additional fluids. Laboratory tests to be performed include RT/PCR and immunofluorescent staining for viral antigen in frozen sections of the biopsy.

c. **Serum and cerebral spinal fluid (CSF)**

At least 0.5 ml of serum or CSF should be collected; no preservatives should be added. Do not send whole blood. If no vaccine or rabies immune serum has been given, the presence of antibody to rabies virus in the serum is diagnostic and tests of CSF are unnecessary. Antibody to rabies virus in the CSF, regardless of the immunization history, suggests a rabies virus infection. Laboratory tests for antibody include indirect immunofluorescence and virus neutralization.

d. **Brain Biopsy**

The rarity of rabies and the lack of an effective treatment make the collection of a brain biopsy unwarranted; however, biopsy samples negative for herpes encephalitis should be tested for evidence of rabies infection. The biopsy is placed in a sterile sealed container; do not add preservatives or additional fluids. Laboratory tests to be performed include RT/PCR and immunofluorescent staining for viral antigen in touch impressions.

Postmortem diagnosis of rabies is made by immunofluorescent staining of viral antigen in touch impressions of brain tissue. Portions of the medulla (brain stem), the cerebellum, and the hippocampus should be frozen and shipped on dry ice to a public health laboratory or the CDC laboratory. Preservation of tissues by fixation in formalin is not recommended if rabies diagnosis is desired.