

### **This Chapter Covers:**

- ◆ **Introduction**
- ◆ **Animals That Contract Rabies**
- ◆ **Clinical Signs of Rabies**
- ◆ **Rabies Prevention**
- ◆ **Rabies Seasons and Cycles**
- ◆ **Animal Bites**
- ◆ **Rabies Quarantine**

### **Introduction**

Rabies is a deadly disease caused by a virus. It is the most serious zoonotic disease that you might encounter.

- Rabies virus affects the central nervous system of warm-blooded animals. The rabies virus is shed (released) in the saliva of an infected animal. An animal usually contracts rabies from the bite of an infected animal. The virus may also enter the body if a mucous membrane (the moist lining/covering of the eyes, nose, or mouth) or a scratch or break in the skin has contact with saliva containing the rabies virus.
- Once the rabies virus enters the body, it begins to multiply in the area near the entry site. If the infection is not stopped at this point, the virus will eventually invade the nerve cells in the area. Once the virus is in the nerve tissue, it travels along the nerve to the brain where it continues to multiply. The virus may then spread along nerves from the brain to the

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## Rabies (Basic)

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salivary glands or other parts of the body. This incubation period lasts a varying amount of time; it can range from days to years, but the average length is 3-8 weeks (refer to Figures 1 and 2 in this chapter's appendix). Some references use 3–12 weeks as the average length (it might be easy to remember 3 weeks to 3 months).

- **If the virus spreads to the salivary glands, the animal may be able to shed (or excrete) the rabies virus in the saliva; this means that the animal is infectious.** Shedding occurs in the last stages of the disease. Clinical signs also appear in these last stages, followed closely by death. Dogs, cats, and domestic ferrets with rabies may shed rabies virus three to six days before they show clinical signs of rabies and only live for a few days after the clinical signs appear. This is why it is so important to quarantine animals that bite or have otherwise potentially exposed a person to rabies. If a dog, cat, or domestic ferret is healthy 10 days after a potential exposure incident, it can be concluded that the rabies virus could not have been in the animal's saliva at the time of the exposure.

### Animals That Contract Rabies

All warm-blooded animals can contract rabies, but some animals are more likely to become infected than others.

#### High-Risk Animals

- Texas law lists five wildlife species as **high risk** for rabies transmission: **skunks, bats, foxes, coyotes, and raccoons**. A reservoir is a particular species of animal in which a disease organism is maintained in nature through ongoing transmission within the reservoir. For instance, skunks, bats, and foxes (and historically coyotes) are wildlife reservoir species in Texas.

## Rabies (Basic)

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If a free-roaming high-risk animal potentially exposes a person to rabies, the animal's brain **must** be tested for rabies; the person **must be evaluated for starting rabies postexposure prophylaxis (prevention) immediately**. As defined in Texas Administrative Code, Rabies Control and Eradication, Section 169.27(e), a free-roaming animal is one that is not in captivity or has been in captivity for less than 200 days immediately before the potential rabies exposure occurred.

- If the high-risk animal is not considered to be a free-roaming animal, refer to special instructions in TAC 169.27(e) and (h) for how to handle a potential rabies exposure.

### **Low-Risk Animals**

- Low-risk animals are warm-blooded animals that rarely get rabies. If they are attacked by an infected animal, they frequently die from the wounds. Low-risk animals include rodents, moles, shrews, opossums, rabbits, and armadillos. Generally, low-risk animals are not tested unless there are unusual circumstances. The Texas Department of State Health Services' Laboratory Services Section discourages testing of indoor, caged-raised pets, such as hamsters, guinea pigs, and gerbils. Rabies postexposure prophylaxis is rarely required for persons due to contact with low-risk animals.

### **Dogs, Cats, and Domestic Ferrets**

- People are bitten most often by dogs and cats. Information on how to deal with bites and other potential rabies exposures is covered in the "Animal Bites" section of this chapter.

## Rabies (Basic)

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### The "Other" Animals

- Domestic farm animals, such as horses, cows, sheep, goats, and pigs, are sometimes exposed to rabid animals and may develop rabies.
- According to Texas law, if an animal is **not** listed as high risk or low risk, and it is **not** a dog, cat, or domestic ferret, it is put in a group called “**other**.” If an “other” animal potentially exposes a person to rabies, the local rabies control authority (LRCA) will decide if it is euthanatized and tested for rabies **or** quarantined or placed in confinement for a 30-day observation period.
- Examples of “other” animals include domestic farm animals, wolf-dog hybrids, tigers, bears, and monkeys.

### Clinical Signs of Rabies

The clinical signs of rabies in domestic animals vary a great deal. Therefore, it is not possible to look at an animal and determine that it is rabid. However, some common clinical signs of rabies in both domestic and wild animals are:

1. **a change in behavior**. For instance, a friendly dog or cat may become vicious and bite without any apparent reason (unprovoked bite). This is often termed the “furious” form of rabies. A friendly dog or cat may become very shy and withdrawn. This may be termed the “dumb” form of rabies. Wildlife may also behave strangely. For example, a normally shy, nocturnal skunk may be seen in broad daylight and appear unafraid of dogs or humans.
2. **unexplained paralysis (inability to move)**. Rabies often causes paralysis of the rear legs or lower jaw. An animal that cannot walk, appears drunk (has an unsteady gait), or cannot close its mouth may be suffering from rabies.

## Rabies (Basic)

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Other clinical signs of rabies include:

not eating	eating strange (non-food) objects
pawing at the mouth	appearance of <u>choking</u>
difficulty in swallowing	chewing at the site of the bite
seizures	hypersensitivities to touch or sound

Once clinical signs appear, death of the animal will soon follow.

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**Remember:** The entire course of clinical rabies in domestic animals usually lasts less than a week.

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### Rabies Prevention

**Emergency first aid** to prevent rabies includes the following steps:

- Let the wound bleed.
- **Wash the wound with soap and running water.**
- Seek medical attention.

Let the wound bleed to help remove the rabies virus from the wound. **Immediately wash the wound with soap and water**; this will also help remove the rabies virus from the wound. Apply an antiseptic, if available. Seek medical attention as soon as possible. **Any bite, even a small one, can be deadly.**

### Rabies Prevention Products

Immunizing products that a person receives **after** potentially being exposed to rabies are called **postexposure prophylaxis** (frequently abbreviated as PEP). The decision of whether to administer PEP should be between a person and his or her physician. If the exposure victim has **not** been previously vaccinated against rabies, he or she will need to be treated with two types of products given by injection:

## Rabies (Basic)

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- One product provides **immediate, but temporary, protection against rabies**. It is a type of antiserum called **human rabies immune globulin (HRIG)** and is made of human antibodies. This product is given according to weight, meaning that a heavy person needs more antiserum than a light person. As much as possible is injected around the bite wound(s); any remaining antiserum should be given in the closest muscle mass that's large enough to receive the remaining globulin (and not where the vaccine is given). These antibodies immediately attack the rabies virus in the body; the antibody level then reduces by approximately half within a few weeks.
- The other product is a vaccine, such as **human diploid cell vaccine (HDCV) or purified chick embryo cell (PCEC)**. **Four doses** of the vaccine are administered in the arm muscle **over a period of two weeks (a fifth dose may be administered to people with poor immune systems)**. The rabies vaccine will cause the body to produce its own antibodies against the rabies virus and provide long-term protection.

### Rabies Vaccinations for Animal Control Officers

According to Section 169.24 of the Texas Administrative Code, Rabies Control and Eradication (rules of the Rabies Control Act), **all animal control officers (ACOs) should take a series of rabies vaccinations to protect themselves from rabies**. This is called preexposure prophylaxis. The following recommendations are provided by the Advisory Committee on Immunization Practices (ACIP).

- Preexposure vaccinations consist of two injections with rabies vaccine (such as HDCV or PCEC) given on days 0 and 7. It is typically recommended for ACOs that you then:

## Rabies (Basic)

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\* have a one-time titer check 1–3 years after this 2-dose primary (initial or first) series and receive a booster if you have a low titer response (<0.5 IU/ml)

or

\* receive a booster no sooner than day 21 and no later than year 3 after the 2-dose primary series.

- If your activities require that you often handle or have contact with bats or that you perform animal brain or head removal for rabies specimen submission, it may be advisable after receiving the 2-dose primary series for you to get your titer checked every two years and receive a booster if you have a low titer response (<0.5 IU/ml) .

If you had preexposure vaccinations and are exposed to rabies, you only need two more injections of rabies vaccine and will **not** need the rabies antiserum (HRIG). If you are exposed to rabies without being aware of it and do not receive PEP, you stand a better chance of not developing rabies than if you were not vaccinated previously.

### Rabies Seasons and Cycles

Rabies occurs throughout the year in Texas. In the spring, there are many skunks with rabies; in the fall, there are numerous bats with rabies. Rabies tends to occur in cycles, meaning that periodically the number of positive rabies cases will increase for a period of time and then decline to the previous level.

Different types of rabies virus are known as variants. Specific variants of rabies virus have developed within certain wildlife reservoirs. Texas has a wide variety of rabies virus variants, including many bat variants. The south-central skunk (SCS) variant is the most common skunk variant. Canine variants, including the domestic dog/coyote (DDC) and Texas fox (TF) variants, were historically common in Texas.

## Rabies (Basic)

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Any of these variants can infect other species of animals. For instance, when a rabid skunk with the SCS variant of rabies virus bites a dog, the infected dog may also develop that variant of rabies virus and die. When a known variant of rabies infects a species other than the reservoir species, the process is called spillover.

A rabies outbreak (an increase in the number of cases) can start with one infected animal. This one animal may bite several other animals before it dies. These animals eventually can pass the virus to many more animals. Most of the time, skunks bite other skunks causing a skunk-to-skunk rabies cycle, bats bite other bats causing a bat-to-bat rabies cycle, and so on.

Epizootics (epidemics in animals) or outbreaks of rabies can occur in a small area of the state or can occur statewide. Historically, rabies outbreaks were common along the US-Mexico border in domestic dogs. For example, the DDC variant of rabies virus became epizootic in coyotes and domestic dogs in South Texas during 1988. A gray fox rabies epizootic in West-Central Texas also began in 1988. This epizootic was caused by the TF variant. To halt the expansion of these two epizootics, the Texas Department of State Health Services' Zoonosis Control Branch began the Oral Rabies Vaccination Program (ORVP). The ORVP is a large-scale rabies control program for wildlife. The program includes dropping baits containing an oral rabies vaccine along the edges of the epizootics. Wildlife, such as coyotes and foxes, that eat the bait are vaccinated against rabies. The vaccinated animals then form a "living immune barrier" to halt the spread of the rabies virus. After achieving control of the epizootics, the ORVP continues to distribute oral rabies vaccine to maintain a barrier of vaccinated animals.

### Rabies Prevention

People generally have very little unintentional direct contact with wildlife, except bats, so exposure to rabies through contact with wildlife is unlikely. Some people feed wildlife, such as raccoons, by hand and can be exposed to rabies when bitten by these animals. Wild animals often expose domestic animals to rabies, which can then expose



## Rabies (Basic)

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people to rabies. The best way to protect people from rabies is to vaccinate domestic animals against this disease. It is also important to educate people about the need to avoid physical contact with bats. Confining pets will help to reduce their contact with wildlife.

### Rabies Summary

You may never see or handle an animal with rabies, but your knowledge of this deadly disease is very important. You may know more about rabies than many in your community. You must remain alert to rabies risks and enforce the rabies laws properly to protect your community from this fatal disease. Your job places you at a higher risk of rabies exposure than most people. Many ACOs remove wild animals, including high-risk species, from urban settings, and nearly all ACOs deal with biting dogs and cats. Make sure that you are protected against rabies. Follow ACIP recommendations and get the preexposure vaccination series.

As an ACO, you help fight rabies by removing stray animals from the rabies cycle. You also make a difference in your community when you educate people about the importance of getting rabies vaccinations for their pets.

### Animal Bites

**Every city and county must appoint a person to serve as the LRCA.** This person does not have to be an ACO, nor does he/she have to be in a medical profession. This person is responsible for investigating all reported potential rabies exposures to humans and making sure that the animals involved are handled properly.

**Chapter 826 of the Texas Health and Safety Code, Rabies Control Act,** is the state law that pertains to procedures for handling potential rabies exposures and quarantine. Refer to it and its associated rules (Texas Administrative Code, Rabies Control and Eradication) when questions arise concerning animal bites. Although the

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## Rabies (Basic)

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following section focuses on bites, a potential rabies exposure includes any incident in which there is probable cause to believe that an animal has exposed a human to rabies.

### Handling Animal Bites

- **Treat every animal bite as a serious matter.** All bites must be reported to the LRCA, who must investigate them. Always respond to each incident to consider if the animal might be rabid.
  
- **Biting animals fall into one of four categories.** Each category requires a different method of handling.
  - 1) **Free-roaming high-risk** animals must be euthanatized and tested. (Refer to the Chapter 826 rules for information on high-risk animals that are not free-roaming animals.)
  
  - 2) **Low-risk** animals may or may not be tested for rabies as determined by the LRCA.
  
  - 3) **Dogs, cats, and domestic ferrets** must be quarantined until the end of the 10-day observation period (240 hours from the time of the bite incident) **or** they can be euthanatized and tested for rabies. There are quarantine/confinement exemptions for assistance and police-service animals (refer to the Chapter 826 rules for details).
  
  - 4) **“Other” animals** are either euthanatized and tested **or** they are quarantined or confined as determined by the LRCA until the end of the **30-day** observation period.

## Rabies (Basic)

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Refer to Chart 1 in the appendix of this chapter for additional information on the disposition of biting animals.

- **Identify all animals correctly.** Testing and observation are useless if they are done on the wrong animal.
- **The attending physician decides if the bitten person receives rabies PEP.** If the animal tests positive for rabies or develops clinical signs of rabies during the observation period, the person needs to begin PEP immediately. The attending physician may consult with their local health department or with the Texas Department of State Health Services about the need for rabies PEP.

### Rabies Quarantine

Most dogs and cats bite to protect themselves or to protect their owner or their owner's property. Please refer to the manual section on animal behavior for more information on this subject. However, since rabies infection is almost always fatal, all biting animals are considered to be suspects for transmitting rabies until proven otherwise.

- **Do not** vaccinate the animal against rabies while it is in quarantine. It is also recommended to not vaccinate it against other diseases or give it non-essential medications that could affect how you interpret its behavior or health status during the observation period. However, the animal may be treated for unrelated medical problems.
- Remember, a dog, cat, or domestic ferret may **shed rabies virus (be infectious)** for **three to six days before** they show clinical signs of rabies. The virus is usually shed in the saliva, and the saliva from a rabid animal may infect open cuts or mucous membranes of other animals or people.

## Rabies (Basic)

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- **It is very important to prevent contact between animals held in quarantine.** Treat the animal held under rabies observation as though it is shedding rabies virus. Animals in quarantine must be separated from all other animals by a solid partition that prevents any physical contact (especially mouth-to-mouth or nose-to-nose contact) between them.
- **Prevent human contact with the animal in quarantine as well.** A friendly lick on the finger may result in having to deal with another potential rabies exposure. There must be a **standard operating procedure (SOP)** that explains the precautions to be observed when unloading, handling, feeding, and caring for the animals in rabies quarantine. It would be best if only one person (who has a current preexposure rabies vaccination) takes care of the animals in quarantine.
- If a quarantined animal does not have a current rabies vaccination, arrangements must be made to have it vaccinated against rabies at the end of the observation period (there may be a delay in vaccination for animals that are less than 12 weeks of age and too young to vaccinate).
- Notify everyone involved in the bite incident if the animal becomes sick or dies during the observation period. If the animal does not become sick during the observation period, it could not have transmitted rabies at the time of the bite incident. Remember to notify everyone involved in the bite incident when the animal is released.

# **Rabies (Basic)**

## **Chapter Appendix**

Chart 1 - Disposition of Biting Animals

Figure 1 - Rabies Incubation Period

Figure 2 - Rabies in a Dog - Example of Incubation and  
Transmission Time Line

# Rabies (Basic)

## Disposition of Biting Animals

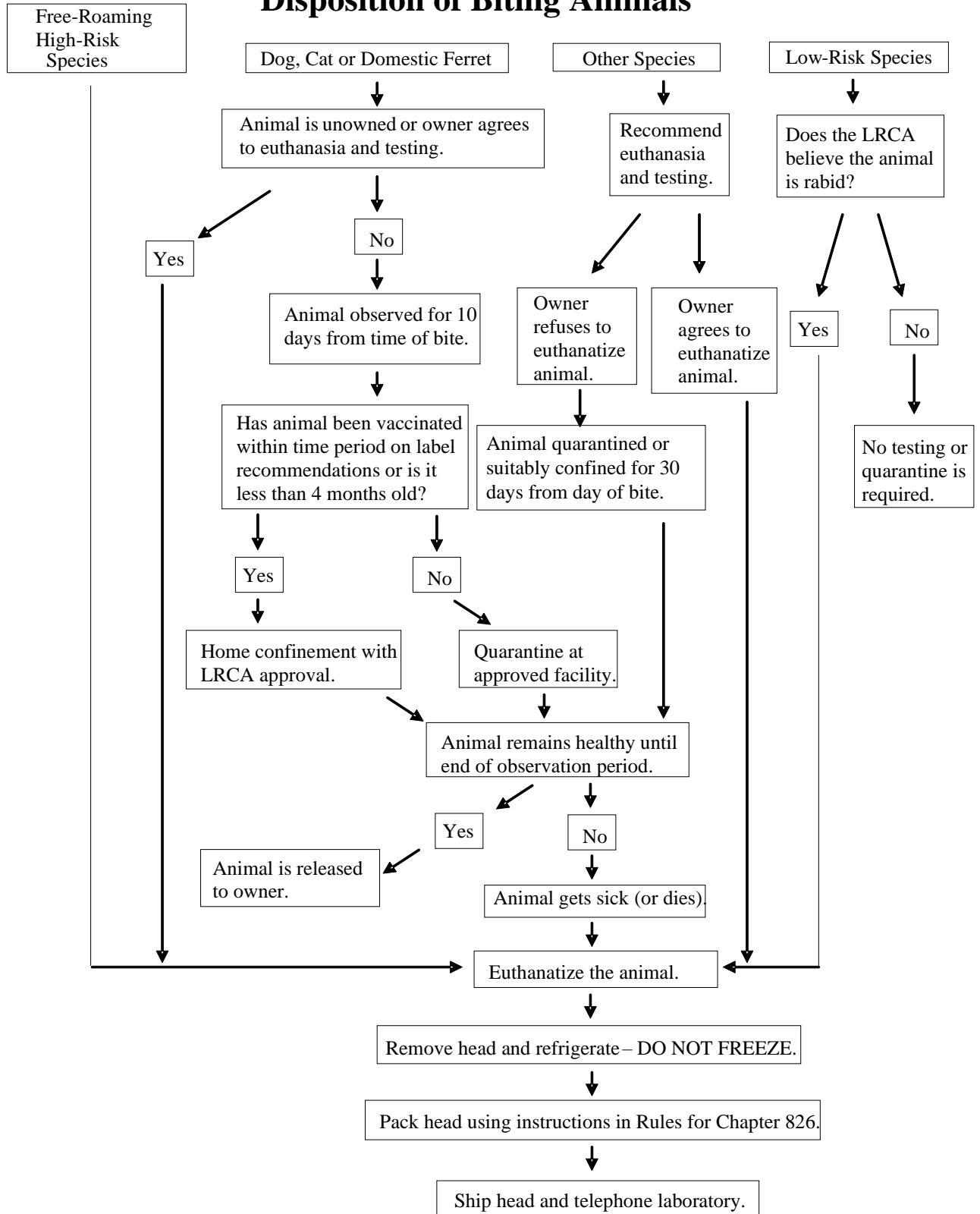
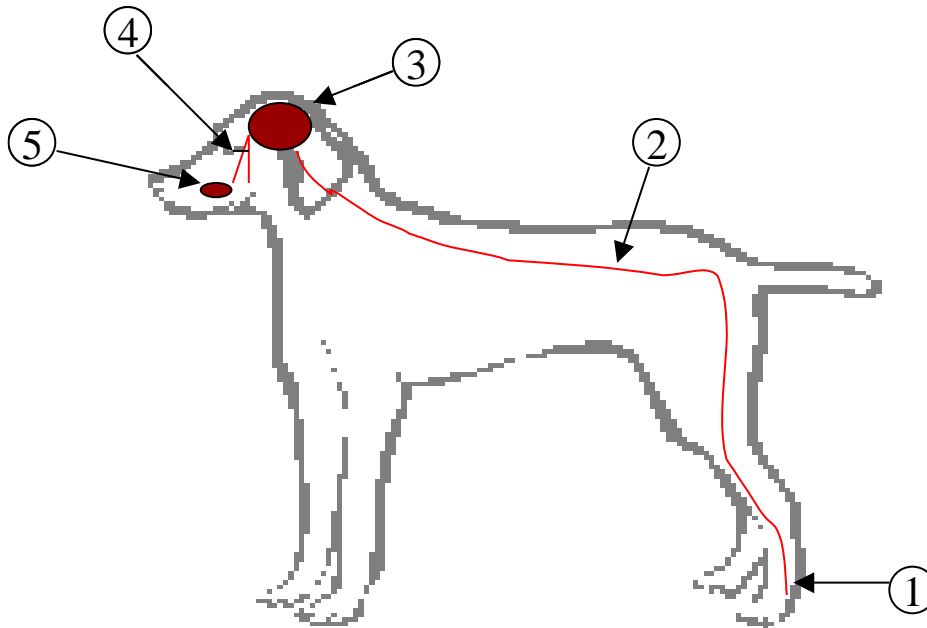


Figure 1

## Rabies Incubation Period



### Timeline:

- 1 thru 5 - May take days to years (average 3-8 weeks)
- 3 □ thru 5 - Dog may or may not show rabies clinical signs when it bites someone

1 thru 4 - Dog is not infectious during these stages

- 1 Bite site
- 2 Virus migrates up nerves to spinal cord
- 3 Virus migrates from spinal cord to brain
- 4 Virus migrates from brain down cranial nerves
- 5 Virus arrives in salivary gland and dog is infectious to others

Figure 2

Rabies in a Dog – Example of Incubation and Transmission Time Line

One Possible Bite Scenario

- ① Unvaccinated dog bitten by a rabid skunk
- ② Same dog bites a person

