

# Rabies In Man

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**R**ABIES is a virus disease primarily of animals and transmitted to animals and to man by the bite of an infected animal, chiefly the dog.

Rabies very rarely, if ever, develops in man as a result of salivary exposure to the skin alone, without a bite.

According to Dennison "There is no disease other than rabies about which the public is more misinformed. The fear, horrors and superstitions of exposed individuals, magnified by a superabundance of bad advice from well meaning friends, often produce a state of mental panic before the physician can be reached. Circumstances of exposure so infinitely remote as to make the possibilities of infection ridiculous and unworthy of even momentary consideration often cause extreme mental anguish. Undue apprehension is probably as common a symptom among the many recently exposed persons as it is among the very few who develop the disease clinically. Under such circumstances, the individual is often unable or unwilling to accept medical advice and insists on vaccine treatment, while the physician, too, often fails to maintain a professional equilibrium and allows himself to be influenced by the undue apprehension of the patient."

According to Sellers, "Whenever rabies is endemic among dogs, every physician in general practice will sooner or later be confronted with the problem of the management of human exposures, be they real or imaginary. Two responsibilities face him. One is the simple procedure of administering antirabic vaccine to per-

sons whose exposure is a definite break through the skin made by the teeth of a known or suspected rabid animal. The second far greater responsibility is the psychologic problem of rabiphobia (fear of rabies) whose victims far outnumber those actually in need of protection."

It must be mentioned here that the time honored Pasteur treatment is not without danger. Although the danger of treatment paralysis occurs in not more than 1 out of every 3,000 persons treated, the danger of developing treatment paralysis is far greater than the possibilities of developing rabies from salivary exposure without a bite. In the past ten years three deaths from treatment paralysis have come to my attention in Iowa. In none of these cases was antirabic treatment justified. In one of these, death followed the second course of treatment.

On the contrary, persons bitten by rabid animals should without question receive antirabic treatment as the dangers of developing rabies is far greater than the chances of treatment paralysis under such conditions.

Why the occurrence of rabies in an animal should cause panic in a community is hardly understandable, as compared to whooping cough which has caused little concern. While there has been but one death from rabies in man the past five years, there has been an average of 42 deaths annually (1935-1945) from whooping cough in Iowa.

Contrary to lay beliefs rabies is not a highly infectious disease nor is it in reality a horrible disease. If rabies were a

highly infectious disease, hundreds of thousands of our ancestors who submitted to the magic of the "mad stone" would have died of the disease. In like manner rendering plant workers who handle rabid carcasses, with utmost disregard, escape contracting the infection. It has been stated that if rabies were easily contracted, it would have been the leading cause of death in the southern United States as only 10 percent of illiterates bitten by rabid animals receive treatment. Various recording in the literature indicate that from 16-33 percent of persons bitten by rabid animals develop the disease. Cornwall reports that of 423 persons bitten by rabid animals and who did not receive Pasteur treatment, 148, or 33 percent died of rabies. Leach and Johnson in carrying out experimental injections in dogs report that only about 62 percent of dogs injected into both jaw muscles with .5cc. of a 10 percent brain emulsion from a dog dying of furious rabies lead to infection.

As for rabies being a horrible death, persons so afflicted rarely suffer as they usually remain conscious and converse intelligently to the end. The convulsions that occur are little different than convulsions associated with other diseases.

Instead of becoming panicky when the disease appears in animals in a community we need to sit down and take stock of the entire problem and devise ways and means of eradicating this needless 100 percent controllable blot on civilization. For many years we have known the cause, and for almost a century we have methods of treating victims, yet we have accomplished little in the way of wiping out the disease.

The incubation period or time between biting and the development of symptoms varies from 10 days to 2 years, although symptoms develop in the average person or animal within 40-45 days. The last human death in Iowa resulted from failure to take antirabic treatment. This was an elderly man bitten on the forearm by a rabid dog on April 2, 1944 and died of rabies December 1, 1944. Bites about the head and neck in young persons are particularly dangerous. There must be little or no delay in starting treatment as the incubation period may be very short and symptoms develop before treatment has had a chance to become effective. The incubation period is also affected by the dose of virus injected; the depth, type and multiplicity of wounds; virulency of the virus; and age of the person or animal.

POSITIVE RABIES EXAMINATIONS AS REPORTED BY  
IOWA VETERINARY DIAGNOSTIC LABORATORY, AMES, IOWA  
AND  
STATE HYGIENIC LABORATORY, IOWA CITY, IOWA  
1944-1948

Animal	Ames Veterinary Diagnostic Laboratory	State Hygienic Laboratory	Total
Dog .....	42	151	193
Cattle .....	40	55	95
Skunk Family .....	24	38	62
Cat .....	12	46	58
Horse .....	11	12	23
Swine .....	2	5	7
Squirrel .....	3	2	5
Fox .....	0	4	4
Sheep .....	0	3	3
Mule .....	0	1	1
Rat .....	0	1	1
<b>Total .....</b>	<b>134</b>	<b>318</b>	<b>452</b>

Positive Specimens Reported to Iowa State Department of Health 264 or 58%

RABIES  
COMPARISON OF MICROSCOPIC AND MOUSE INOCULATION TESTS  
State Hygienic Laboratory  
Iowa City, Iowa  
1941-1948

Year	1941	1942	1943	1944	1945	1946	1947	1948	Total
Negative or Doubtful Microscopic Tests .....	54	59	62	54	104	87	90	87	597
Positive Mouse Inoculation Tests .....	10	6	10	7	10	12	7	12	74
Percent Positive .....	18.51	10.17	16.13	12.96	9.61	13.79	7.78	13.79	Average Percent Positive 12.39

Experiments in animals show that the young are highly susceptible while resistance develops as age increases. Data from Georgia 1925-45 show that 61 persons bitten by rabid animals died of rabies. Thirty-two of these died in spite of the Pasteur treatment. Of the 32, the bites were about the head and neck in 60 percent, hands and arms 34 percent, lower extremities 3 percent and trunk in 3 percent. Thus antirabic treatment under certain circumstances may not be effective. *There were no deaths during this period from exposures other than a bite.*

That certain amounts of virus must enter the body before infection takes place is well exemplified by the mouse test. As little as 1/33,000,000 gram of infected mouse brain will infect mice if injected intracerebrally. It requires 100 times that dosage to infect mice intramuscularly and 1,000 times that amount when injected under the skin.

Rabies is prevalent in most states in the union. Twenty-one human deaths were reported in the United States in 1947, whereas 8,946 animal deaths were reported for the same period. It is likely that there were ten times as many animal deaths as reported.

Rabies is prevalent whenever animals, chiefly the dog, are infected. An infected dog will travel as many as a hundred miles, biting everything in his path before succumbing to the disease. In Iowa for a period of 20 years there has been, with but one exception, more rabies in December and January than in August.

When a person is bitten by a suspected rapid animal, **DON'T KILL THE ANIMAL.** Call a veterinarian, have the animal penned up securely, fed, watered, and observed. If the animal is rabid it will show progressive symptoms and die usually within three to five days. The dying animal should be sacrificed, the head removed, packed in adequate **wet** ice and promptly delivered to the laboratory for examination. With rare exceptions, Negri bodies, the infectious agent, will be found in the dying animal's brain. If the animal is not rabid it may be released after 14 days observation. If the animal is immediately killed Negri bodies will **not** be found in from 10-16 percent as verified by mouse inoculation tests. Needless antirabic treatment can thus be avoided by not killing the dog and by placing it under observation.

#### Indications for Pasteur Treatment

First get a history of the offending animal..

#### Rabies should be considered present:

- (1) If the animal was clinically rabid although Negri bodies are not found on microscopic examination.
- (2) If the brain showed Negri bodies although clinical findings were not suggestive of the disease.
- (3) If the animal disappears after biting.
- (4) In any animal that bites without provocation and is immediately killed, it should be regarded as suspicious even though microscopic tests are negative.

Having thus arrived at the fact that

the animal in question was rabid, the next step is to direct attention to the **nature of exposure and need for antirabic treatment.**

**Treatment is indicated:**

(1) When there are visible wounds into or through the skin that were known or suspected to have been made by the teeth or claws of the animal.

(2) When the wounds were inflicted through clothing which was torn by the teeth of the animal.

(3) When wet saliva came in direct contact with open or raw lesions of less than 24 hours duration.

(4) When the person is a small child and has been in direct contact with the animal and can't give reliable testimony.

**Pasteur Treatment is contraindicated:**

(1) When exposure is limited to saliva coming in contact with the unbroken skin anywhere on the body.

(2) If saliva came in contact with wounds more than 24 hours old or which are covered with an unbroken scab.

(3) If teeth pressure wounds are made through clothing which is not torn.

(4) When infected animals or contaminated objects have been handled.

(5) If injury occurs not less than seven days prior to the appearance of rabid symptoms.

(6) If biting animal remains normal for as long as one week after biting.

If treatment is indicated always question regarding previous treatment and reaction. If there is history of reaction, resort to booster shots of five to six injections.

The present ultra-violet attenuated vaccine is highly effective in preventing the disease. With the advent of the mouse potency test potent antigenic vaccines are assured.

Rabies has been, with but few exceptions, prevalent the world over since the Third Century B. C. England and several nations on the continent have been able to control rabies by rigid quarantine and vaccination of dogs. England has been free of rabies since 1903 save for one outbreak during World War I, when dogs were smuggled in by aero-

plane. An epidemic resulted requiring three years of vaccination and quarantine to control. All dogs entering England are quarantined for six months regardless of the owners rank or prestige. With rare exceptions little has been done in the United States in controlling this 100 percent controllable disease.

With the cooperation of city, county, state and federal authorities and all dog owners, it is felt that rabies can be eliminated from the United States within a matter of three to five years. Suggested measures for control are as follows:

**Federal:**

(1) Quarantine all dogs at the portal of entry into the United States for six months as a permanent measure.

(2) Efforts should be made to secure uniform control measures in all states and to carry them out simultaneously.

(3) Establish and enforce rules and regulations regarding interstate shipment of dogs.

**State:**

(1) Make rabies a reportable disease.

(2) Require and enforce the licensing of all dogs as a permanent measure.

(3) Require and enforce annual vaccination of dogs until the disease is eradicated.

(4) Require and enforce the destruction or impounding of all unlicensed unvaccinated dogs.

(5) State control measures should be enforced until all states are free of rabies. Should rabies reoccur in a given state, reinstate quarantine and vaccination until the area is again free.

**General:**

(1) An educational program is essential to impress the masses with the need for such a program and to overcome the prejudices of certain groups.

### Abundance of Magnesium

Magnesium is a relatively abundant element comprising about 2 percent by weight of the earth's crust and about 1 percent of surface soils. It is essential for plant life and is normally present in all feedstuffs ranging from a low of around 0.1 percent in some cereal products up to a high of around 0.6 percent in cottonseed meal and soybean meal.