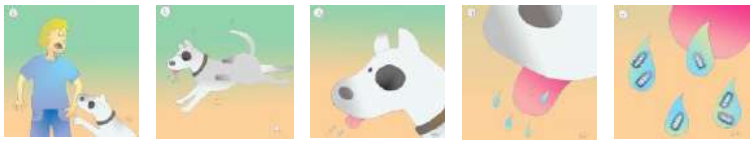
M i c r o Z o o m

- a game of observation and memorization

Support Material

Rabies

Rabies is a fatal disease. This means that if an unvaccinated person is infected with the rabies virus and develops the disease, he/she will die.
IMPORTANT! Rabies is a disease caused by a virus, which is transmitted to humans by contaminated animals.



IMPORTANT!

Because the virus may be in the animal's spittle, transmission can occur by bite, scratch, or even if the animal licks a spot that has an injury. This is why a person, when attacked or bitten by any animal, should seek a health center or a doctor who will indicate the necessary steps to be taken according to each situation.

The most common transmitters of the rabies virus are dogs and cats. Wild animals such as bats and monkeys or farm animals like oxen and horses can also transmit the rabies virus.

Angry animals (with rabies disease) may exhibit aggressive behavior, increased sensitivity, spasms, paralysis and, generally also show hydrophobia, i.e. they can not drink water.

Often, however, the animal may be contaminated without having these symptoms. Most of the time, at the time of the accident there is no way to be sure that the animal poses any risk of being a carrier of the rabies virus, so the right attitude is to always seek a doctor or health clinic.

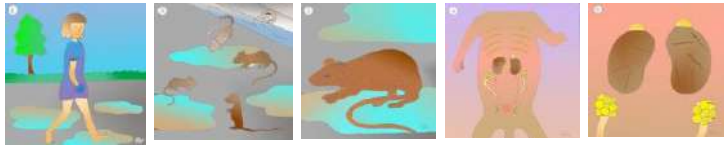
When there is a possibility of knowing and accompanying the animal that has bitten you is necessary to verify if it was vaccinated and the validity of the vaccine.

If the animal has any of the symptoms mentioned or if the animal disappears, the person who has been bitten should be vaccinated.

The search for medical advice is fundamental so that there is no risk of developing the disease.

Leptospirosis

Leptospirosis is a disease transmitted by the *Leptospira* bacteria. The main source of transmission is water or food contaminated with urine from animals, mainly from rats. Dogs, pigs and other animals can also transmit the disease.



IMPORTANT!

To avoid contamination by the *Leptospira* bacteria, it is important to keep water treatment and correct storage of food up to date (beverage cans or any food should not be stored where there are mice whose urine may contaminate the packaging or the food itself).

It is also necessary to always clean and disinfect possibly contaminated areas with bleach.

In addition, the lack of an efficient sewage system and drainage of rainwater (unbundled culverts) can favor the contamination of objects and food with the urine of contaminated rats and animals.

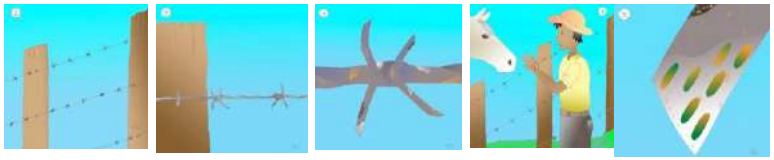
Those who work in flooded areas and are exposed to contamination by *Leptospira*, should use protective equipment such as rubber gloves, gloves and wooden clothing.

Children and adults should not walk or play in flooded waters that may contain rat urine contaminated with the bacteria.

Tetanus

Tetanus is a disease caused by the *Clostridium tetani* bacteria, which may be present in soil or animal feces. When this bacterium is in the soil, it is found in the form of a spore and in this condition does not produce the tetanus toxin, the substance responsible for the Tetanus disease.

Transmission of tetanus bacteria occurs most often after accidents with sharp, dirty or old objects. The deeper the wound, the greater the chance of bacterial proliferation as it only grows in environments where there is no oxygen (anaerobiosis). However, contamination can also occur after injuries of any nature such as exposed fractures, burns or bites.



IMPORTANT!

In case of accident, injuries should be washed immediately with soap and water and, if possible, with hydrogen peroxide. It is always recommended, in the event of a tissue injury, that people seek medical help for the necessary steps.

When the spore of this bacteria enters the human organism, usually through some injury, it has the possibility to "germinate" when it stops being spore and becomes the same bacteria in the form that we call "vegetative". Once in the vegetative form it starts to multiply in the tissues and produces the “tetanus toxin” that has a very potent action on our organism.

The tetanus vaccine is essential and should be given after the child is born and repeated every ten years.

Pneumonia

The name pneumonia is used for the inflammation of the lung tissue. These can be caused by bacteria, viruses, fungi, worms, allergies or intoxications. One of the causative agents of pneumonia is the *Streptococcus pneumoniae* bacteria, also known as *Pneumococcus*.

It is a bacteria that is transmitted by droplets of spittle that can remain in the air after sneezing or coughing. Healthy people can often transmit the *Pneumococcus* without being sick.

The pneumonia disease caused by *Streptococcus pneumoniae* can develop in anyone, but especially in children, the elderly or malnourished people or people with deficiencies in the defense system.

IMPORTANT!

As in other cases, the prevention of this disease can be done with a good diet that keeps the body healthy for a better immune response and not staying indoors in times of epidemic. In the case of suspected illness seek the help of a doctor or health clinic so that the necessary steps are taken as soon as possible. One of our body's natural barriers against this bacteria are our defense cells that "phagocyte" these then.

However, many species of pneumococci, as well as other bacterial species, have, around their cells, a capsule made of slippery substance, which makes phagocytosis difficult.

Unicellular Seaweed Blooms

Among the living beings that we know so far there is a group that, being unicellular belongs to the Kingdom of Protists and not the plant kingdom where we find the multicellular algae. The multicellular algae (many cells) are large and visible to the naked eye and the unicellular, i.e., formed by a single cell, can only be observed with the use of special devices such as microscopes. Algae, like plants, are capable of obtaining energy by photosynthesis (they transform the light energy of the sun into chemical energy). Although most people know that plant photosynthesis generates oxygen, few know that most of the oxygen we use to breathe does not come from plants, but it comes from photosynthetic unicellular algae.

Algae with flagella can move between the surface and the bottom of the oceans using nutrients from the bottom and sunlight that reaches the surface. In an abnormal situation, when nutrients like nitrogen and phosphorus increase in an enormous way, unicellular algae begin a "super growth" that gives rise to what we call “Blooming”. These "blooms" can be seen in the water as green, red or, rarely, yellowish spots, according to the pigment formed by the algal species.

Most of the time the flowering is caused by the pollution of water with industrial waste, untreated sewage, fertilizer crops or livestock waste created in the vicinity of the rivers.

The degradation of these pollutants generates an amount of nitrogen and phosphorus able to unbalance the environment and give rise to the "super growth" of algae that prevents light from reaching deeper layers of the sea, damaging the photosynthetic organisms found there. With the death of these photosynthetic organisms the oxygen becomes scarce causing the death of the fish.

IMPORTANT!

In some normal situations, some algae, especially from the group of dinoflagellates such as *Pfiesteria pscicida*, can produce toxins capable of killing small marine animals. When the blooms occur with these algae the "overproduction" of these toxins also happens, causing the death of larger animals, such as fish. These fish, when caught and ingested can cause poisoning of those who eat them once they contain the toxin that killed them.