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Poisonous Animals

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Abstract: Nature is home to millions of animal species, some of which have special mechanisms for self-defense or prey capture. One such mechanism is the production of venom. Although venomous animals can be dangerous to humans, they are important in maintaining biodiversity and ecological balance. Toxins from venomous animals are used in medicine to combat and protect against various diseases.

Keywords: defense mechanism, snakes, scorpions, spiders, jellyfish, venom, biology, medicine.

Toxiferous animals are creatures that produce biologically active toxins in their bodies. They are divided into two main categories:

1. Active venomous animals - actively inject their venom through a bite, sting or needle (for example, snakes, scorpions, some spiders).

2. Passively poisonous animals - poison is secreted through their body (skin, glands or tissues) (for example, poisonous frogs, some fish and jellyfish).

Actively poisonous animals include animals with special poisonous glands or cells that produce a poisonous substance - toxin and have a special wounding apparatus for introducing toxins into other organisms. Typically, such poisonous animals use their poison to attack. They have a strong toxic effect. The composition of the poison of poisonous animals, the organ systems, organs it affects, which tissues it affects, how it affects them and what changes it causes, is studied by a separate science - toxicology.

Passively poisonous animals include animals in which toxic products of metabolism accumulate in some organs or tissues. Poisoning occurs when animals belonging to this group are eaten.

Poisons and toxic substances of poisonous animals differ from each other in terms of toxic activity. Some poisonous substances contain more neurotoxins and affect the nervous system, while others may contain more hemorrhagins and myotoxins and poison the blood and muscular systems. It cannot be said that the poison of animals belonging to the same systematic group has the same effect, and vice versa, the poison of animals belonging to different systematic groups may have the same effect. For example: the poison of the black snake and the venom of the spectacled snake are the same - neurotoxin, and affect the nervous system. On the contrary, the poison of animals belonging to the same species and group may differ from each other in terms of chemical structure. For example, sea snakes and black snakes belong to the same type of animal world, even if they belong to the same order, the poison of one is neurotoxin, and the poison of the other is hemorrhagic.

The biological effects of venoms also vary:

- Neurotoxins – paralyze the nervous system. For example, the venom of the black mamba is a powerful neurotoxin.

- Hemotoxins – break down blood cells and cause tissue necrosis. For example, found in some species of western scorpions.
- Myotoxins – destroy muscle tissue.
- Cardiotoxins – change the heart rhythm, slow down or stop the heart.

Some important representatives of venomous animals

1. Snakes (Serpentes)

Snakes are the most studied group of venomous animals. For example, species such as Naja naja (Indian cobra), Dendroaspis polylepis (black mamba), and Bothrops asper (aspen viper) have venom that has a strong effect on the heart and nervous system.

2. Scorpions (Scorpions)

Scorpion venom consists of various peptides and enzymes that affect sodium and potassium ion channels. This disrupts the transmission of nerve impulses.

3. Spiders

The venom of the spiders Latrodectus mactans (black widow) and Loxosceles reclusa (brown recluse) is a powerful neurotoxin and necrotoxin. In humans, it causes severe allergic reactions, severe pain, and tissue inflammation.

4. Marine animals

The box jellyfish Chironex fleckeri is one of the most poisonous marine creatures. Its venom can stop the heart in a matter of minutes. Conus snails produce a very potent conotoxin.

5. Poisonous frogs

The Phyllobates terribilis, a South American species, is the most poisonous land animal. The substance batrachotoxin it secretes can be fatal even in micrograms.

Ecological and medical role of poisonous animals

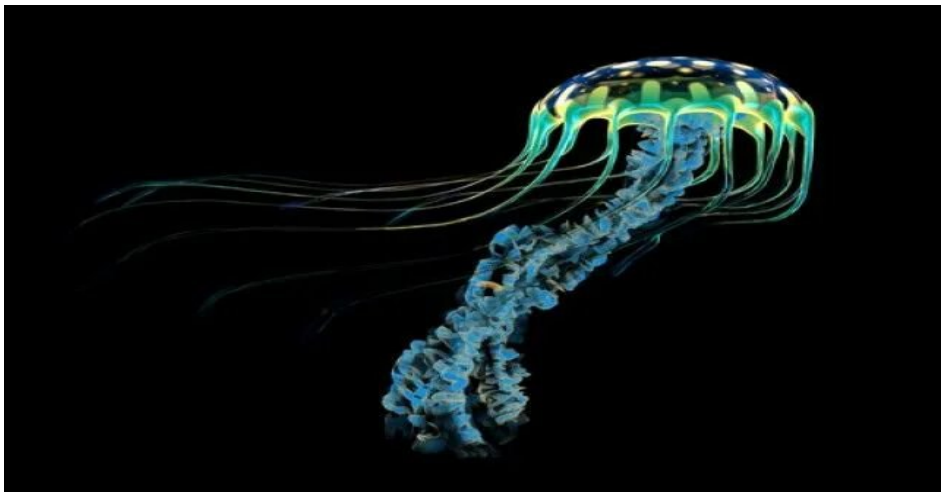
Poisonous animals occupy an important place in the food chain in their habitat. They often contribute to regulating populations, reducing competition with predators, and maintaining the balance of the biogeocenosis.

In addition, in modern medicine, the following drugs are being created based on their venom:

- Capoten (heart medicine) — created on the basis of a peptide obtained from the venom of the Brazilian viper.
- Exenatide — obtained from the venom of the gila monster and is used to treat diabetes.
- Ziconotide — obtained from the venom of the cone eel and is used as an alternative to morphine for pain relief.

Cnidarians that are poisonous to humans include sea anemones, some types of corals, and jellyfish. Around their mouths and on their tentacles, there are a large number of special stinging cells that produce a toxic substance. If a person touches their tentacles, they can be injured. Their poison has a neurotropic and hemolytic effect. Cnidarian venom contains: organic acids, histamine, serotonin, cyclic amines, and various toxins of a protein nature. Among animals belonging to the cnidarian type, the poison of tropical corals, jellyfish, and tropical siphonospheres can cause severe poisoning. The poison of sea anemones, cyanea (Cyanea sp) jellyfish, and rhizostoma pulmo jellyfish has only a local effect and can burn the skin. The most dangerous of the stony corals is the stinging false coral (Millipora alcicorniis), which is found in tropical regions of the Pacific and Indian Oceans, as well as in the Caribbean Sea. If a false coral is touched, a severe pain immediately appears in the hand. Then the area begins to become inflamed, and sometimes there is general poisoning of the whole body. False coral lives in colonies. Its colonies resemble a branched lime tree. The beautiful branches of the "tree" attract people. Therefore, many people take coral branches in their hands, as a result of which they are poisoned.

Freely floating hydroids can also pose a danger to humans. On the coasts of Japan, Korea, in the southern part of Sakhalin and on the Kuril Islands, small "statue-like" jellyfish (Gonicnemus vertens) live.



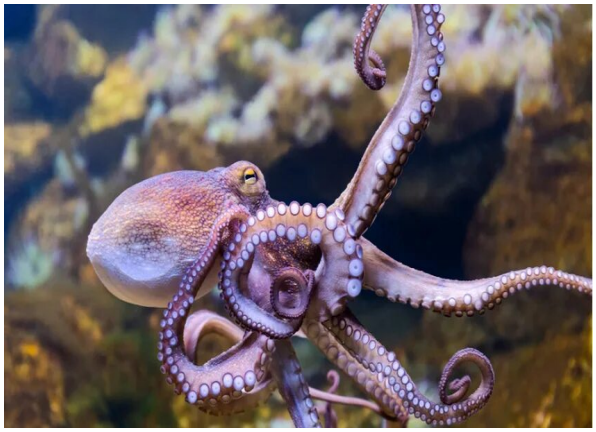
Their body is shaped like a flattened bell, with a diameter of 25 mm. On its edge there are up to 80 tentacles, all of which end in suckers. In the center of the bell there are 4 velvety lips, and around the rounded mouth there are dark-colored gonads. These structures resemble an idol inside the bell, which is why they are also called idol-shaped jellyfish.

Among soft-bodied animals, octopuses and gastropod mollusks belonging to the genus Conus are poisonous. The venom of octopuses contains histamine, as well as components with a highly toxic effect. Even the smallest species of octopuses are poisonous. The most dangerous of the octopuses is the Australian octopus (Halatochaena maculosis), which is the size of a palm. Its poison can kill a person in a few minutes. The bite leaves a large, deep wound, bleeding profusely, regardless of the size of the wound. So, octopus venom sharply reduces the ability of blood to clot.

Usually, octopuses do not attack humans first, but if they are disturbed or an attempt is made to capture them, they will inflict injuries.

Among gastropods, mollusks belonging to the genus Conus are relatively dangerous for humans, they are widespread in the Indian Ocean basin, the coast of the Western Pacific Ocean, from Polynesia to East Africa and the Red Sea. The shell of these mollusks has a conical shape, which is why they got their name. Their length reaches 15-20 cm. Often their shells are colorful and beautiful, and they injure the enemy with a sharp, pointed spine (spear). The tip of the spear

resembles a hook. There is a venom duct inside the stinger, through which it injects a powerful, neurotoxic venom into its prey. When a person is poisoned by this venom, they experience severe pain, their fingers become weak, and even lose their ability to feel, and the reddened area enlarges. At the same time, shortness of breath and tachycardia are observed. In some cases, the injured person loses consciousness, paralysis of the arm develops, and death has also been observed.



Among the Echinodermata (Echinodermata), several species of sea cucumbers, sea urchins, and starfish are poisonous animals. The phylum Ignatidae includes more than 6,000 species found from the shores of all seas and oceans to their bottoms. An average of 80 species of sea urchins, starfish, and ophiura are considered dangerous to humans.

The most dangerous are sea urchins (Echinoldea). They live in sandy depths, free from waves and currents, in rock crevices and caves, and among rocks. When their stinger pierces human skin, the stinger breaks and the poison enters the puncture site directly. The stinger stings cause severe pain, which is similar to the pain of a hot nail. After a few minutes, hyperemia occurs, the area swells, sometimes local sensation is lost, and even paralysis can be observed. The most poisonous sea urchins are found in tropical seas. Holothuria (Holothurioidea or sea cucumbers) differ from other ignathidae in the length of their bodies. The poison of holothuria is called holothurin. Holothurin causes symptoms such as acute gastritis, nausea, and vomiting. When poisoned, severe pain is observed in all parts of the body. The hands swell and redden. The duration of intoxication depends on the amount of poison that has entered the body. If holothurin gets into the eyes, it can lead to blindness. Sea urchins can be dangerous as poisonous animals. During the reproduction of their uvula (edible, very tasty), toxic products that can cause poisoning in humans can accumulate. Treatment of poisoning is symptomatic.

Most venomous animals belong to the class Arachnids, which includes scorpions, spiders, and some species of ticks. Scorpions (Scorpionida) are the oldest order of arthropods on Earth. Scorpions have a very wide range of habitats: they live in warm and temperate regions, among rocks, in rodent burrows, in ruins, and in the cracks of mud-plastered houses.

Scorpions live in forests, among logs, under leaves. Scorpions can also be found in places where people live, where they have been observed getting into shoes, blankets and clothes. During the day, they hide, and become active with the onset of darkness. The poisonous glands of scorpions are located on the last segment of the abdomen (telson), ending with a sting. At the tip of the sting, the path to the poisonous glands opens. With the help of the sting, the poison is injected into the body of the prey.

The poison of large individuals is stronger. Their poison has a neurotropic and cardiotropic effect. The place where the scorpion stings is very painful, the pain lasts from several minutes to several hours. Hyperemia and swelling appear at the site of the sting, and the feeling of sensation disappears. The general toxic state develops in the first hours after the onset of the disease. In this case, the person stung by a scorpion trembles, it becomes difficult to speak, breathe and swallow. Often there is a feeling of fear, headache, pain in the heart area, rapid heartbeat, shortness of breath, dizziness, muscle twitching, weakness, sweating.

Scorpion poisoning does not lead to serious consequences. Fatalities are rare and only observed among children. The most dangerous scorpion in our country is the black scorpion.

The blue-ringed octopus is one of the most poisonous animals in the world, despite its small size. This beautiful and unique creature is distinguished by its aggressive nature and has earned the nickname "the dwarf killer". It kills 1000 people in the world. The salivary glands of this octopus contain the strongest organic poison. It is produced by special bacteria. When the substance enters the bloodstream, it paralyzes the nervous system in a few minutes, the person stops breathing, the musculoskeletal system fails, and then cardiac arrest occurs.

Stingrays - these seemingly harmless creatures live in warm seas and kill more than 2,000 people every year. Stingrays are not aggressive and rarely attack people. People go to them themselves. Because the animals are invisible and live on the seabed. They hunt in shallow water, burying themselves in mud or sand. Their food is small crustaceans. The body of this fish ends with a thin tail with a ring of dead spines. When they reach adulthood, the length of the spear reaches 50 cm. There are many sharp lines on its surface. This spike leaves a very large and deep wound. The poison, which contains 10 toxic substances, immediately reaches the site. Then it begins spasms, convulsions, dizziness, paralysis of the arm. This can lead to rapid pain and death.

Africanized bees - these monsters were created by Brazilian scientist Orri Kerr as a result of an unsuccessful experiment. After that, his aggressive inventions managed to escape. In 1967, these bees attacked houses in Rio de Janeiro, killing people.

They are parasites and attached to certain creatures. Accordingly, the name is horse ticks, sheep ticks, human ticks, etc. The tick bites unnoticed and lays eggs under the skin, the eggs do not hatch from the skin until they reach adulthood. Although poisonous animals are often considered dangerous to humans, in fact they are unique creatures that maintain the balance in nature and have their own unique defense system. By studying their biological structure, defense strategies and the properties of their poison in depth, we can make a great contribution to medicine, biology and ecology. Therefore, studying poisonous animals is extremely important not only for safety, but also for science and human health. Poisonous animals are not only examples of biodiversity, but also a valuable natural resource for medicine and pharmaceuticals. Through in-depth study of their toxins, effective drugs are being developed to improve human health. At the same time, protecting these animals and preserving their habitat is also necessary to maintain ecological balance.

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