GENOTYPIC AND PHENOTYPIC ADAPTATIONS IN CHELICERATES

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Abstract: *Another characteristic of chelicerae is the shortening of their whiskers and head (acron). Also, the first pair of legs on the thorax formed chelicerae, which serve to grind and crush food. The 2nd pair of legs of the thorax are called pedipalps, and they perform the function of sensing and, in some cases, grasping.*

Key words: *whisker, system, cheliser, cell, sensation*

Arachnids are a highly developed group of chelicerae, whose life is associated with a terrestrial environment. Arachnids with different structural groups have common features, all of which have lost compound eyes and developed only simple eyes. He doesn't even have a mustache on his head. Of the six pairs of legs on the thorax, the first two pairs became chelicerae (palpable jaws) and pedipalps (palpable feet). These organs are involved in the nutrition of these animals. The remaining four pairs of legs are walking legs. Arachnids breathe through lungs or tracheas. In addition to the coxal glands, malpighian ducts located in the abdomen also participate in the composition of the excretory organs.

External structure. The body of arachnids consists of thorax and abdomen. The thorax consists of an acron and 7 segments (sometimes the 7th segment is not developed). In some groups (salpugs and when some bottoms are advanced), the front 4 segments are fused to each other, and 2 are freely fused. Only after these segments, abdominal segments begin. In many arachnids, the abdominal joints are fused like the thorax, and the body remains two solid sections. Also, in some groups, these two sections are combined to form one whole body. This situation can be seen in mites. The body size of arachnids ranges from 0.2 mm to 20 cm. The chelicerae and pedipalps are different in different arachnids. In most groups (scorpions, pseudoscorpions, grasshoppers, and grasshoppers), the chelicerae are rather short and located in front of the mouth opening. Chelicera consists of three joints. The uppermost joint forms a movable, sharp hook. In mites, the tip of the chelicera is sharpened, and the tooth consists of two-jointed protrusions. Pedipalps consist of several joints. A masticatory tumor in its main joint grinds food. The rest of the joints of the pedipalp act as feelers. In some arachnids (scorpions, false scorpions) the pedipalps are long claws. In spiders and slugs, pedipalps are similar to walking legs and serve as sense organs. The remaining 4 pairs of thorax are walking legs, the tips of which are provided with claws.

Legs are not developed in the abdomen of arachnids. But in some groups (scorpions, false scorpions, spiders) there are modified gastropods, which have become lung sacs or thread-winding glands. Body coverings of arachnids are structured similar to those of other arthropods, consisting of a three-layered cuticle and the underlying hypodermis and basement membrane. The cuticle is quite thin, but it prevents water from evaporating from the body. This feature is due to the presence of a wax-like lipoprotein substance in the outermost layer of the cuticle (epicuticle). The body coverings of arachnids also include

venom glands (in scorpions and some spiders), thread-winding glands, which are formed from skin epithelium.

Digestive system. Different groups have different structures. The foregut is heavily muscled and has an enlarged pharynx, followed by the esophagus and the absorptive stomach. Salivary glands are opened to secrete liquid that dissolves proteins in the throat. Arachnids kill their prey, piercing its body and draining salivary glands. Under the influence of liquid, the internal tissues of the prey disintegrate and become liquid. The spider sucks this liquid food. Liquid food passes from the absorptive stomach to the midgut, where it is digested. The anterior part of the midgut forms rather long lateral processes. These increase the size of the intestine and the absorption surface. A pair of hepatic ducts also opens into the midgut. The liver secretes digestive enzymes and is also involved in the digestion of food.

Excretory organs. A pair of branched malpighian ducts opens into the intestinal cavity at the junction of the middle and hindguts. Unlike tracheal tubes, these tubes are formed from endoderm during ontogenesis. In arachnids, the cleavage products consist of guanine particles. In this case, separation helps save water in the body. In arachnids, coxal glands are involved in the separation process. These glands are two pairs (sometimes one pair) and develop from the mesoderm. These glands are located in 2 (sometimes 1) segments of the thorax and open outward at the base of the 3rd or 5th pair of legs.

Respiratory organs consist of lungs and trachea. Some arachnids (scorpions, wasps, some spiders) have lungs, while others (scorpions, false scorpions, some mites, and grasshoppers) have tracheas. Many spiders have both lungs and tracheas. The lungs consist of sacs located in the abdominal cavity of the body cavity and breathing holes on the surface of the body. A large number of parallel leaf folds hang from the cavity of the sacs. Hemolymph circulates in them. Air enters between the folds through the breathing holes. Different groups of arachnids have different numbers of lungs. For example, centipedes and some spiders have two pairs, and scorpions have four pairs of lung sacs.

The tracheal system begins with breathing holes or stigmas located in the 1-2 segments of the abdomen. From each stigma, a bunch of long, thin air tubes formed from the endoderm with a closed end goes into the body. 74 In false scorpions and mites, air ducts are simple and unbranched, and in grasshoppers, such air ducts form lateral branches. The lungs and trachea in arachnids have independent, independent origins. Lungs are much older than tracheas. Their evolution came from the modified abdominal appendages. Each such leg with injuries has sunk into the body and formed a cavity similar to a lung sac. The system of tracheas is formed in a completely different way, and this system should be considered as a system more adapted to land. Respiratory organs are not formed in the lower development of arachnids (mostly very small ones) and in some groups of mites. Accordingly, the breathing of such species takes place in a diffuse way through the thin coverings of the body.

Circulatory system. In arachnids (scorpions), the body of which is made up of distinct metameria, the heart is long tubular, located in the anterior part of the abdomen, above the intestine, and has 7 pairs of slit-like ostia on both sides. In spiders, the structure of the heart is somewhat simplified and there are 3-4 pairs of ostia; in hayfields, ostia are reduced to 2 or

1 pair. Finally, in some ticks, the heart looks like a short bag and has a pair of ostia. Most mites do not have a heart at all due to their microscopic size.

In the circulatory system of arachnids, an aorta arises from the anterior and posterior ends of the heart (in scorpions) or only from the anterior end (in spiders) towards the anterior and posterior ends of the body. In some groups, a pair of collateral arteries emerge from each chamber of the heart. Hemolymph from the arteries flows into the body cavity. Hemolymph flows from the lacunae in the body cavity to the pre-cardiac cavity and from it to the heart through the ostium. The hemolymph of arachnids contains the respiratory pigment hemocyanin.

Nervous system and sense organs. Although the nervous system of arachnids has the structure of the abdominal nervous system of ringworms, it is possible to see the tendency of the centralization of this system. It is also possible to note that the nervous system is much better developed in arthropods of this class. The brain consists of two parts, i.e., the anterior part, the protocerebrum, which provides nerve fibers to the eyes, and the posterior part, the tritocerebrum, which provides nerve fibers to the chelicerae. Due to the absence of antennules (whiskers) in arachnids, the middle part of the brain, which provides nerves to this organ, is not developed.

The structure of the abdominal nervous system corresponds to the development of body joints. In scorpions, nerve nodes in the thoracic part of the nerve chain join to form a large head thoracic nerve node. Nerves come from this node to 2-6 pairs of legs of the thorax (pedipalps and four pairs of walking legs). There are 7 nerve nodes in the abdomen. Besides the big nerve ganglion, there is also a small nerve ganglion in the thorax. Due to the reduction of abdominal segments, the number of abdominal nerve nodes decreases and their concentration is observed in this section. In spiders, all the nerve ganglia are connected with the thoracic nerve ganglion, and finally, because all the parts of the body are connected in ticks, all the nerve ganglia of the abdominal nerve chain (including the thoracic nerve ganglion) are connected with the brain. , around the common larynx forms a single ganglion in the form of a nerve ring.

Arachnids also have different sensory organs. Numerous hairs on the pedipalps sense mechanical effects. They also act as a feeling. Special hairs called trichobothria on the pedipalps, legs, and body surface receive air vibrations. Lyre-like organs in the form of small slits in the cuticle perform the function of chemical sensing and smelling. Sensory ends of nerve cells come to the membranous base (bottom) of these organs. The visual organs of arachnids consist of simple eyes. Such eyes are located in the back of the chest, and there are 12, 8, 6, even 2. In scorpions, one pair of eyes is slightly larger and located in the center, and the remaining 2-5 pairs are located on the sides. Spiders usually have 8 eyes.

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