THE ANATOMY OF THE DIGESTIVE AND UROGENITAL SYSTEMS OF THE AMPHIUMA

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Living and preserved specimens of the amphiuma were secured for laboratory study. The living specimens were kept in an aquarium and one is still living in this aquarium at the time of this publication. They were fed on bits of raw meat offered on the forceps.

The adult amphiuma has an elongated, eel-like body about seventy-five centimeters in length. Two pairs of small, weak appendages are attached to the pelvic and pectoral girdle. Each appendage measures about two and one-half centimeters in length.

The amphiuma is an aquatic amphibian found throughout the southeastern part of the United States.

The specimen which was studied is classified as follows:

Phylum .....Chordata
Sub-phylum .....Vertebrata
Class .....Amphibia
Order .....Caudata
Sub-order .....Salamandroidae
Family .....Amphiumidae
Genus .....Amphiuma
Species .....Tridactylum

Little work has been done on the anatomy of the amphiuma. It was thought that a brief summary of the work done on the anatomy of the digestive and urogenital systems would prove interesting.

The digestive system, due to the length of the animal, is different in size and shape from the same system in other amphibia.

The mouth is terminal with the upper lip slightly overhanging the lower one. Inside the mouth are three rows of monocuspid teeth. Two parallel rows are in the upper part of the mouth, one being on the maxillary bone and the other on the vomerine bone. Both rows extend posteriorly to the internal openings of the nares. The third row of teeth is on the lower mandible.

The animal has no tongue but the floor of the pharynx is very muscular.

The internal openings of the two spiracles may be found in the pharynx near the transverse fold which marks the opening of the esophagus.

The esophagus which opens from the posterior part of the pharynx has no definite length because there is no constriction between it and the stomach. The internal surface consists of many longitudinal folds.

The digestive tract from the esophagus enlarges to form the stomach. The stomach lies parallel to the length of the animal and its posterior end is marked by the pyloric valve.

The small intestine which attaches to the stomach at the pyloric valve is only partially coiled and measures from twenty-five to thirty centimeters in length.

The large intestine is demarcated from the small by a muscular constriction and somewhat resembles a carrot in shape. A large anterior part may be distinguished from a muscular posterior part when the large intestine is dissected. The large intestine joins to the cloaca which opens to the exterior. Glandular outgrowths of the digestive system are a large liver and the pancreas.

The excretory and reproductive systems are so closely associated that some organs function for both systems, therefore it is impossible either to discuss or dissect one without the other. The association and fusion of the two systems make it known as the urogenital system.

The kidneys of the female amphiuma are located in the posterior, ventral part of the coelom, one on either side of the bladder. The paired organs are about six centimeters long in the adult. Many blood vessels are conspicuous on the external surface of the kidneys.

A very short ureter connects the posterior part of each kidney with the cloaca. This ureter is so short that it is merely the connection to the anterior part of the cloaca.

The bladder is a long cylindrical sac. The open end of the bladder is connected to the extreme anterior end of the cloaca. The rest of the organ extends toward the anterior part of the coelom. The bladder in the adult animal measures about twenty-five centimeters in length. It reaches a larger size in the amphiuma than in any other amphibian.

Paired ovaries, small but very long, are located in the posterior part of the coelom. The posterior end of each ovary is fastened to the dorsal surface of the kidney.

A large lobulated fat body lies parallel to each ovary. These bodies do not have a definite shape or size but were very evident in all the animals examined. The fat body is connected to the anterior end of the ovary but it could not be determined whether or not there was any duct or direct opening between the two.

The two oviducts or Mullerian ducts show an extreme adaption to the body length. The anterior opening of each oviduct is found near the anterior end of the coelom. This opening is more than twenty centimeters from the nearest end of the ovary. The narrow oviducts traverse the coelom on either side and open into the cloaca on each side just posterior to the opening of the large intestine.

Careful examination of the female cloaca disclosed no spermatheca for storage of the sperms until the eggs are laid. If there is no spermatheca it may be assumed that the fertilization takes place in the oviducts because the eggs are laid on land.

The external appearance and location of the kidneys in the male amphiuma is the same as in the female. The large elongated bladder has the same location in the two sexes.

Two long cylindrical testes tapering at each end take up much of the space in the posterior half of the coelom. The testis tapers to a duct at the posterior end. This duct extends along the dorsal surface of the kidney. Four vasa efferentia connect the duct with the kidney along the dorsal surface of the latter.

The large, paired fat bodies are also found in the male specimen.

Rudimentary oviducts lie along each testis from its most anterior part to the surface of each kidney. These are functionless as there is no opening into the cloaca.

The cloaca of the male differs much from that of the female. It has the same ventral position and approximately the same size but at its most posterior point a slight projection may be seen. This projection apparently has no ducts leading into it but the abdominal gland lies immediately dorsal to it.

The pelvic gland is located in the roof of the cloaca. Rows of papillae form the cloacal glands on the walls of the cloaca.

Although the internal organs of this animal are the same as like organs in other amphibia, the position and shape that these organs assume make the study of the amphiuma one of great interest.