A Tumor in a Fresh-Water Mussel*

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INTRODUCTION

The description of tumors in invertebrates is rare. Smith in 1934 (4) described a mesenchymal tumor in the oyster (Ostrea virginica). This tumor had arisen from the pericardium, was nodular or polypoid and consisted of large oval mesenchymal cells with an outer layer of simple columnar ciliated epithelium. A similar tumor was found in an oyster in 1887 by Ryder (2), and another tumor was observed in 1890 by Williams (6) in the fresh water mussel Anodonta cygnea. The tumor from Anodonta cygnea was described as a polypoid adenofibroma from the pallium.

Tumors have also been seen in ants by Brun (1), and in Drosophila by Stark (5). Scharrer (3) induced tumors experimentally by cutting the recurrent nerve in an insect. It is the purpose of this paper to describe a connective tissue tumor with an epithelial covering in the mussel Anodonta implicata.

OBSERVATIONS

This specimen was found among mussels imported for zoology classes from the Marine Biological Supply House (Woods Hole, Mass.). The shell of the mussel measured 5.8 by 13.1 cm. and the visceral mass 3.3 by 6.0 cm. The tumor arose from the inner labial palp of the right side and measured 0.8 cm. in diameter and 2.0 cm. in length. Its surface was nodular or polypoid, the nodules being of unequal size (Fig. 1).

Region adjacent to the tumor.—The inner surface of the palp was covered by folded simple columnar epithelium bearing long cilia. The outer surface of the palp was smooth with no folds and its epithelium was for the most part stratified squamous, but in certain regions columnar. The columnar cells of the inner surface, which were continuous with the tumor epithelium, were long and narrow, with spindle-shaped nuclei. No granules were seen in the cytoplasm of these cells. Scattered among the epithelial elements were goblet cells with a large vacuole.

The connective tissue included irregularly arranged fibers of variable thickness. The connective tissue cell nuclei were well stained but the cytoplasm was scant. Among the fibers were numerous masses of connective tissue cells filled with yellow pigment. Some of these cells were nucleated, others were not. Spaces containing blood were observed among the fibers. The white blood corpuscles frequently had eccentrically placed nuclei and some had granular cytoplasm.

The tumor.—The columnar epithelium from the folded inner surface of the palp continued over the nodular surface of the tumor (Fig. 2). The columnar cells were smaller and less regular than those of the inner surface of the palp. Numerous goblet cells with a large vacuole were noted and occasionally secretory granules were found (Fig. 3). The pigmented connective tissue cells were entirely absent from the tumor. The connective tissue cells were very abundant near the periphery of the nodules but scanty in the center. Mitotic figures were very few. The connective tissue cells resembled those in the connective tissue of the palp, but were somewhat larger and their cytoplasm was more granular. The connective tissue fibers were like those of the normal region; however there was an abundance of blood sinuses as compared with the normal area. These vascular sinuses contained white blood corpuscles with eccentric nuclei, some of them possessed cytoplasmic granules and others did not. White corpuscles were found invading the connective tissue cells in some abundance.

SUMMARY

A connective tissue tumor, lined by simple columnar ciliated epithelium, arising from the palp of the mussel Anodonta implicata, is described.

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REFERENCES

Fig. 1.—Connective tissue tumor with part of the mouth region, slightly enlarged, from *Anodonta implicata*.

Fig. 2.—Section of the tumor from *Anodonta implicata*. Hematoxylin-eosin stain. Mag. X 150.

Fig. 3.—Peripheral region of tumor from *Anodonta implicata* showing epithelial lining. Hematoxylin-eosin stain. Mag. X 700.

Fig. 4.—Central region of tumor showing numerous blood sinuses and corpuscles among the connective tissue cells. Hematoxylin-eosin stain. Mag. X 700.
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