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RESEARCH ARTICLE

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HISTOMORPHOLOGY OF SEMINAL VESICLE IN PERSIAN STURGEON (ACIPENSER PERSICUS)

Abstract

Sturgeon is the most valuable fish species. The major sturgeon species have now been classified as "critically endangered" by the International Union for Conservation of Nature. Little is known about the role of seminal vesicles beyond their fertility function. It has been suggested repeatedly that seminal vesicles have an impact on sexual activity. Although this has been investigated in various animal models, such a role has never been found. In order to find the structure of seminal vesicle in Persian sturgeon, sampling of seminal vesicle in this fish were carried out. Histological sample were dehydrated by routine methods and embedded in paraffin wax. They were sectioned by microtome and stained with H & E stain. Microscopic analysis of this gland showed a system of secretory tubules lined by a simple squamous to cuboidal epithelium. The cells presented an elongated nucleus with intense basophile condensed chromatin. The lining epithelium of the adjacent secretory tubules laid a basal membrane with a discreet intervening interstitial tissue, with sparse fibroblasts and blood vessels. The secretory tubules filled with seminal fluid were anastomosed, forming a vesicular collective network, which gave rise to the vesicular ducts. These ducts were lined by a simple cubic epithelium. The epithelial cells showed homogenous cytoplasm with a round nucleus and a visible and generally eccentric nucleolus.

Key words: Histomorphology, seminal vesicle, Persian Sturgeon

Introduction

Fishes are the most diverse and numerous groups of vertebrates. Our knowledge on seminal vesicle in sturgeon is limited. Sturgeons (Chondrostei, Acipenseridae) are a "living fossil" fish species, which inhabit the Northern Hemisphere [1]. Sturgeons reproduce in freshwater [1]. Seminal vesicles are accessory sex glands present in the male reproductive system of fishes that were attached to the posterior region of the common spermatic duct in male fishes [2,3,4,5].Various functions in fishes are attributed to the seminal vesicles, such as storage and nutrition of spermatozoa, secretion of sialomucines, proteins and enzymes, storage of lipids and phospholipids, production of steroids and pheromone, phagocytosis of residual germ cells, and enhancement of sperm motility and fertilization efficiency [6,7]. Anatomical, histological and EM studies are presented on the male seminal vesicles of 111 species of gobies (Gobiidae, Teleostei). There vesicles, attached to the sperm-ducts, are lined with an excretory epithelium composed of three types of cells: 1)columnar cells with giant Golgi cisterns in the form of large rings apical to the nucleus; 2)excretory cells with remarkably interdigitative basal lamina, that resemble sperm-duct cells; and 3) groups of interstitial, Leydig-type cells that possibly form a part of the mesorchial gland [8].The secretory epithelium of the seminal vesicle is formed by a monolayer of cells that change dimensions and shape at various stage of their activity [8,9].The Seminal vesicles in several gobiid fishes exhibit seasonal development.on the other hand, Weisel (1949) has reported that in *Gillichthys mirabilis*, an estuarine gobiid fish, the seminal vesicles do not show cyclicity; the amount of secretion and the appearance of the secretory epithelium do not change appreciably in the various seasons[10]. Taking the aforementioned into account, our primary objective was to describe, for the first time, the microscopic anatomy of the seminal vesicles of the *Persian Sturgeon*. All new knowledge will help to draw attention to this species and ongoing efforts to better understand and thus better handle and protect them.

Materials & Methods

10 fishes 1-2 ages were used for light microscopic examination. The Persian Sturgeon used in this study was collected from Caspian Sea. The fish were sacrificed by severing the spinal cord and dissected immediately after. The Seminal vesicles were removed, and then cut into 3-4mm thick slides and fixed in 10% buffer neutral formalin. For light microscopy (LM) analysis the sampled pieces

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were routinely dehydrated through ascending series of ethanol, cleared in xylene, infiltrated and embedded into paraffin. Sections were stained with Hematoxyline and Eosin (H&E).

Results

Microscopic analysis of this gland showed a system of secretory tubules lined by a simple squamous to cuboidal epithelium. The cells presented an elongated nucleus with intense basophile condensed chromatin. The lining epithelium of the adjacent secretory tubules laid a basal membrane with a discreet intervening interstitial tissue, with sparse fibroblasts and blood vessels. The secretory tubules filled with seminal fluid were anastomosed, forming a vesicular collective network, which gave rise to the vesicular ducts (Fig. 1). These ducts were lined by a simple cuboidal epithelium. The epithelial cells showed homogenous cytoplasm with a round nucleus and a visible and generally eccentric nucleolus (Fig. 2).

Discussion

Seminal vesicles, which occur as paired glandular region of the common spermatic duct in male teleost fishes, were noted by Rathke (1824) in the goby, *Gobius niger*[11]. Weisel (1949) has described the seminal vesicles of *G.mirabilis*[10]. Over the years, Seminal vesicles structure and function in many vertebrate species, including fish, has been precisely described. However, in the *Persian Sturgeon*, our knowledge about the cytology and histology of the Seminal vesicle of the *Persian Sturgeon* is scarce. Since no histological studies of the Seminal vesicle of the *Persian Sturgeon* have been reported previously. These basic studies are important for comparative morphological analyses and also for understanding of the pathological or physiological alterations of the organs, either related to infections or environmental disease. Incomparative with *Persian Sturgeon*, the seminal vesicles appeared as wings extending from the base of the testes in goby species, The internal structure consisted of chambers interconnected with each other by wide openings, and lined by simple epithelium and underlined by a lamina propria [12].Histologically in the Gobiid fishes the wall of the vesicles has a tunic of connective tissue, penetrated by muscle fibers and blood capillaries [8] that are similar to *Persian Sturgeon*. The thick secretions from the seminal vesicles contain proteins, enzymes, fructose, mucus, vitaminC, flavins, phosphorylcholine and prostaglandians. The high fructose concentrations provide nutrient energy for the spermatozoa. Spermatozoa ejaculated into the vagina are not likely to have contact with the seminal vesicular fluid but transfer directly from the prostatic fluid into the cervical mucus as the first step on their travel through the female reproductive system.

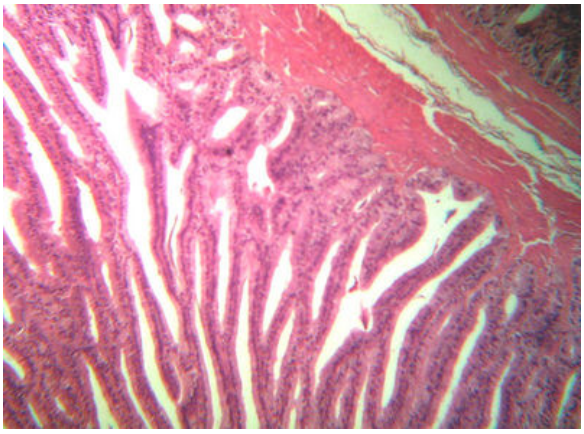

Fig. 1.Seminal vesicle of *Persian sturgeon*, a thick layer of connective tissue is present as a gland capsule, the mucosa forms longitudinal folds into the lumen (H & E, ×100)

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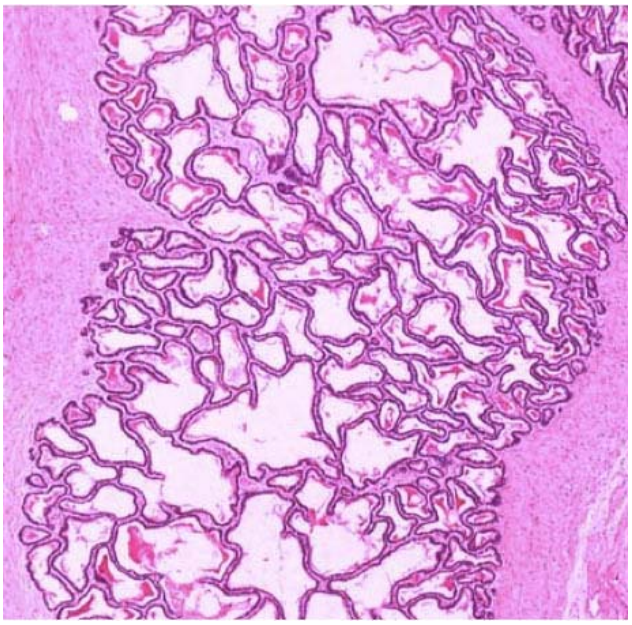

Fig. 2. Seminal vesicle of *Persian sturgeon*. (H & E, ×250)

Conclusion

As conclusion, this paper presents a first study of the histological organization of the seminal vesicle of the *Persian Sturgeon*. Our contribution is unique in its scope because it is the first assessment of seminal vesical *in Persian Sturgeon* that can help for better handle, protect and prevent them from extinction.

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