

DEVELOPMENT OF THYROID GLAND IN COMMON CARP, *CYPRINUS CARPIO* L. (CYPRINIDAE)

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ABSTRACT

The development of thyroid gland in five developmental stages of common carp, *Cyprinus carpio* L. The thyroid originates from the pharyngeal floor as a median ventral keel in late embryos having four pairs of arches.

It differentiates into profollicular aggregations and true follicles with flattened walls and empty lumina or with lumina filled with cotton waste - like material in three days - old elvers. Secretion of homogeneous eosinophilic colloid with a limited increase in the height of follicular wall is noted in five days - old elvers. In nine days - old individuals the follicles increase in size due to coalescence. The thyroid gland reaches its maximal activity as judged by its histology in one - two months - old individuals. The gland is of the diffused type.

INTRODUCTION

The thyroid gland is one of the most conservative organs in vertebrates (1). Its histology, ultrastructure, function and development have been extensively studied in anuran amphibians (2, 3). Such studies are, however, scarce in teleosts (4, 5), especially those dealing with development (6, 7). This work is designed to throw light on the development of thyroid gland in the common carp, *Cyprinus carpio* L. (Cyprinidae)

MATERIALS AND METHODS

Embryos and elvers were obtained from Al - Wahda Fishery in Soaira 60 Km south east of Baghdad. They were morphologically examined under a stereo - dissecting microscope before fixation in aqueous Bouin's fluid. The specimens were embedded in paraffin, serially sectioned at 8 μ m and stained with haematoxylin and eosin.

RESULTS

The thyroid primordium develops as a keel-like evagination of the pharyngeal floor between anterior pharyngeal arches in embryos with newly developed fourth arches. The primordium seem to detach from the pharyngeal floor at hatching time or shortly after.

In three days - old (total length 6.8 mm) elvers the thyroid gland is composed of several small follicles and a number of profollicular aggregations of thyroid cells.

All of these elements are what some closely packed and have intimate relation with blood vessels. There is no distinct capsule surrounding the gland.

The follicles (Fig. 1) are small in size with an average diameter of 12 μm (8 - 14 μm). The follicular wall is built up of 2 - 5 flattened to low cuboidal cells with vesicular nuclei and finely granulated, moderately basophilic cytoplasm. Some of the follicles are empty. Others are filled with non homogeneous, faint eosinophilic colloid, or with cotton waste-like material.

The thyroid follicles of five days - old (7 - 7.2 mm long) elvers is slightly larger than those of the previous stage with an average diameter reaching 15 μm . The follicular wall is composed of low cuboidal cells. The lumina are filled with homogeneous, weak to strong eosinophilic colloid. There is no distinct capsule around the gland. However, fibroblasts and collagenous fibres are discernible around and amongst the thyroid tissue.

Examination of thyroid gland of nine days - old (7.5 - 7.8 mm long) individuals shows coalescence of follicles to form larger ones (Fig 3). Otherwise, the histological picture is the same as that given for the last stage.

In later stages, i. e. one - two months old (11 - 12 mm long) individuals the thyroid follicles become scattered in the hypobranchial plate, so that the thyroid gland can be described as diffused (Fig. 4). They are round to oval in shape with an average diameter of 30 μm and are always found in association with blood vessels. The follicular wall is definitely made up of simple cuboidal epithelium. The cytoplasm of thyroid cells shows few chromophobe vacuoles. No similar vacuoles could be observed in the colloid.

DISCUSSION

As in all other vertebrates (8) and teleosts (6 , 7) studied, the thyroid gland of the common carp, *Cyprinus carpio* L. differentiates from the pharyngeal floor between the anterior two pairs of the pharyngeal arches as an evagination. It does not, however, migrate posteriorly for a considerable distance as in anurans (3) for example, instead, it becomes spread throughout the hypobranchial plate.

The thyroid gland reaches a maximal activity in one - two months - old elvers. This is indicated by the increased height of follicular wall and chromophobe vacuoles observed in its cells (9). This maximal activity does not however, match that observed in metamorphosing amphibians where chromophobe vacuoles can be seen in colloid too (3 , 8).

No parafollicular cells could be observed during the present study. This conforms with results obtained on other teleostean species studied so far (4 , 6 , 10).

Two morphologically distinct types of thyroid have been reported. The first type is more common in teleosts. Thyroid of this type is diffused, composed of scattered follicles with no limiting capsule (9). Thyroid of the second type, is composed of two distinct median lobes (10). The present work clearly shows that thyroid gland of *C. carpio* belongs to the first type.

Whether lobation of the gland represents an advanced feature or not cannot be decided at the time being (11) and more data are needed for this purpose. Yet, the diffused type of thyroid as the one observed in the present study may have an advantage of easier access to circulation.

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- Fig . 1 . A number of thyroid follicles of three days old elver Notice the flattened follicular wall and the non-homogeneous colloid .
- Fig . 2 . Thyroid follicles of five days - old elvers . The colloid is homogeneous , weak - strong eosinophilic .
- Fig . 3 . Coallescence of thyroid follicles (arrow head) in nine days - old elvers .
- Fig . 4 . A section through the hypobranchial plate showing the diffused nature of thyroid .

نشوء الغدة الدرقية في الكارب الشائع *Cyprinus carpio* L. (Cyprinidae)

درس نشوء الغدة الدرقية في خمس مراحل النمو للكارب الشائع *Cyprinus carpio* L. وبينت الدراسة إن الغدة الدرقية تنشأ من قاع البلعوم في الأجنة المتأخرة ذوات أربعة أزواج الأقواس الأهرية ، بشكل جؤجؤ وسطى بطني . ثم تتمايز إلى تجمعات شبيهة بالجربسات وإلى جربسات ذوات جدران مسطحة وتجاويف خالية أو مملوءة بمادة غير متجانسة بعد ثلاثة أيام من الفقس ، يفرز الغر وان المتجانس أليف الأصباغ الحامضية في عمر خمسة أيام بعد الفقس . ويلاحظ اتحاد الجربسات بعضها ببعض في البرقات التي بلغت يومها التاسع . تصل الغدد الدرقية ذروة نشاطها ، كما يمكن استنتاجه من مظهرها النسيجي ، في الأفراد الذين تتراوح أعمارهم بين شهر وشهرين . ودلت الدراسة على أن الغدة الدرقية في الكارب من النوع المنتشر.

