



Hypocalcemic Hormone Secretion From Corpuscles of Stannius in the Freshwater Fish, *Notopterus Notopterus*

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ABSTRACT

A pair of corpuscles of Stannius are present embedded in the posterior portion of the kidney in the freshwater fish, Notopterus notopterus. In the present study molecular weight and nature of secretion from these endocrine glands were analysed. The corpuscles of Stannius gland extract was prepared and the homogenate was processed for analysis by applying SDS-PAGE method. The results indicate that the products of corpuscles of Stannius of the fish, Notopterus notopterus is a protein having molecular weight of 41 kDa which is a hypocalcaemic hormone (hypocalcin) as reported in other fishes.

KEYWORDS : *Notopterus notopteres, hypocalcaemia, glycoprotein*

Introduction

The corpuscles of Stannius (CS) have been most consistently implicated in the control of plasma calcium metabolism (12). Stanniocalcin (STC), the hormone secreted by the CS, lowers plasma calcium levels by reducing gill calcium uptake (2,11,9,7). Since role of CS in fish has not been still established, however, there are some reports that CS secretes a glycoprotein hormone which regulates calcium homeostasis (3,7,1). Hence, in the present investigation CS extract has been analysed for the nature of secretion in the freshwater fish *Notopterus notopterus*.

MATERIALS AND METHODS

SDS-polyacrylamide gel electrophoresis:

The corpuscles of Stannius (CS) were dissected out from the fish *Notopterus notopterus* maintained in the laboratory. The CS glands were homogenized in 0.05 M ammonium acetate (pH 7.4) using Patter homogenizer. The supernatant obtained after centrifugation (at 900 g for 5 min.) was lyophilized and prepared for sodium dodecyl sulfate-polyacrylamide gel electrophoresis SDS-PAGE. SDS-page was performed according to (4) with 8% polyacrylamide slab gels. SDS-PAGE was carried out under reducing conditions with mercaptoethanol. After fixation of the proteins in the gels by methanol and glutaraldehyde. The gels were stained with coomassie brilliant blue R-250.

Observations

Identification of the hypocalcemic factor

The corpuscles of Stannius of the freshwater fish, *Notopterus notopterus* are pair in number, embedded in the posterior portion of the kidney. The SDS-PAGE analysis under reducing conditions of a crude tissue homogenate of corpuscles of Stannius in the fish, *Notopterus notopterus* indicate that the secretions (product) is a protein and has a molecular weight of 41 kDa Figure-1 shows hypocalcin a hormone product from corpuscles of Stannius has been studied and found to be present in six freshwater fish species such as European eel, tilapia, gold fish and in carp (7). In the present study on application of SDS-PAGE analysis under reducing condition, the corpuscles of Stannius extract homogenate found to contain a protein having molecular weight of 41 kDa

SDS-PAGE: (SDS-PAGE analysis of partially purified STC from the fish *Notopterus notopterus* (Fig-1)

Lane-1 is molecular weight marker; phosphorylase (97 kDa); bovine serum albumin(66kDa); ovalbumin(43kDa); carbonic anhydrase (29kDa); lane-2 crude, lane-3 ammonium sulphate, lane-4 after dialysis, lane-5 G-100.

Discussion

The study on the SDS-PAGE application of CS tissue homogenate indicates that the product of CS of *N. notopterus* is a protein having a molecular weight of 41 kDa, which might be a hypocalcemic hormone reported in other fishes (5). Because of its high molecular weight, this product from CS of the fish *N. notopterus* can be called as

hypocalcin. As this name (hypocalcin) was proposed for a CS hypocalcemic principle with a molecular weight about 10 kDa by (10), whereas

the name teleocalcin was first given to a hypocalcemic principle with a molecular weight of 3 kDa isolated from CS of Salmon (8). Hypocalcin is present in relatively large amount in the CS of the six freshwater species such as European eel, Tilapia, gold fish and carp hypocalcin a hormone product from corpuscles of Stannius has been studied and found to be present in six freshwater fish species such as European eel, Tilapia, gold fish and in carp(5).

The present observation on the molecular weight of 41 kDa for the product (hypocalcemic principle) of *N. notopterus* were in agreement with the reports of Lafeber et al., (1988) in six species of fish studied, which showing that isolation of hypocalcin yields a band of 41 kDa after SDS-PAGE under non-reducing conditions. There are similar reports on other fishes (12). Hence, it is indicated that the CS of the freshwater fish *N. notopterus* secretes a product having molecular weight of 41 kDa as that of other fishes, and this product of CS can be called as hypocalcin hormone.

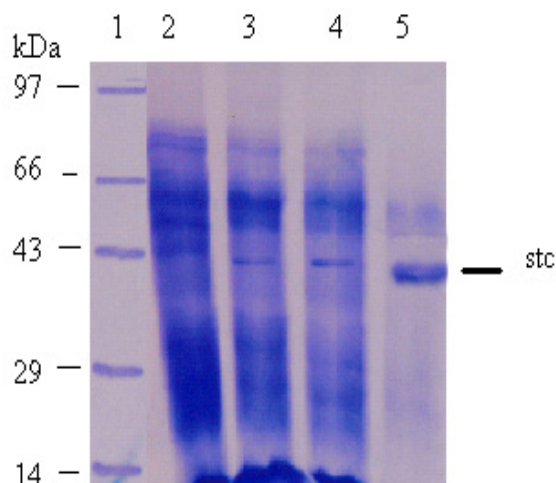


Fig. 1: SDS-PAGE analyses of partly purified steniocalcin in the corpuscles of Stannius extract from the fish, *Notopterus notopterus*.

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