THE ROLE OF SULFAHYDRL AND DISULPHIDE GROUPS IN THE NOTOCHORD OF AMPHIOXUS (*BRANCHIOSTOMA*)

IT is well known that the notochord of amphioxus is made up of vertically arranged flattened plates composed of transversely oriented fibres. In recent years notable advances have been made on the fine structure of the notochordal plates and its fibres. Eakin and Westfall (1962) from an electron microscopical study on the notochord reported that the plates vary in size from 1 μ to 4 μ. Welsch (1968) observed that 5-6 notochordal plates adhere together as a group and separated by oblique intermediary plates. Further, the transverse fibres were reported to occur as thin and thick filaments (Flood, 1967).

That the cross striations of the thick and thin filaments were of the paramyosin type was reported by Flood (1967) who also extracted a paramyosin like protein from the notochord (Flood, 1968). Furthermore, the ultrastructure of the notochordal plates showed a close similarity to the fine structure of the oblique striated muscles of annelids and molluscs. Welsch (1968) showed that the thick and the thin filaments of the notochord are arranged in A-, H-, and I bands, an arrangement which is similar to that of muscle fibres.

From the observations referred to above, a thesis has been brought forward to suggest that the notochord of amphioxus is essentially muscular. In the light of these recent findings it is felt of interest to study the functional aspect of the notochord.

Transverse sections of the notochord when subjected to histochemical tests showed that it is devoid of chitin but abundant in proteins rich in aromatic substances (results unpublished). It was further observed that the notochordal plates showed a positive response to argentaffin test which is suggestive of the presence of reducing substances which may include a group such as sulfahydrls (Pearse, 1961). Sections of the notochord on treatment with 1% solution of barium chloride in 2 N hydrochloric acid followed by the addition of a crystal of sodium nitrite, turned white indicating the presence of sulphur (Feigl, 1960). That the organic sulphur occurs in the form of sulfahydrl (SH) and disulphide (-S-S-) groups was indicated by the positive reaction with alkaline tetrazolium and alkaline nitroprusside tests.

In the light of the occurrence of sulfahydrl groups in the muscle fibres, Weber (1958) proposed a chemical scheme to account for the sliding motion assumed in the Huxley-Hanson theory of muscle contraction. Therefore, in view of the recent concept of muscular notochord it is possible that the sulfahydrl groups may play a similar role in the sliding motion of the thick and thin filaments to bring about concomitant contractions with that of the myotomes during swimming.

Sulphur is known to occur in the integuments of arthropods in which it has been shown that protein is stabilized by -S-S- bonding to confer rigidity and resistence property to the cuticle (Krishnan, 1954, 1956). The role of sulphur in contributing mechanical rigidity to the notochord will be communicated.

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Department of Zoology,
University of Madras,
Madras-5.

JAYAPAUL AZARIAH

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