

DISTRIBUTION OF CHITIN IN ANIMALS. Charles Jeuniaux, Dept. of Biochemistry, University of Liège, Belgium.

An accurate quantitative method for the detection and estimation of chitin has been devised, using a purified chitinase as highly specific reagent. This method enables the discrimination of the free chitin from the chitin chemically bound to other substances.

A first survey of the distribution of chitin in a number of skeletal and cuticular structures seems to indicate that the ability to synthesize this polysaccharide is a primitive property of the animal cell. Chitin has indeed been found in the shells of Thecamoebaea and Foraminifera, in the walls of the gemmules of Spongillidae, and in the periderm of athecate and thecate Hydrozoa. In the other Metazoa, chitin synthesis seems to have been lost in the Deuterostomia. On the contrary, this property has been kept along the evolutionary stem of Protostomia, the absence of chitin being observed in a few phyla only (Platyhelminthes, Nemertina, Sipunculida). In the Protostomia, chitin is a constituent of many different types of anatomical structures, which can be considered as morphological and physiological radiations of chitin biosynthesis.

In addition to the known cases of chitinous structures among Invertebrates, chitin has been clearly identified in the egg shell of Nematoda and Acanthocephala, in the tubes, shells and ectocysts of the Lophophorate phyla, in the hooks of Thalassema (Echiurian), in the different types of chaetae of Annelids, in the peritrophic membrane of Arthropods, as well as in the shells of Mollusks, not only in those of Cephalopoda (including Nautiloidea) but also in those of different Gastropoda and of the Oyster.

A tendency in the evolution of cuticular and skeletal structures in Protostomia is the increasing quantitative importance of chitin in the organic matrix of these structures. The amount of chitin in lower Invertebrates is indeed rarely more than 20% of the organic matter, but attains 20-37% in the chaetae of Annelids, 20-50% in the cuticle of Insects and 50-85% in that of Crustaceans. In nearly all the groups studied so far, including the most primitive, chitin is principally present in the form of complexes, probably glycoproteic in nature, resistant to the action of pure chitinases. Free chitin generally represents less than 20% of the total chitin. In this respect, Mollusks are opposed to the other groups, their shells containing larger amounts of free chitin (up to 80 p. 100 of total chitin).

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