

PB 14 - Chitin Distribution in Molluscan Cuticle and Shell

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The evolutionary history of the molluscan shell is far from being understood. In addition to acidic macromolecules and silk-fibroin gel, chitin is one of the most important components in shell formation. The distribution and characterization of chitin in conchiferan shells, polyplacophoran shell plates and their putative evolutionary precursors, i.e. mantle cuticle and sclerites, may provide valuable clues to unravel shell evolution. β -chitin is hitherto known from cephalopods only. Although chitin is also reported from other *Conchifera*, polyplacophoran shell plates and cuticle, and aplacophoran cuticle, its type has not been determined. Moreover, conflicting data exists on the presence of chitin in sclerites. We here present data on chitin distribution in aplacophoran, polyplacophoran and conchiferan mollusks inferred from immune histochemistry using bacterial chitin binding proteins and infrared spectrometry (IR). The cuticles of *Chaetoderma nitidulum* (*Caudofoveata*) and *Acanthopleurus spiniger* (*Polyplacophara*), as well as its shell plates, were found to contain alpha chitin, but is was not discovered in sclerites. We also detected α -chitin in the bivalve *Mytilus galloprovincialis*. These results suggest that the polyplacophoran shell plates and the conchiferan shell arose from a combination of biomineralization properties of sclerite-forming cells and the α -chitin of the cuticle.