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Bioadhesion in the marine crustacean *Pollicipes pollicipes*

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Marine organisms such as invertebrates and seaweeds are found attached, either temporary or permanent, to a variety of substrates and surfaces of other organisms, from coastal to deep-sea environments. Their mechanisms of underwater attachment are of interest to materials science for develop bioinspired technology with applicability in the fields of surface engineering and biomedicine.

Generally marine adhesives are highly viscous or solid materials composed of proteins, but this composition can vary widely between organisms. The presence of DOPA (L-3,4-dihydroxyphenylalanine) and phosphorylated serine (pSer), which indicate high cohesion and adhesion strength, are found in marine adhesives of mussels, tubeworms, sea-cucumbers and sea-stars. Other organisms, like ascidians, produce post-translational modifications forming DOPA and TOPA (3,4,5-trihydroxyphenylalanine) and barnacles appear not to require any post-translational modifications. Barnacles, sessile crustaceans with mineralized plates, are of interest due to the strong permanent adhesive that they produce, although their mechanisms of adhesion remain unclarified.

Taking into account that the development of bioadhesives is most effective when using molecular tools to a better understanding of the key features and mechanisms of natural adhesives, we propose to apply protein chemistry tools to characterize the adhesive proteins from the stalked barnacle *Pollicipes pollicipes* (Crustacea Scalpelliformes), an important marine resource exploited in Portugal that is found in rocky shore environments. After solubilization of secreted adhesive material and isolation of the proteins, protein characterization will be assessed by mass spectrometry. The amino acid sequences will be compared to other related species to find for protein homologues or putative novel proteins. It is expected that development of this research may contribute to biotechnological advances in the design of new surgical adhesives or biohybrid and biomimetic materials. It may also be applied to other research fields, such as in the development of toxic-free antifouling compounds and in the aquaculture of this species, as an alternative to supply the market and for re-stocking programmes.