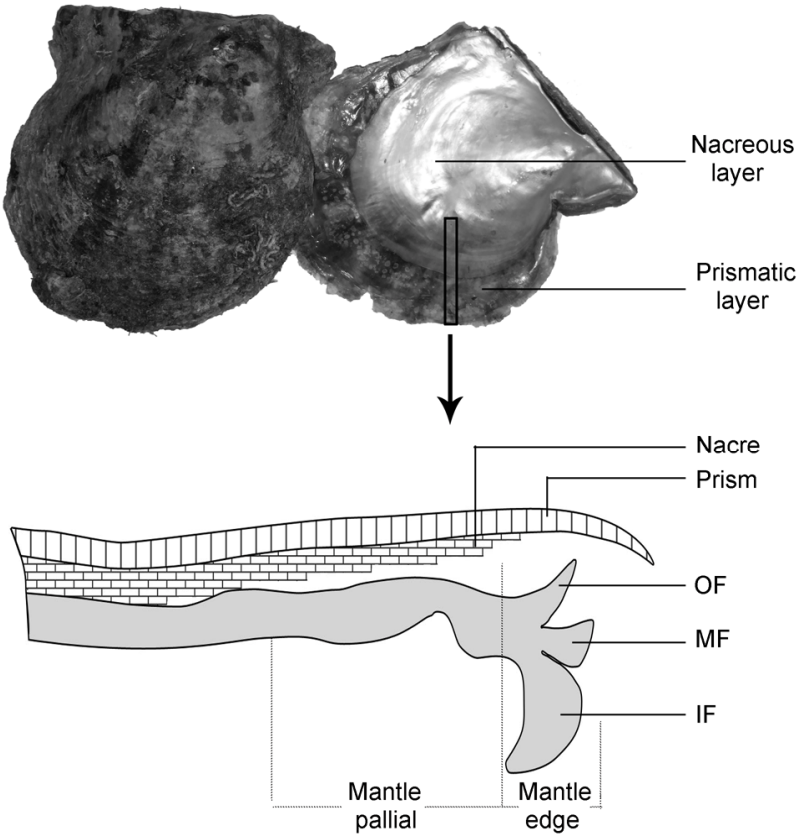
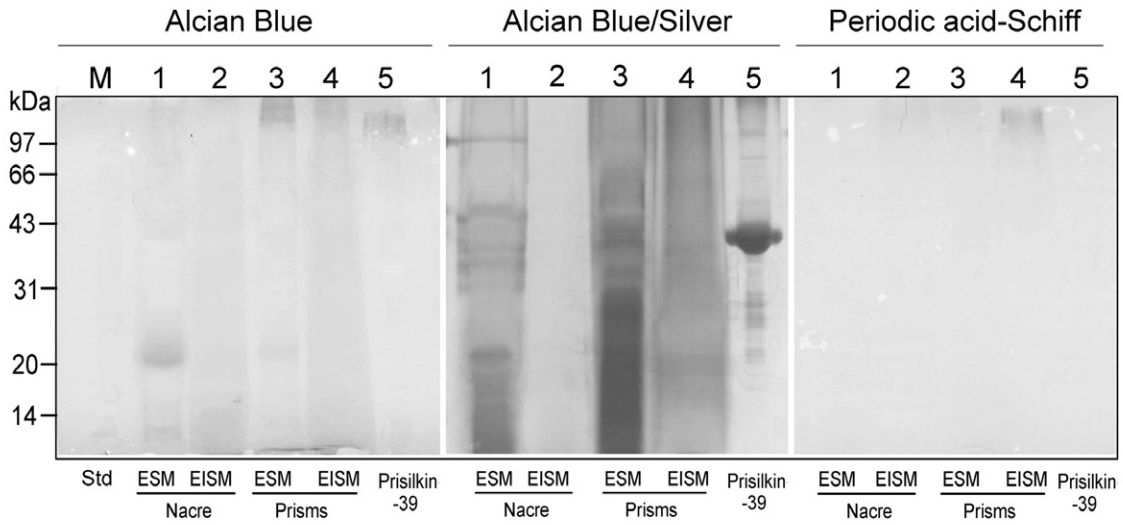


Supplemental Figure 1. Schematic drawing of the layered structure of the the shell of *P. fucata* and its relationship with the mantle tissue. *OF*, outer fold; *MF*, middle fold; *IF*, inner fold. In the lower panel, the mantle tissue is artifically divided into two regions: the mantle edge corresponding to the prismatic calcite shell layer and the mantle pallial corresponding to the nacreous aragonite layer.



Supplemental Figure 2. Characterization of the total glycoproteins in different shell extracts by Alcian Blue staining (*left panel*), combined Alcian Blue/silver nitrate staining (*middle panel*) and periodic acid-Schiff staining (*right panel*). *Lane 1,* EDTA-soluble matrix of the nacre; *Lane 2,* the denatured fraction of the EDTA-insoluble matrix of the nacre; *Lane 3,* EDTA-soluble matrix of the calcitic prisms; *Lane 4,* the denatured fraction of the EDTA-insoluble matrix of the calcitic prisms; *Lane 5,* recombinant Prisilkin-39.

Annotation: the prism EISM extracts showed a heavily stained profile after being incubated with the Alcian Blue reagent (*left panel, lane4*). Similarly, total glycoproteins in the prism EISM extracts were visualized at higher sensitivity and staining ability using a combined Alcian Blue/silver staining method (*middle panel, lane 4*). No positive staining results were obtained in our attempts to stain the shell matrix extracts with PAS (*right panel*), both on gels and on blots. Moreover, although recombinant Prisilkin-39 failed to stain blue with the normal Alcian Blue reagent (*left panel, lane 5*), it could be clearly detected using the more sensitive Alcian Blue/silver staining method (*middle panel, lane 5*).