Identification of mineral-binding proteins modulating biomineralization from the Pacific oyster shell

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Ethylenediamine-tetraacetic acid extracted water-soluble matrix proteins in molluscan shell secreted from the mantle are believed to control crystal nucleation, morphology, orientation, and phase of the deposited mineral. Previous experiments were done with protein mixtures. To elucidate the role of single proteins, we have characterized three proteins isolated from the aragonite and calcite components of the Pacific oyster shell, Crassostrea gigas, These purified proteins are designated FL, CH, and MYO. Degenerate oligonucleotide primers corresponding to N-terminal and internal peptide sequences were used to amplify cDNA clones by a polymerase chain reaction. Preliminary crystal growth experiments demonstrate that synthesizing proteins obtained from cloning produced $CaCO_3$crystals with morphology distinct from crystals grown in the presence of the soluble protein from oyster shell. CD analyses demonstrate that the soluble proteins possess significant percentges of alpha-helix and beta-sheet in solution.