# The relationship among cell, organic matrix and biomineralization in freshwater pearl oyster

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*Hyriopsis cumingii* (Zhejiang province, China) is the most widely used animal for freshwater pearl farming in China. Pearl is a kind of common biomineral produced from the biomineralization process. The majority of fresh water pearls have luster. The inorganic component of these lustrous pearls is constituted by aragonite crystals regarded as aragonite pearls. While some pearls that have vaterite crystals as inorganic component are viewed as vaterite pearls, and most of them are lack of luster. *Hyriopsis cumingii* shell nacre, aragonite pearl and vaterite pearl were chosen to study the relationship among the cell, organic matrix and biomineralization.

Part of mantle in the shell, in contact with shell edge, was dissected to make a primary cell culture. The cells could emigrate from the tissue after 24 h, leading to form a clear boundary of the tissue and the cells. The precipitated organic matrix from the cells and the induced biomineralization were further studied.

A peculiar method was introduced to extract water soluble matrix (WSM), acid soluble matrix (ASM) and acid insoluble matrix (AIM) from the shell nacre, aragonite pearl and vaterite pearl. Biochemical analysis of these organic matrixes involved in crystal formation and polymorph selection was carried out to discuss the regulatory function of organic matrix on biomineralization. Chromatography confirms the hydrophobic pattern of the organic matrix intermingled with mineral, the opposite of the early mobilizable water soluble fraction. Amino acid composition confirms hydrophobic residues as major components of all the extracts, but it reveals an imbalance in acidic residues rates in WSM vs ASM and in aragonite vs vaterite. Electrophoresis gives evidence for signatures in proteins with a 140 kDa material specific for aragonite in WSM. Conversely all ASM extracts reveal the presence of about 55 kDa components, including a discrete band in vaterite extract.

The extracted WSM, ASM and AIM were used in the *in vitro* mineralization to study the mechanism of organic matrix mediated biomineralization.