Expression profiles of biomineralization-related genes at different stages of pearl formation in *Pinctada fucata*

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In pearl farming, a piece of mantle tissues from a donor oyster is implanted into a host oyster along with an inorganic nucleus. The outer epithelial cells of the graft proliferate and form a pearl sac which secretes various shell matrix proteins (SMPs) to form a pearl surrounding the nucleus by a complex physiological process which has not been well-understood yet. Using an RNA-seq approach, here we aimed to unravel the expression of the key genes involved in pearl biomineralization at different stages. During grafting experiments for three months, we collected nine samples (donor mantle epithelial cells, donor mantle pallium, donor mantle pallium on grafting, and mantle pallium each from the host at 24 hr, 48 hr, 1 week, 2 week, 1 month, and 3 month post grafting). The pearl sac was developed by two weeks after transplantation. For the first time, we identified some stem cell marker genes differentially expressed during pearl sac formation. PCA analysis on 192 biomineralization-related genes showed clearly different expression profiles between before and after 1 week after grafting. The expression profiles of these genes demonstrated that prismatic layer forming SMPs were first up-regulated and then gradually down-regulated, indicating their involvement in the onset of pearl mineralization. Most of the nacreous layer forming SMPs were up-regulated after the formation of pearl sac with the highest expression at 1 month, suggesting the completion of nacreous layer formation. These findings provide valuable information in understanding the molecular mechanism of pearl formation in *P. fucata*.

Biography

Mariom is a PhD student at ‘The University of Tokyo’ and an assistant professor at ‘Bangladesh Agricultural University’. Her research interests lie in the area of molecular biology and biotechnology. Her work now focuses on molecular mechanisms underlying the formation of pearl sac and pearl because increased understanding towards producing a high quality lustrous pearl is required to further improve the effectiveness of pearl culture technique. She earned a bachelor of science in ‘Fisheries’ and a master of science in ‘Fisheries Biology and Genetics’ from ‘Bangladesh Agricultural University’.

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