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### Study on genes involved in biosynthesis of PUFA in marine bivalves

PUFA play an important role in development, reproduction, growth, etc., of marine bivalves. Previous research showed that bivalve is rich in PUFA, especially EPA(C20:5n-3) and DHA(C22:6n-3), however, bivalve could biosynthesize PUFA is always a controversial topic. Radionuclide tracer analysis gave evidence some bivalve could *de novo* synthesis PUFA from precursors, which, however, could not exclude effect of microorganism inside the experimental animals. Four genes (*ELOVL2*-like, *ELOVL4*, *FAD5* and *FAD8*) involved in PUFA metabolism were cloned in noble scallop *Chlamys nobilis*. *ELOVL2*-like and *ELOVL4* could elongate C18 and C20 to C22 and C24 respectively, while *FAD5* and *FAD8* showed  $\Delta 5$  and  $\Delta 8$  desaturation activity respectively. Thesis studies firstly gave molecular evidence that scallop could at least biosynthesize AA and EPA through “ $\Delta 8$  pathway”. DHA might not synthesize in noble scallop because no desaturase with  $\Delta 4$  and  $\Delta 6$  activity was found. It seemed impossible that the scallop biosynthesize DHA through the “ $\Delta 8$  pathway” C24:5n-3→elongation→C26:5n-3→ $\Delta 8$ desaturation→C26:6n-3→ $\beta$ -oxidation→C24:6n-3→ $\beta$ -oxidation→C22:6n-3(DHA), because *ELOVL4* could not provide C26 substrates by elongating C24. As a result, noble scallop possibly relied heavily on diet DHA to optimize its health. Interestingly, *ELOVL2*-like, *ELOVL4* and *FAD8* genes showed less efficient activity towards n<sup>-3</sup> PUFA substrates than their homologous n<sup>-6</sup> substrates, resulting in a relative low efficiency to biosynthesis n<sup>-3</sup> PUFA, implying an adaption to marine environment.

### Biography

Zheng Huaiping has his expertise in the Genetics and Breeding in the scallops. He completed his PhD in 2015 and Post-doctoral studies in 2017 both from Institute of Oceanology, Chinese Academy of Sciences, China. Since 2008, as a Director, he has worked at Marine Biology Institute, Shantou University. A new variety named “Nan’ao Golden Scallop” has been bred by his team using artificial selection. Moreover, he has focused on biosynthesis of PUFAs in marine bivalves in recent years. He has published more than 20 papers in reputed journals and has been serving as a reviewer for many reputed journals.

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