

## Spatiotemporal lipid profiling during coral embryogenesis

Federica Buttari<sup>1,2</sup>, Sujune Tsai<sup>3</sup>, Zhi-Hong Wen<sup>1</sup>, and Chiahsin Lin<sup>\*2,4</sup>

<sup>1</sup>Department of Marine Biotechnology and Resources, National Sun Yat-sen University, Kaohsiung, Taiwan.

<sup>2</sup>National Museum of Marine Biology & Aquarium, Pingtung, Taiwan.

<sup>3</sup>Department of Post Modern Agriculture, Mingdao University, Chang Hua, Taiwan.

<sup>4</sup>Institute of Marine Biology, National Dong Hwa University, Pingtung, Taiwan.

### Abstract

To evaluate the variation in the content and composition of lipids and understand their role during the embryonic developmental stages, major lipid classes: sterol ester (SE), wax ester (WE), triacylglycerol (TAG), cholesterol, phosphatidylethanolamine (PE), phosphatidylcholine (PC), lysophosphatidylcholine (LPC) and fatty acids were assessed on the octopus coral *Galaxea fascicularis* in this study. The gametes and embryos were homogenized with a mixture of chloroform and methanol, obtaining a biphasic system in which the chloroform layer contained the lipids. Thin layer chromatography (TLC), transesterification to fatty acid methyl ester (FAME) and gas chromatography mass spectrometry were used to determine the lipid and fatty acids content. The results showed that SE, WE, and TAG, altered in content during the different developmental stages. Cholesterol and PC were the dominant lipids in all stages, whereas the contents of TAG, PE, and SE were significantly lower than those of the aforementioned lipid classes. In contrast with the lipid profile of the oocyte, sperm exhibited a much lower content of WE and the non-appearance of SE; however, the rest of lipid classes showed no statistical difference in content. As concerned the content of fatty acids, there was a peak of concentration in the early stages of embryonic development with the prevalence of saturated fatty acids (SFA); on the other hand, there was a low content of fatty acids at the sperm level. This study revealed that lipid content and composition may fluctuate between embryonic developmental stages and the finding will undoubtedly assist future lipid research in other coral species.

\*Email: [chiahsin@nmmba.gov.tw](mailto:chiahsin@nmmba.gov.tw)