Unusual Fatty Acid Composition of Marine Nudibranch Mollusks: Mirror of Feeding and Bacterial Symbiosis

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Lipid and fatty acid composition of marine organisms can provide valuable physiological and ecological information as well as serve as biological markers for determination of food sources of the animals. Lipid analysis of the nudibranch mollusks *Dendrodoris nigra* and *Discodoris lilacina* collected from intertidal zone of the Jeju Island, Korea indicated that the mollusks lipids comprised mainly phospholipids and sterols. Among phospholipids, phosphatidylcholine, sphingophosphonoglycolipid, phosphatidylethanolamine and ceramide aminoethyphosphonates were predominant. The fatty acid compositions of the nudibranchs exhibited a wide diversity and differed greatly from that of other marine gastropods. They displayed large amounts of very long chain fatty acids known as demospongic acids, thus suggesting predation on sponges. Fatty acid of the species provide the evidence that the predators, *D. nigra* and *D. lilacina*, are monophagous and feed presumably on sponges *Halichondria sp.* and *Callyspongia diffusa*, correspondently. Another unique feature concerned an abundance of various odd and branched fatty acids. Ultrastructural observations of the tissues revealed symbiotic bacteria in the epithelial cells of the notum and the mantle edge of *D. nigra*. A noticeable feature was also an abundance of novel *iso*-17:0 and *anteiso*-17:0 dimethylacetals together with predominant 16:0, which indicated to the presence of plasmalogens in the tissues of nudibranch mollusks.