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Topic: Marine biology and ecology



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ABSTRACT Subject :

Exploring the diversity of bacterial communities living in the mucus and in association with the Antarctic sponges *Mycale acerata* and *Dendrilla antarctica* (Terra Nova Bay, Ross Sea)

Abstract 15/02/2023 09:14:52



Marine sponges are in close contact with the surrounding environment. Being filtering organisms, they often accumulate the contaminants present in the water and sediments, but can also sequester the microorganisms from the water bodies, implementing an active selection of them to establish symbiotic association. Here because they are vulnerable to biological and chemical forms of pollution and have been proposed as sentinels and purifying components of waters. Microbe-invertebrate associations, commonly occurring in marine environment, play a fundamental role in the life of symbionts, even in hostile habitats, assuming a key importance for both ecological and evolutionary studies. The special dynamics occurring in the relationship organism-environment and host-symbiont are reflected for example in the isolation of heavy metal resistant bacteria from sponges living in metal-polluted environments. Current data related to the composition, host- and site-relatedness of the bacterial communities associated with Antarctic sponges are limited to few works, resulting in a still fragmented and incomplete knowledge. In this context, it is difficult to ascertain which microorganisms are intimately associated with the host as core microbiome symbionts, which are transients and consequently their possible role in the symbiosis relationship. Many marine invertebrates produce mucosal layers - whose role has not been fully clarified yet - generally constituted of high percentages of water, polysaccharide and protein mixtures. Several functions were attributed to such special layers, i.e. adhesion enhancement, water preservation, movement helping, heterotrophic feeding, and they are considered a survival strategy for sessile marine organisms, highly vulnerable to external disturbing factors or to infections. The present work was aimed at exploring the bacterial communities associated with the Antarctic sponges *Mycale* (*Oxymycale*) *acerata* (Kirkpatrick, 1907) and *Dendrilla antarctica* (Topsent, 1905) collected during the XXXIV Antarctic Expedition in the Thetys Bay (Terra Nova Bay; Ross Sea), and those present in their mucus layers. The inorganic content of the mucus and the presence of metals was estimated by MP-AES analysis. Total HCN content of dried samples was determined using an elemental analyser. The mucus samples evidenced a high amount of Na and Mg, but also presence of Ca, Fe, K, Se, V, trace of some heavy metals and other chemical elements. Data obtained highlighted the predominance of Proteobacteria, mainly affiliated to Alpha- and Gammaproteobacteria, with some dissimilarities between the two sponge species, especially at genus level. The present study represents a meaningful contribute to the scant knowledge of the structure and

biochemistry of Antarctic marine sponge mucus matrices and provides useful insights for biotechnological applications. Funding: this research was supported by the Programma Nazionale di Ricerche in Antartide (project PNR