

Editorial

# New Research Advances on Marine Invertebrates

Alexandre Lobo-da-Cunha <sup>1,2</sup> 

- <sup>1</sup> Department of Microscopy, Institute of Biomedical Sciences Abel Salazar (ICBAS), University of Porto, Rua de Jorge Viterbo Ferreira, 228, 4050-313 Porto, Portugal; alcunha@icbas.up.pt  
<sup>2</sup> Interdisciplinary Centre of Marine and Environmental Research (CIIMAR), Avenida General Norton de Matos, Terminal de Cruzeiros do Porto de Leixões, 4450-208 Matosinhos, Portugal

Marine ecosystems encompass a wide variety of invertebrates, pelagic and benthonic, from intertidal to deep-sea habitats in polar to tropical regions. The invertebrates constitute a paraphyletic group of animals that includes all metazoans except those belonging to the chordate subphylum Vertebrata. Therefore, they are distributed through all the phyla of metazoans (a total of 36 phyla according to some recent classifications), including the Cephalochordata (lancelets) and Urochordata (tunicates) of the phylum Chordata [1]. It was estimated that invertebrates correspond to more than 92% of all living marine animal species [2], ranging in size from microscopic organisms [3,4] to the giant squids. Invertebrates are major components of oceanic food webs, being involved in nutrient cycling. Suspension-feeders, such as bivalves, remove particles from the water column, thus improving local water quality, and reef-builders, such as corals, are ecosystem engineers that create habitats for many other marine species [2]. However, a significant number of these species are currently endangered by coastal habitat destruction, overfishing, ocean acidification and other forms of pollution that threaten marine biodiversity [2]. In addition to their high environmental importance, some marine invertebrates also have great economic value. Several species of crustaceans and molluscs are greatly sought after for human consumption, being produced in large quantities in aquaculture facilities or captured through fishing activities [5,6]. Moreover, the high diversity of marine invertebrates makes them a vast source of biomaterials and bioactive natural products with pharmaceutical, nutraceutical and antifouling applications, among other uses [7]. Nevertheless, despite all the research undertaken so far, much still remains to be investigated about these animals. Therefore, this Special Issue aimed to collect articles providing new and relevant information in this field. The seven articles included here reflect the diversity of marine invertebrates. The studies on echinoderms concern the histology of bizarre deep-sea holothurians [8], gut regeneration in holothurians [9] and the anti-cancer properties of the coelomic fluid of a sea-urchin [10]. Another article presents a morphological description of three different types of acellular material lining hemal spaces of a penaeid shrimp [11]. The study on Placozoa was focused on the crystal cells that have been implicated in gravity reception in these very small and simple animals that lack muscles and nerves, which feed by external digestion [12]. The article on the oesophagus, stomach and intestine of chitons disclosed new data about the histology and ultrastructure of the digestive system of these less-studied molluscs [13]. Finally, an extensive study on eunicid *polychaetes* revealed the influence that prostomial sensory organs have on brain microanatomy and showed that the specificities of the sensory organs support the latest phylogenetic relationships within this group of annelids [14]. In these articles, a variety of research methods were applied in order to progress our understanding of marine species, including light and electron microscopy, liquid chromatography, mass spectrometry, flow cytometry and cell and tissue cultures. With this Special Issue we also seek to stimulate further developments in the investigation on marine invertebrates, a field with great potential for fascinating new discoveries.



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