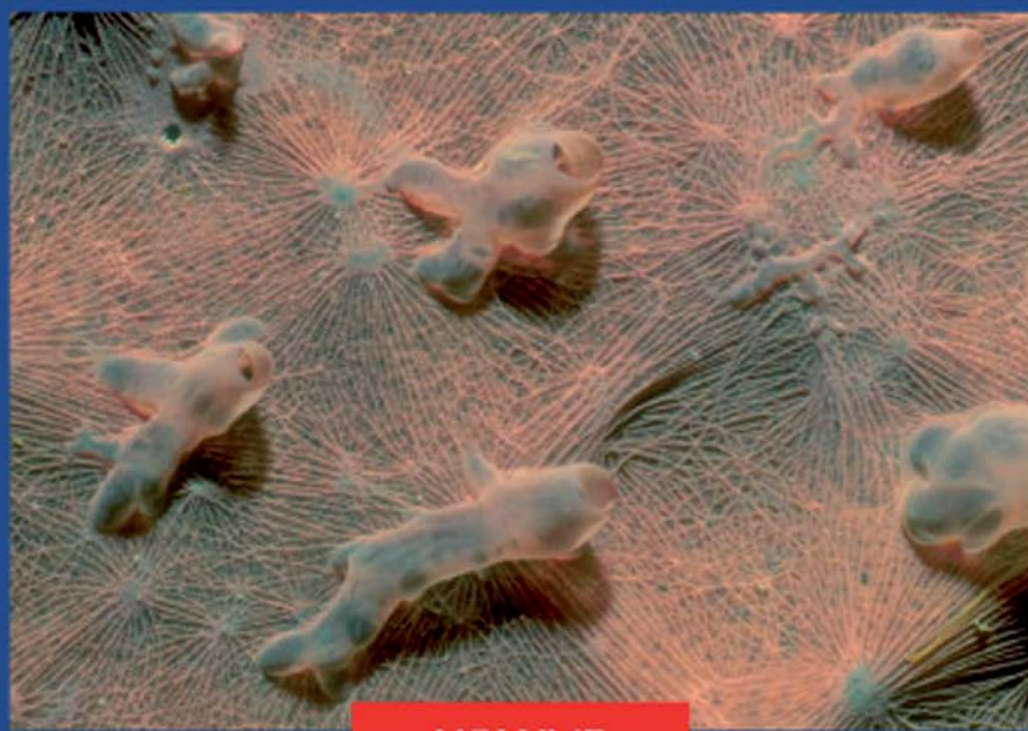


Advances in MARINE BIOLOGY

ADVANCES IN SPONGE SCIENCE:
PHYSIOLOGY, CHEMICAL AND MICROBIAL DIVERSITY, BIOTECHNOLOGY



VOLUME

62

Edited by
Mikel A. Becerro, Maria J. Uriz,
Manuel Maldonado, and Xavier Turon

Series Editor
Michael Lesser





VOLUME SIXTY TWO

**ADVANCES IN
MARINE BIOLOGY**

**Advances in Sponge Science:
Physiology, Chemical and
Microbial Diversity,
Biotechnology**

Advances in MARINE BIOLOGY

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Edited by

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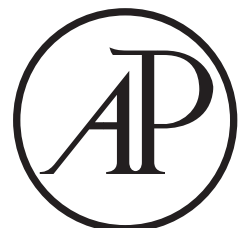
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PREFACE

The idea of this special contribution reviewing the latest advances in sponge science was conceived during the World Sponge Conference held in Girona (Spain) in September 2010. Dr. Michael Lesser, editor of the *Advances in Marine Biology* book series, first suggested the production of a sponge-dedicated monograph. As organizers of the conference, we realized that the amount of information available had increased exponentially in recent years. As this overwhelming new information is scattered over an enormous volume of scientific papers published in journals of very different disciplines, we agreed that a thorough compilation and comprehensive review would be appropriate and useful. The monograph could convey the latest advances in sponge science to sponge specialists besides providing a comprehensive overview to a wider audience with interest in invertebrate biology, marine ecology, molecular ecology, or phylogeny among others. This contribution is timely because we lack reviews in some topics, while in other aspects, reviews were either too old or have become outdated because significant progress has been achieved in the past years. So we took the bait and you have in your hands the results of our efforts to sum up the most relevant and up-to-date scientific literature on the Phylum Porifera.

Sponges are extraordinary animals. With over 8000 extant described species, these organisms are major players in many scientific disciplines. Sponges have relevant roles in shaping the ecological functioning of many marine benthic communities, hold a strategic position for understanding the evolutionary origin of animals, and produce a great variety of secondary metabolites and skeletal structures that have made them preferred targets in biotechnological research. This contribution, split in two thematic volumes, comprises a representative selection of the most active fields of sponge research. Even if not exhaustive, this multiauthor blend of visions offers a wide portrait of the state of the art in sponge science. We have intended the volumes to highlight recent developments in multiple scientific fields, while identifying current limitations and knowledge gaps and delineating challenges and foreseeable future directions.

More specifically, the contributions include an overview of the titanic research work performed on taxonomy and ecology of Caribbean sponges over the past decades. The amazing array of ecological interactions in which sponges engage, with special emphasis on the diversity and functionality of their associated microbiomes, are dealt with in other chapters. The revolution that new molecular tools have represented in ecological studies is also covered in a dedicated chapter. The role of sponges in biogeochemical

nutrient cycling is reviewed for the first time. The cell and molecular biology of sponges is a rocketing field, which gets its most recent advances and insights discussed from a modern perspective. Some chapters deal with sponge systematics and phylogeny, which are being hotly debated from several points of view, including a variety of hypotheses to interpret the relationships between sponge groups, other basal invertebrates, and early bilaterian animals. The rich chemical warfare featured by sponges, which has made this group a prolific source of new active natural products, has also been addressed, as well as the sponge machinery for processing and accumulating silica and its implications in tissue engineering. Although some of these chapters provide a good balance between basic and applied research, more biotechnologically oriented issues related to the culture of sponges, sponge cells, or symbionts for the production of chemicals have also found its place in the monograph. The chapters have been organized in two volumes: one covering the topics of phylogeny, systematics, and ecology, and the other dealing with physiology, chemical and microbial diversity, and biotechnology.

We address these volumes to both sponge specialists and nonspecialists, pursuing a twofold goal. We have intended to make the forefront of sponge research easily accessible to the nonspecialist, illustrating the state of the art of the field, and presenting current controversial issues. For the specialist, we wanted this monograph to be a handy, valuable update on the most recent advances in sponge science. We hope we have achieved our goals, at least partially. It goes without saying that the value of the volumes is mostly the merit of the contributing authors and the willing reviewers who altruistically devoted much time to read and make useful suggestions on the manuscripts. Our warmest thanks to all of them as well as to the AMB editorial staff who took care of editing and producing these books. We also thank you, the reader, for your interest in sponges and sponge science. We hope this collection of reviews is entertaining, useful, and inspiring for you all.

Mikel A. Becerro, Maria J. Uriz,
Manuel Maldonado and Xavier Turon