SPECIAL ISSUE FOR CURRENT ORGANIC CHEMISTRY

“Bioactive Natural Product Search and Discovery from the Sea”

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Aims and Scope:
Oceans provide enormous and diverse habitats for marine life. Their extreme environment of high hydrostatic pressure and low temperatures, hydrothermal vents with high hydrostatic pressure, high temperatures and metal concentrations and anoxic marine sediments are of the important sources for marine organisms to produce novel compounds. Special marine environment that hosts a wide diversity of organisms is a rich source of biological active natural products, many of which have not been found in terrestrial sources. The uniqueness of marine life leads to the remarkable diversity of marine natural products. In recent decades, marine natural products have received considerable attention for their various biological activities and many other utilities. Many of them have been exploited as candidates for drug discovery. Marine natural products chemistry is the important branch of modern natural organic chemistry, which gathered its momentum during the 1980's and matured in the last decade. Marine natural products studies have made great contributions to the development of organic chemistry, especially in the fields of heterocyclic chemistry, macromolecular chemistry, natural product chemistry, peptide chemistry, polymer chemistry and toxin chemistry. This thematic issue is to summarize the recent advances in structure and function studies of major types of marine natural products including heterocyclic compounds, peptides, toxins, terpenes, macromolecular compounds and macromolecules. The proposed ten review papers are going to cover and discuss and major challenge and prospective of this topic such as chemical diversity, structure elucidation, biological properties and utilities. This proposed issue will help us toward the understanding of these marine-derived compounds and facilitate the utilization of their fantastic biological activities. Ten contributors and their respective title for the proposed papers are listed below. They are all active scientists and have made important contributions for their specific research area. Prof. Imhoff’s group from Helmholtz Center for Ocean Research (GEOMAR), Germany have discovered many interesting compounds from marine fungi, and published them in the leading natural product journals. The review by Prof. Imhoff focuses on recent advances in marine fungi-derived compounds for understanding novel marine compound backbones, structural uniqueness and their bioactivities. As important natural peptides, marine-derived antimicrobial peptides are a class of biologically active peptides, which functioned as antimicrobials in marine organisms. Due to their nontoxicity, broad-spectrum antimicrobial activities and the ability to escape drug-resistance mechanisms, antimicrobial peptides are taken as a potential treasure in pharmaceutical and food industries. In recent years, major advances have been achieved in elucidation their amino acid composition and structures by new methods. Prof. Cai from Christian-Albrechts-University of Kiel, Germany will provide an expert review on the structures, biological properties and utilities of marine-derived Antimicrobial Peptides. After investigating marine macrocyclic compounds for many years, Prof. He and coworkers summarize the progress in chemical diversity and bioactivity of marine macrolide compounds. Thanks to the improvement of techniques of sample collecting, it has now been accepted that extreme marine environment like deep sea and hydrothermal vent that hosts a wide diversity of organisms is a rich source of biological active natural products, many of which have not been found in terrestrial sources. These compounds play an important role in the adaptation of marine organism to their environment. Many compounds have been proved to be anti-stress compounds synthesized in response to abiotic and biotic stress. In order to understand the role of stress driven compounds, their unique structures and biological functions, the paper written by our lab reviews the scientific results of structural uniqueness and functions of the natural products from stressful marine environment like deep sea and hydrothermal vent. Marine
Toxins have drawn researcher's attention due to their interesting structures and their involvement in human intoxication impacts brought by those incidents. Elucidation of chemical structures is a major challenge since most marine toxins' structures are of great complexity. The literatures on wide range applications of new techniques for marine toxin elucidation are surveyed and structural aspects of complex marine toxins framework are reviewed by Dr. Liu from Ohio University. Marine-derived terpenoids are one of the important classes of natural compounds, including tetra terpenes, triterpenes, diterpenes, sesquiterpenes, monoterpenes and terpene dimers and trimers, many of which possess unique carbon skeletons. Massive investigations have been carried out on marine terpenoid, and a great number of novel backbones have been identified, which possess of an array of biological activities such as anticancer and anti-inflammation. The progress in chemical diversity and biological activities of marine terpenoid is reviewed by Prof. Wang from Zhejiang Gongshang University. Marine cyclopeptides belong to the peptide family, many of which are heterocyclic and contain considerably modified amino acid building blocks. Marine cyclopeptides have been extensively studied since they possess of remarkable chemical diversity and important pharmacological activities, and thus have been considered as promising candidates for drug developments. Dr. Zhou from University of Massachusetts Amherst reviews the advance of the chemical diversity and potential biomedical application of marine cyclopeptides. Macroalgae that occupy the littoral zone, are a great source of compounds with diverse applications. These compounds are among the most important chemical composition in add-value products and applications. Prof. Cardoso from Instituto Politécnico de Coimbra, Portugal provides an updated review of the chemical composition of macroalgae as well as their potential. In recent years, marine polysaccharides have emerged as an useful polymer in many areas. These marine polysaccharides can participate in many biological processes through interactions with growth factors (crinopexy). The structure of these natural carbohydrates is innovative and quite complex. Marine biopolymers represent key scaffolds toward large challenging fields, such as biomedical applications (glycosaminoglycans, regenerative medicine and drug delivery) and tailored biomaterials. Chemical modifications can be applied to modify their final properties in a specific purpose. New functional glycans are achievable and represent a real potential with their intrinsic biocompatibility and biodegradability. Prof. Collic-Jouault from Laboratory of Biotechnology and Marine Molecules, Ifremer, Rue de l’île d’Yeu, France have dedicated to marine polysaccharides studies, providing an updated review of complex bioactive hydrogels using innovative chemistry on marine natural polymers. Approaches for discovery of bioactive natural compounds from marine actinomycetes comprising methods based on bioactivity, molecular approaches for biosynthetic pathway and production of the active compounds through manipulation of biosynthetic pathway/s will be intensively reviewed by Dr. Vikineswary. While most reviews in this special issue focus on a specific area, Prof. Chen from United States Department of Agriculture looks at the theme topic in a more general view and provides a review concerning chemical diversity of health-benefiting natural products from marine sources.

The aim of this special issue is to bring together the expertise of different research groups and presents new and exciting research in the field of natural product search and discovery from the sea.

**Tentative Submission Deadline:**
Receiving manuscript: September 31, 2013
Receiving comments from reviewers: November 31, 2013
Final decision and submitting to Editor-in-Chief for approval: December 15, 2013