

Bioactive Natural Products and Chemical Biology

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Marine microorganisms such as dinoflagellates, bacteria, and fungi as well as marine invertebrates such as sponges and tunicates have proven to be a good source of compounds with intriguing structures and interesting biological activity. These bioactive marine products are expected to be useful bioprobes in the studies of life sciences as well as promising drug leads in the drug developments.

Some macrolides isolated from marine tunicates and dinoflagellates showed potent cytotoxicity and antitumor activity. The molecular targets of these macrolides were found to be actin and ATPase, respectively. Some inhibitors of enzymes such as DNA polymerases, CDK-4, Ca-ATPase, and so on have been obtained from marine-derived fungi. Several oxylipins obtained from marine sponges exhibited different spectra in inhibition of some DNA polymerases.

Daphniphyllum alkaloids are a family of fused-heterocyclic natural products elaborated by trees of the genus *Daphniphyllum* (Daphniphyllaceae), while *Lycopodium* alkaloids have unique heterocyclic frameworks of C11N, C16N, C16N2, and C27N3 types with varying levels of oxidation from the genus *Lycopodium* (Lycopodiaceae). These ring systems have attracted great interest as challenging targets for total synthesis as well as biosynthetic studies. In our search for structurally unique and biogenetically interesting *Daphniphyllum* and *Lycopodium* alkaloids, a number of novel fused-cyclic alkaloids have been isolated from different species of the two genera. Some alkaloids elevated NGF mRNA expression or inhibited acetylcholinesterase.

In this symposium, the structures, stereochemistry, and bioactivity of the interesting marine products as well as the bioactive plant alkaloids will be described.