UNIVERSITY OF CALIFORNIA, SAN DIEGO

Natural Products Chemistry of Taxonomically Diverse Ascidians From Southern Californian and Caribbean Waters

A thesis submitted in partial satisfaction of the
requirements for the degree Master of Science
in Oceanography (Marine Chemistry)

by

Sarah Ellen E. Richards-Gross

Committee in charge:

Professor William H. Fenical, Chair
Professor D. John Faulkner
Professor Paul F. Dayton
Professor Jay S. Siegel
Professor Joris Gieskes

1993

ABSTRACT OF THE THESIS

Natural Products Chemistry of Taxonomically Diverse Ascidians From Southern Californian and Caribbean Waters

by

Sarah Ellen E. Richards-Gross
Master's of Science in Oceanography
Scripps Institution of Oceanography
University of California, San Diego, 1993
Professor William H. Fenical, Chairman

The presence of secondary metabolites in marine invertebrates, especially those in tropical waters where competition and predation are more intense, has long been recognized. Recently, animals of the class Ascidiacea have proven especially rich chemically, possessing many novel compounds, often with unique antiviral or antitumor activity. Relatively little is known about the natural products chemistry of these animals and even less about the ecological and developmental implications of these metabolites.

Ascidians from the tropical Caribbean waters have been investigated. Several species of colonial ascidians present in the mangrove and reef habitats were assayed for chemically based feeding deterrence. Four novel structures,

the didemneimides A-D, composed of indole, maleimide, and imidazole moieties, have been isolated and identified.

Ascidians from the temperate waters off La Jolla, California were similarly investigated. A broad screening program was undertaken to identify the chemical resources of this area. More than 20 species were collected at a variety of habitats and seasons. Pharmacological activities as well as potential chemical defense mechanisms were tested. The colonial species *Cystodytes lobatus* was found to use chemical mediation to maintain a surface free of fouling organisms.

An extensive review of the chemical literature and the chemical ecology of ascidians through 1992 is included.