

**STRUCTURAL AND SYNTHETIC STUDIES OF
BIOACTIVE NATURAL PRODUCTS**

Shoubin Tang

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Dr. David G. I. Kingston, Chair

Dr. Richard D. Gandour

Dr. Paul R. Carlier

Dr. Felicia A. Etzkorn

Dr. Harry C. Dorn

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By

Shoubin Tang

Dr. David G. I. Kingston, Chairman

Department of Chemistry

Virginia Polytechnic Institute and State University

ABSTRACT

As part of an ongoing investigation for anticancer agents from natural resources, four plant extracts were determined to contain interesting bioactivity. These extracts were separated by chromatography to afford a number of bioactive compounds that were characterized by spectral analysis.

Fractionation of the fruit extract of *Cryptocarya crassifolia* led to the isolation of two known flavonoids and two known cryptocaryalactones. Fractionation of the bark extract of the same plant also gave the same two cryptocaryalactones. All these compounds were weakly active in a cytotoxicity assay.

Two new isoflavones were isolated from the roots of an Egyptian lotus plant, *Lotus polyphyllos*. Both compounds were characterized by UV, NMR, and mass spectroscopic analysis

The methanol extract from the leaves and bark of a *Brexiella* sp. were found to display significant cytotoxic activity versus the A2780 mammalian cell line. Two highly

active cardenolides, glucodigimetholide and xysmalogenin glucoside, were isolated and found to be responsible for the bioactivities. Both compounds were characterized by spectroscopic analysis and comparison to the known literature data.

Two marine extracts were also investigated. The pyridoacridine alkaloids, amphimedine and neoampimedine, were isolated from the marine sponge *Petrosia* sp., and three bromo-tyrosine alkaloids were isolated from the marine sponge *Porphyria flintae*. The structures of these known compounds were all elucidated by comparison to literature data.

Two 6'-amino-glycoglycerolipids had been previously isolated from a marine algae species and shown to inhibit the activity of the enzyme Myt-1 kinase. These compounds and some related compounds were synthesized and their bioactivities against Myt1 kinase were determined.

Two isotopically labeled paclitaxel analogs (^2D , ^{19}F) were prepared in preparation for studies of the tubulin-binding conformation of paclitaxel by REDOR NMR. A new macrocyclic *A-nor*-paclitaxel was also synthesized, and was found to have good cytotoxicity and improved tubulin-binding activity as compared with paclitaxel.