New Bioactive Pregnadiene-Derived Glycosides from the Gulf of California Gorgonian *Muricea cf. austera*

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Abstract

Two new steroidal glycosides, pregna-5,20-diene-3-β-glucopyranoside (2), and pregna-5,20-diene-3-β-(6′-O-acetyl)glucopyranoside (3), and the known trihydroxy sterol, pregna-5-ene-3β,20α,21-triol (1) have been isolated from the Gulf of California gorgonian *Muricea cf. austera*. The structures of the new compounds were established on the basis of chemical and spectral studies. Compound 3, and its peracylated derivative, 4, displayed moderate in vitro cytotoxicity (IC₅₀: 17.3 and 14.3 μg/mL respectively) toward HCT-116 human colon carcinoma. Compound 1 showed growth inhibition of *Staphylococcus aureus* and *Bacillus subtilis* at 250μg/disk, in the agar disk-diffusion assay.

Keywords: antibacterial activity, cytotoxicity, Muricea austere, steroidal glycosides, Pregnadiene-derived, Gulf of California.

Latin binomials of organisms (Family)

*Muricea cf. austera* Verrill (Plexauridae)
*Damiriana hawaiiana* de Laubenfels (Mycalidae)
*Gersemia rubiformis* Pallas (Nephtheidae)
*Muricea fructicosa* Verrill (Plexauridae)
*Pseudoplexaura wagenaari* Stiasny (Plexauridae)
*Pieterfaurea unilobata* Thomson (Nidaliidae)
*Eunicea* sp.
*Muricea* sp.
*Bacillus subtilis*
*Staphylococcus aureus*

Introduction

Marine octocorals of the order Gorgonacea are known to produce a extensive range of biologically active secondary metabolites (Faulkner, 1999). Recently, our research group assayed a number of octocorals from the Gulf of California, belonging to the genus *Muricea*, resulting interesting antibacterial activity (Encarnación-Dimayuga et al., 2000). On that basis, the gorgonian *Muricea cf. austera* Verrill (Plexauridae) was selected for study with the goal the isolation of antibacterial compounds. Species of the genus *Muricea* have been shown to be rich sources of novel steroids (Block, 1974; Benito-Pruna et al., 1983; Popov et al., 1983; Bandurraga & Fenical, 1985), and sesquiterpenoids (Izac et al., 1982; Jeffs & Lytle, 1974). Very recently the isolation of degraded pregnanes from *Muricea* sp. was reported (Ortega et al., 2002). In this paper, we describe the isolation, identification, and biological activity of the previously reported trihydroxy sterol 1 and two new sterol glycosides, 2 and 3.

Materials and methods

General experimental procedures

Optical rotations were measured with an AUTOPOL III polarimeter (Rudolph Research Analytical, Flanders, NJ). Melting points were measured with a MELTEMP II (Laboratory Devices, USA) and are uncorrected. IR spectra were recorded in KBr pellets with a Perkin Elmer Paragon 500 spectrometer. MS data were obtained on an Agilent 1100 LC-MS using electrospray ionization. Proton and carbon NMR