

Isolation and Characterization of Novel Biologically Active Polyacetylenes from the Marine Sponge *Halichondria* sp.

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(*Halichondria* 科海綿の新規生物活性ポリアセチレン類の単離と構造決定)

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INTRODUCTION

Acetylenic natural products are widely distributed occurring in plants, moss and lichens, fungi, marine algae, sponges, tunicates, insects, frogs and, in trace quantities, humans. Polyacetylenes are unstable succumbing either to oxidative, photolytic, or pH-dependent decomposition.¹⁾ Polyacetylenic compounds have been shown to possess diverse pharmacological activities which include antitumor, antiviral, antimicrobial and anti-inflammatory activities.²⁾

RESULTS AND DISCUSSION

Marine sponges (11 species) were collected from the coast of Irimote Island, Okinawa, Japan in December 2009, and primary screening was applied to their Et₂O, *n*-BuOH, *aq.* ext. The Et₂O ext., which prepared from the marine sponge *Halichondria* sp. showed significant anti-proliferative activity against HeLa and K562 cell lines. A bioassay-guided separation gave totally twelve compounds (1-12) while two compounds (4 and 5) were still mixture. Structure elucidation of isolated compounds was carried out using 2D-NMR, ESI-TOFMS and GC-MS or ESI-TOFMS analysis of the degraded products by RuCl₃ oxidation. The absolute stereochemistry of isolated compounds was examined by their Mosher's ester.³⁾ The chemical structures were shown in Figure 1. Compounds 1, 3, 7, 9, 10 and 11 were new and compounds 2, 6, 8 and 12 were known compounds. The anti-proliferative activity of compounds 1-3, 6-8 were evaluated and compounds 2, 3, 6 and 8 showed the significant activity. The IC₅₀ values were presented in the Table 1.

Table 1 IC₅₀ values (μM) of Cmpounds 1-3, 6-8 on the Proliferation of HeLa and K562 Cell Lines

Compounds	1	2	3	6	7	8
HeLa	0.94	0.44	0.45	0.40	4.13	0.36
K562	1.71	0.27	0.28	0.24	1.95	0.16

CONCLUSION

This work has demonstrated the first time isolation of six new polyacetylenic compounds (1, 3, 7, 9, 10 and 11), two of them were obtained as an acid ester derivative (10, 11) from the Et₂O ext. of *Halichondria* sp. All the active compounds consist of a "pent-en-yn-ol" terminus, and this finding was good agreed with the previous report.^{4,5)}

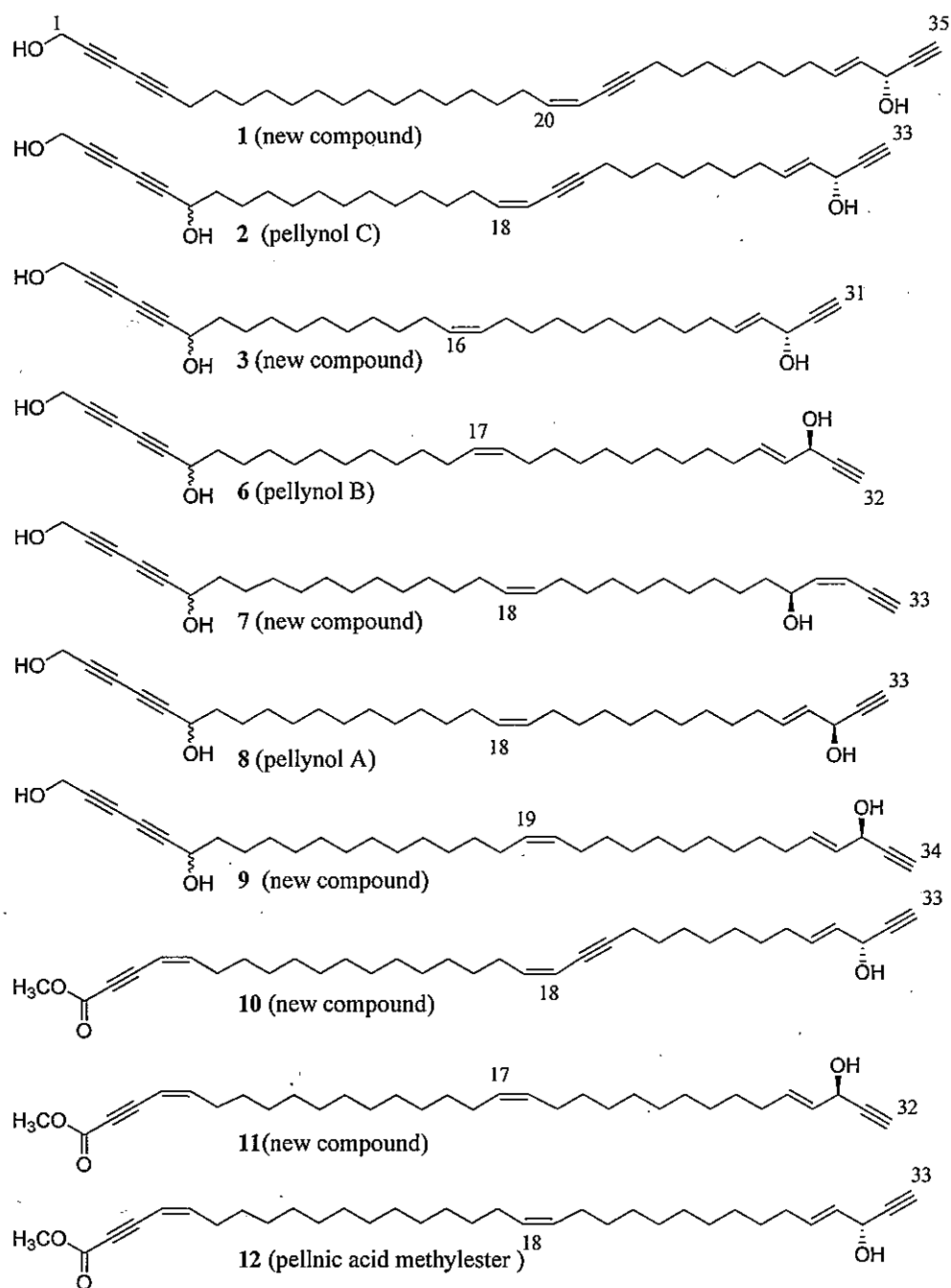


Figure 1 Polyacetylenic Compounds Isolated from the Marine Sponge *Halichondria* sp.

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