Marine Natural Products. XXXVI.[1] Biologically Active Polyacetylenes, Adociacetylenes A, B, C, and D, from an Okinawan Marine Sponge of *Adocia* sp.

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Adociacetylenes A (1), B (2), C (3), and D (4) were isolated as new polyacetylenes from an Okinawan marine sponge of *Adocia* sp. Their chemical structures have been elucidated on the bases of their chemical and physicochemical properties. Adociacetylenes A (1), C (3), and D (4) exhibited inhibitory activity in the *in vitro* endothelial cell-neutrophil leukocyte adhesion assay.

Key words marine sponge; *Adocia* sp.; adociacetylene; polyacetylene; endothelial cell-neutrophil leukocyte adhesion inhibition

In recent years, a number of marine natural products having unprecedented chemical structures and exhibiting various biological activities have been reported.[3,4] They include some polyacetylenes[5] with antimicrobial,[6] cytotoxic,[7] enzyme-inhibitory,[8] and anti-human immunodeficiency virus (HIV) activities.[9]

As a part of our continuing studies in search of new biologically active substances from marine organisms,[1,3] we have been investigating the chemical constituents of an Okinawan marine sponge of *Adocia* sp. by means of bioassay-guided fractionation and separation. So far, we have isolated four new C-30 polyacetylenes named adociacetylenes A (**1**), B (**2**), C (**3**), and D (**4**), together with a known polyacetylene, petrosynol (**5**).[6] In this paper, we present a full account of the isolation and structure elucidation of these polyacetylenes.[10]

The whole of a fresh marine sponge of *Adocia* sp., collected at −10 m in July at Aragusuku Island, Okinawa Prefecture, Japan, was extracted with acetone by soaking, and the solvent was evaporated under reduced pressure to give the acetone extract. The acetone extract was partitioned into an ethyl acetate (AcOEt)–water mixture and the water phase was further partitioned with 1-butanol. Through the guidance of antimicrobial bioassay, the AcOEt-soluble portion was separated repeatedly by silica gel and Sephadex LH-20 column chromatography and finally purified by HPLC to provide adociacetylenes A (**1**, 0.17% from the AcOEt-soluble portion), B (**2**, 0.06%), C (**3**, 0.01%), and D (**4**, 0.49%), and petrosynol (**5**, 3.14%).

Adociacetylene A (**1**) was obtained as an optically active colorless oil. It gave a *quasi*-molecular ion $(M+H)^+$ peak at *m/z* 463 in the fast atom bombardment (FAB)-MS. The IR spectrum of **1** showed absorption bands

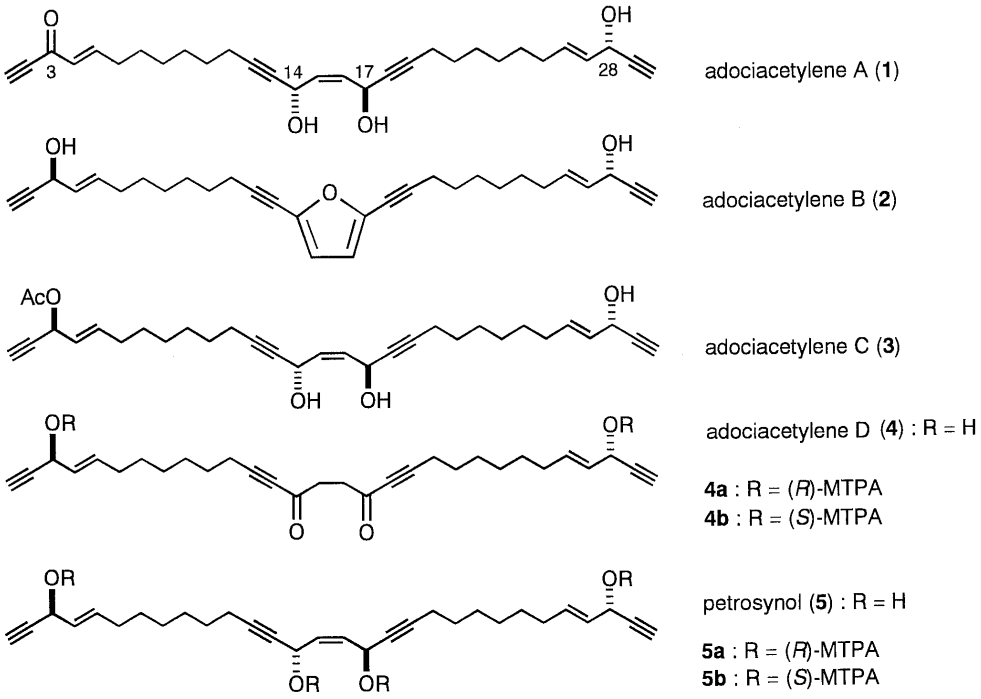

Fig. 1

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assignable to hydroxyl (3380 cm^{-1}), alkyne (3292, 2227, 657 cm^{-1}), and enone (1645, 1620 cm^{-1}) moieties. The ^{1}H-NMR spectrum of **1** was similar as a whole to that of petrosynol (**5**),[6] which was isolated simultaneously as the major constituent from the same sponge. However, in contrast to petrosynol (**5**), which possesses a *C*2 symmetrical structure, adociacetylene A (**1**) showed an additional combination of signals attributable to its terminal stucture, that is, the signals due to the H-1 acetylenic proton and H-4 and H-5 olefinic protons were observed at lower field [δ 3.23 (1H, s), δ 6.19 (1H, d, J=16 Hz), δ 7.24 (1H, dt, J=16, 7 Hz), respectively] (Table 1) as compared with those [δ 2.57 (1H, d, J=1 Hz), δ 5.62 (1H, dd, J=15, 6 Hz), δ 5.90 (1H, dt, J=15, 7 Hz)] observed in **5** (Table 2). Furthermore, the ^{13}C-NMR spectrum of **1** showed a characteristic carbon signal at δ_C 177.9 (s), which indicated the presence of a carbonyl moiety in **1**, together with other signals assignable to carbons in the petrosynol-like structure (Table 3).

Detailed ^{1}H- and ^{13}C-NMR analyses of adociacetylene A (**1**), including homo- and heteronuclear correlation spectroscopies (COSY), led us to presume that adociacetylene A (**1**) is a 3-keto analog of petrosynol (**5**), as shown in Fig. 1.

Table 1. ^{1}H-NMR Data for Adociacetylenes A (**1**) and C (**3**)[a]

Proton at	**1**[b]	**3**[c]
1	3.23 (1H, s)	2.53 (1H, d, 2)
3	—	5.83 (1H, br d, *ca.* 7)
4	6.19 (1H, d, 16)	5.54 (1H, ddt, 15, 7, 1)
5	7.24 (1H, dt, 16, 7)	6.01 (1H, dtd, 15, 7, 1)
6	2.32 (2H, m, 7)	2.08 (2H, m)
7—10	1.37—1.51 (8H, m)	1.31—1.51 (8H, m)
11	2.22 (2H, t, 7)	2.21 (2H, t, 7)
14	5.28 (1H, br s)	5.27 (1H, d, 4.5)
15	5.70 (1H, d, 5)	5.70 (1H, dd, 4.5, 1.5)
16	5.70 (1H, d, 5)	5.70 (1H, dd, 4.5, 1.5)
17	5.28 (1H, br s)	5.27 (1H, d, 4.5)
20	2.22 (2H, t, 7)	2.21 (2H, t, 7)
21—24	1.37—1.51 (8H, m)	1.31—1.51 (8H, m)
25	2.08 (2H, m)	2.08 (2H, m)
26	5.91 (1H, dt, 15.5, 7)	5.91 (1H, dtd, 15.5, 7.5, 1)
27	5.61 (1H, dd, 15.5, 6)	5.62 (1H, ddt, 15.5, 7, 1)
28	4.84 (1H, br d, *ca.* 6)	4.84 (1H, br d, *ca.* 7)
30	2.56 (1H, d, 1)	2.53 (1H, d, 2)
Ac	—	2.10 (3H, s)

a) The δ values in ppm and J values in Hz. *b*) Measured at 270 MHz in $CDCl_3$. *c*) Measured at 500 MHz in $CDCl_3$.

Adociacetylene B (**2**) was also obtained as an optically active colorless oil. It gave a *quasi*-molecular $(M+Na)^+$ ion peak at *m/z* 467 in the FAB-MS, while the IR spectrum of **2** showed the presence of hydroxyl (3390 cm^{-1}), alkyne (3296, 2227, 655 cm^{-1}) and furan (1518, 790 cm^{-1}) moieties in the molecule. The ^{1}H- and ^{13}C-NMR spectra of adociacetylene B (**2**) showed characteristic signal patterns which were reminiscent of the *C*2 symmetrical polyacetylene structure of petrosynol (**5**) (Tables 2, 3). However, **2** lacked the signals assignable to the central *cis*-ene-diol moiety (at C-14—C-17) of **5**. Instead, the olefinic two-proton signal at δ 6.39 and the carbon signals at δ_C 114.5 (2C, d, C-15, C-16) and δ_C 137.2 (2C, s, C-14, C-17) observed for **2** clearly indicated the presence of a 2,5-disubstituted furan moiety at the center of the symmetrical structure of adociacetylene B (**2**), and this was also supported by its MS and IR spectral data given above. Consequently, the relative stereostructure of adociacetylene B has been presumed to be as shown in **2**.

During our NMR studies, it was noticed that petrosynol (**5**) in $CDCl_3$ was gradually converted (presumably *via* air-oxidation) to adociacetylenes A (**1**) and B (**2**) on standing at room temperature for a long time (*ca.* 40 d). This finding suggested that the absolute configurations at the chiral carbons of adociacetylenes A (**1**) and B (**2**) are identical with those of petrosynol (**5**). Initially, the absolute stereostructure of **5** was proposed on the basis of the CD allylic benzoate method.[6] However, since each allylic alcohol moiety in **5** is adjacent to an acetylenic moiety, the influence of the acetylenic moiety could be substantial. In order to clarify the matter and to confirm the absolute stereostructure of **5**, we have applied the modified Mosher's method.[11] A detailed comparison of the chemical shifts in the ^{1}H-NMR spectra of the (*R*)-α-methoxy-α-(trifluoromethyl)-phenylacetyl (MTPA) ester (**5a**) and the (*S*)-MTPA ester (**5b**) has substantiated the 3*S*, 14*S*, 17*S*, and 28*S* configurations in **5**. Consequently, the 14*S*, 17*S*, and 28*S* configurations in adociacetylene A (**1**) and 3*S* and 28*S* configurations in adociacetylene B (**2**) have been confirmed.

Adociacetylene C (**3**) was isolated as a colorless oil with optical activity. The FAB-MS of **3** showed a *quasi*-molecular ion $(M+Na)^+$ peak at *m/z* 529, while the molecular composition of **3** was defined as $C_{32}H_{42}O_5$ by the high-resolution FAB-MS analysis. The IR spectrum of **3** showed absorption bands assignable to an acetoxyl group (1738 cm^{-1}) together with those of hydroxyl (3393

Table 2. ^{1}H-NMR Data for Adociacetylenes B (**2**) and D (**4**) and Petrosynol (**5**)[a]

Proton at	**2**[b]	**4**[c]	**5**[c]
1	2.56 (1H, d, 2)	2.57 (1H, d, 2)	2.57 (1H, d, 1)
3	4.84 (1H, br d, *ca.* 6)	4.85 (1H, br d, *ca.* 6)	4.83 (1H, dd, 6, 1)
4	5.61 (1H, dd, 15, 6)	5.59 (1H, ddt, 15, 6, 1)	5.62 (1H, dd, 15, 6)
5	5.92 (1H, dt, 15, 7)	5.90 (1H, dtd, 15, 7, 1)	5.90 (1H, dt, 15, 7)
6	2.08 (2H, m)	2.06 (2H, m)	2.08 (2H, m)
7—10	1.41—1.57 (8H, m)	1.34—1.55 (8H, m)	1.30—1.51 (8H, m)
11	2.41 (2H, t, 7)	2.36 (2H, t, 7)	2,21 (2H, dt, 2, 7)
14	—	—	5.27 (1H, ddt, 4.5, 1.5, 2)
15	6.39 (1H, s)	2.89 (2H, ABq, 17)	5.69 (1H, dd, 4.5, 1.5)

a) The δ values in ppm and J values in Hz. *b*) Measured at 270 MHz in $CDCl_3$. *c*) Measured at 500 MHz in $CDCl_3$.

cm^{-1}) and alkyne (3288, 2224, 652 cm^{-1}) moieties.

The ^{1}H-NMR spectrum of adociacetylene C (**3**) suggested an unsymmetrical polyacetylene structure for **3** from its signal patterns and showed the presence of one acetoxyl group [δ 2.10 (3H, s)]. From a detailed ^{1}H- and ^{13}C-NMR spectral analysis of **3** (Tables 1, 3), it was found that most of the proton and carbon signals of **3** were similar to those of petrosynol (**5**), except for the oxymethine proton at C-3, observed at δ 5.83 (1H, br d, J=*ca.* 7 Hz), which was shifted almost 1 ppm downfield as compared with the H-3 methine signal of **5**. This finding has led us to presume that adociacetylene C (**3**) is a 3-*O*-acetyl analog of petrosynol (**5**). This presumption was also supported by two dimensional (2D)-NMR experiments, including the ^{1}H-detected multiple-bond heteronuclear multiple quantum coherence (HMBC) analysis. In order to verify this presumption, adociacetylene C (**3**) was treated with lithium hydroxide in aqueous tetrahydrofuran to provide petrosynol (**5**) in a quantitative yield. Consequently, the absolute stereostructure of adociacetylene C (**3**) has been determined as shown.

Table 3. ^{13}C-NMR Data for Adociacetylenes A (**1**), B (**2**), C (**3**), and D (**4**) and Petrosynol (**5**)[a]

Carbon no.	**1**[b]	**2**[b]	**3**[c]	**4**[c]	**5**[c]
1	79.0 (d)	73.9 (d)	74.8 (d)	74.0 (d)	73.7 (d)
2	79.6 (s)	83.3 (s)	79.7 (s)	83.4 (s)	83.3 (s)
3	177.9 (s)	62.8 (d)	64.1 (d)	62.8 (d)	62.7 (d)
4	132.1 (d)	128.5 (d)	124.4 (d)	128.7 (d)	128.4 (d)
5	155.7 (d)	134.5 (d)	137.0 (d)	134.1 (d)	133.5 (d)
6	32.5 (t)	31.8 (t)	31.8 (t)	31.8 (t)	31.7 (t)
7	27.6 (t)[d]	28.2 (t)[d]	28.3 (t)[d]	27.5 (t)[d]	28.0 (t)[d]
8	28.2 (t)[d]	28.6 (t)[d]	28.3 (t)[d]	28.4 (t)[d]	28.2 (t)[d]
9	28.3 (t)[d]	28.6 (t)[d]	28.4 (t)[d]	28.5 (t)[d]	28.2 (t)[d]
10	28.4 (t)[d]	28.6 (t)[d]	28.4 (t)[d]	28.6 (t)[d]	28.3 (t)[d]
11	18.7 (t)	19.4 (t)	18.7 (t)	18.9 (t)	18.4 (t)
12	86.5 (s)	95.0 (s)	86.5 (s)	95.1 (s)	85.9 (s)
13	79.8 (s)	70.9 (s)	79.8 (s)	80.6 (s)	79.6 (s)
14	58.6 (d)	137.2 (s)	58.6 (d)	185.4 (s)	57.9 (d)
15	132.0 (d)	114.5 (d)	132.1 (d)	38.9 (t)	131.5 (d)
16	132.0 (d)		132.1 (d)		
17	58.6 (d)		58.6 (d)		
18	79.7 (s)		79.7 (s)		
19	86.3 (s)		86.5 (s)		
20	18.7 (t)		18.7 (t)		
21	28.5 (t)[d]		28.5 (t)[d]		
22	28.5 (t)[d]		28.5 (t)[d]		
23	28.7 (t)[d]		28.5 (t)[d]		
24	28.9 (t)[d]		28.5 (t)[d]		
25	31.7 (t)		31.7 (t)		
26	134.3 (d)		134.3 (d)		
27	128.6 (d)		128.6 (d)		
28	62.8 (d)		62.8 (d)		
29	83.3 (s)		83.3 (s)		
30	74.0 (d)		74.0 (d)		
Ac			169.8 (s)		
			21.8 (q)		

a) The δ_C values in ppm. *b*) Measured at 67.8 MHz in $CDCl_3$. *c*) Measured at 125 MHz in $CDCl_3$. *d*) The assignment in each column may be interchangeable.

Adociacetylene D (**4**) gave a *quasi*-molecular ion $(M+Na)^+$ peak at *m/z* 485 in the FAB-MS, and the high-resolution FAB-MS defined the molecular formula as $C_{30}H_{38}O_4$. The ^{1}H-NMR spectrum of **4** showed signal patterns suggesting a symmetrical polyacetylene structure. In a comparison of the ^{1}H- and ^{13}C-NMR spectra of **4** with those of petrosynol (**5**) (Tables 2, 3), it was found that the *cis*-15,16-ene-14,17-diol structure in **5** [signals at δ 5.69 (2H, dd, J=4.5, 1.5 Hz), δ_C 131.5 (2C, d), and signals at δ 5.27 (2H, ddt, J=4.5, 1.5, 2 Hz), δ_C 57.9 (2C, d)] were replaced with a 1,4-diketone group [signals at δ_C 185.4 (2C, s) and two methylene signals at δ 2.89 (4H, ABq, J=17 Hz), δ_C 38.9 (2C, t)] in **4**.

In the HMBC experiment on adociacetylene D (**4**), ^{1}H–^{13}C correlations were observed as depicted in Fig. 2: i) between methylene protons at C-15 and carbons at

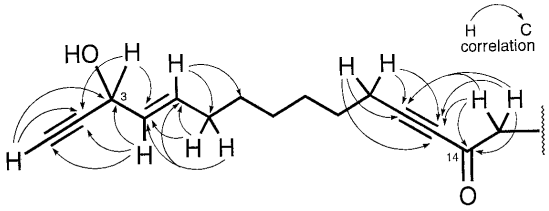

Fig. 2. HMBC Experiment on Adociacetylene D (**4**)

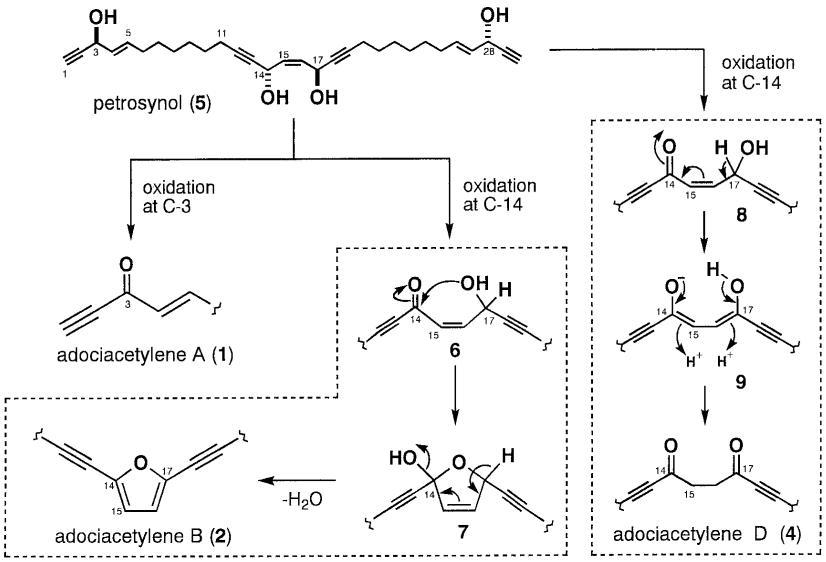

Fig. 3. Putative Metabolic Pathways for Adociacetylenes A (**1**), B (**2**), and D (**4**) from Petrosynol (**5**)

C-14, C-13 (δ_C 80.6), and C-12 (δ_C 95.1), ii) between oxymethine proton at C-3 (δ 4.85) and carbons at C-2 (δ_C 83.4) and C-4 (δ_C 128.7), and iii) between several other protons and carbons as shown. Finally, in order to determine the absolute stereostructure of **4**, the modified Mosher's method[11] was applied to the (*R*)-MTPA ester (**4a**) and the (*S*)-MTPA ester (**4b**), and the 3*S*, 28*S* configurations of **4** were confirmed.[12]

Comparison of the chemical structures of the newly isolated adociacetylenes A (**1**), B (**2**), and D (**4**) with that of petrosynol (**5**), has led us to propose the metabolic pathways shown in Fig. 3. Thus, a partial oxidation of petrosynol (**5**) at the 3-hydroxyl group yielded adociacetylene A (**1**), while adociacetylene B (**2**) was presumably produced by a partial oxidation of the 14-hydroxyl group in **5** followed by dehydrative cyclization through a hemiacetal intermediate **7**. Furthermore, the conversion of petrosynol (**5**) into adociacetylene D (**4**) may be rationalized in terms of a partial oxidation of the 14-hydroxyl group in **5**, followed by isomerization as depicted.

Petrosynol (**5**)[6] and adociacetylene A (**1**) showed weak antibiotic activity [10 and 11 mm diameter growth inhibitions for *E. coli* and *B. subtilis* at 50 μg/disk (i.d.= 8 mm)]. Adociacetylene A (**1**) showed moderate cytotoxicity against KB cells (IC_{50} 0.8 μg/ml). Furthermore, it was found that adociacetylenes A (**1**),[13] C (**3**), and D (**4**) inhibited neutrophil leukocyte adhesion to tumor necrosis factor-α (5 JRU/ml)-stimulated endothelial cells at 1 μg/ml concentration.

Experimental

The instruments used to obtain physical data and the experimental conditions for chromatography were the same as described in our previous paper.[1]

Isolation of Adociacetylenes The frozen marine sponge of *Adocia* sp. (92 AR-3) (12 kg), which was collected at Aragusuku Island, Okinawa Prefecture, Japan in July 1992, was steeped in acetone, and the filtrate was concentrated under reduced pressure below 30 °C to give an extract, which was partitioned into an AcOEt–water mixture. The AcOEt-soluble portion was evaporated under reduced pressure to give the AcOEt extract (120 g). The water phase was further partitioned with 1-butanol to give the 1-butanol-soluble portion (16 g).

The AcOEt extract (30 g) was subjected to silica gel column chromatography (SiO_2 350 g, *n*-hexane : CH_2Cl_2 : MeOH = 8 : 5 : 3 → MeOH) to furnish fr. A (2.03 g), fr. B (2.51 g), fr. C (7.62 g), fr. D (1.16 g), fr. E (3.24 g), and fr. F (2.91 g). Fraction E (3.20 g) was further subjected to column chromatography (SiO_2 115 g, *n*-hexane : AcOEt = 1 : 1) and subsequently to HPLC (Capcell Pak ODS C_{18} SG 120 250 mm × 10 mm i.d., CH_3CN : H_2O = 60 : 40) to isolate adociacetylene A (**1**, 52 mg, 0.17% from the AcOEt-soluble portion), adociacetylene B (**2**, 18 mg, 0.06%), and petrosynol (**5**, 950 mg, 3.14%). Fraction C (7.60 g) was then chromatographed over silica gel (SiO_2 300 g, *n*-hexane : AcOEt = 1 : 1) and Sephadex LH-20 (MeOH) columns, and subsequently purified by HPLC (Capcell Pak ODS C_{18} SG 120, CH_3CN : H_2O = 60 : 40) to give adociacetylene C (**3**, 4 mg, 0.01%) and adociacetylene D (**4**, 148 mg, 0.49%).

Adociacetylene A (**1**): A colorless oil, $[\alpha]_D$ +110° (c = 0.33, $CHCl_3$, 22 °C). IR ν_{max}^{KBr} cm^{-1}: 3380, 3292, 2932, 2227, 2098, 1645, 1620, 1238, 1006, 657. UV λ_{max}^{MeOH} nm (ε): 242 (30900). ^{1}H-NMR: as given in Table 1. ^{13}C-NMR: as given in Table 3. FAB-MS *m/z*: 463 $(M+H)^+$. High-resolution FAB-MS *m/z*: Calcd for $C_{30}H_{39}O_4$ $(M+H)^+$: 463.2882. Found: 463.2849.

Adociacetylene B (**2**): A colorless oil, $[\alpha]_D$ +21.7° (c = 0.38, $CHCl_3$, 22 °C). IR ν_{max}^{KBr} cm^{-1}: 3390, 3296, 2930, 2227, 1518, 1010, 790, 655. UV λ_{max}^{MeOH} nm (ε): 293 (26300), 285 (25800), 279 (27900), 275 (27100). ^{1}H-NMR: as given in Table 2. ^{13}C-NMR: as given in Table 3. FAB-MS *m/z*: 467 $(M+Na)^+$. High-resolution FAB-MS *m/z*: Calcd for $C_{30}H_{36}NaO_3$ $(M+Na)^+$: 467.2562. Found: 467.2567.

Adociacetylene C (**3**): A colorless oil, $[\alpha]_D$ +90° (c = 0.53, $CHCl_3$, 20 °C). IR ν_{max}^{KBr} cm^{-1}: 3393, 3288, 2930, 2224, 1738, 1234, 1014, 652. ^{1}H-NMR: as given in Table 1. ^{13}C-NMR: as given in Table 3. FAB-MS *m/z*: 529 $(M+Na)^+$. High-resolution FAB-MS *m/z*: Calcd for $C_{32}H_{42}NaO_5$ $(M+Na)^+$: 529.2930. Found: 529.2924.

Adociacetylene D (**4**): A slightly yellowish oil, $[\alpha]_D$ +18.1° (c = 0.99, $CHCl_3$, 22 °C). IR ν_{max}^{KBr} cm^{-1}: 3399, 3294, 2930, 2212, 1672, 1153, 1010, 657. UV λ_{max}^{EtOH} nm (ε): 225 sh (21500), 221 (22400). ^{1}H-NMR: as given in Table 2. ^{13}C-NMR: as given in Table 3. FAB-MS *m/z*: 485 $(M+Na)^+$. High-resolution FAB-MS *m/z*: Calcd for $C_{30}H_{38}NaO_4$ $(M+Na)^+$: 485.2668. Found: 485.2682.

Petrosynol (**5**): A slightly yellowish oil, $[\alpha]_D$ +111° (c = 1.29, $CHCl_3$, 22 °C). IR ν_{max}^{KBr} cm^{-1}: 3400, 3290, 2930, 2227, 1271, 1006, 655. ^{1}H-NMR: as given in Table 2. ^{13}C-NMR: as given in Table 3. FAB-MS *m/z*: 487 $(M+Na)^+$.

Preparation of the (*R*)-MTPA Ester of 5 A solution of **5** (7 mg) in dry CH_2Cl_2 (1 ml) was treated with *R*-(+)-α-methoxy-α-(trifluoromethyl)phenylacetic acid (16 mg), 1,3-dicyclohexylcarbodiimide (17 mg), and 4-dimethylaminopyridine (2 mg), and the mixture was stirred at room temperature for 5 h. The reaction mixture was poured into ice-water and the whole was extracted with AcOEt. Work-up of the AcOEt extract in a usual manner gave a product. Purification of the product by column chromatography (SiO_2 10 g, *n*-hexane : AcOEt = 4 : 1) afforded the (*R*)-MTPA ester **5a** (21 mg).

5a: A colorless oil, FAB-MS *m/z*: 1335 $(M+Li)^+$. High-resolution FAB-MS *m/z*: Calcd for $C_{70}H_{68}F_{12}LiO_{12}$ $(M+Li)^+$: 1335.4679. Found: 1335.4647. ^{1}H-NMR (270 MHz, $CDCl_3$) δ: 2.53 (1H, d, J = 2 Hz, H-1), 5.94 (1H, m, H-3), 5.56 (1H, dd, J = 15, 6 Hz, H-4), 5.92 (1H, m, H-5), 1.96 (2H, m, H-6), 2.09 (2H, t, J = 6 Hz, H-11), 6.43 (1H, dd, J = 6, 2 Hz, H-14), 5.60 (2H, dd, J = 6, 2 Hz, H-15).

Preparation of the (*S*)-MTPA Ester of 5 The (*S*)-MTPA ester **5b** (22 mg) was prepared from **5** (8 mg) and *S*-(−)-α-methoxy-α-(trifluoromethyl)phenylacetic acid through the same procedure as described for the preparation of **5a**.

5b: A colorless oil, FAB-MS *m/z*: 1335 $(M+Li)^+$. High-resolution FAB-MS *m/z*: Calcd for $C_{70}H_{68}F_{12}LiO_{12}$ $(M+Li)^+$: 1335.4679. Found: 1335.4706. ^{1}H-NMR (270 MHz, $CDCl_3$) δ: 2.55 (1H, d, J = 2 Hz, H-1), 5.95 (1H, m, H-3), 5.50 (1H, dd, J = 15, 7 Hz, H-4), 5.88 (1H, m, H-5), 1.93 (2H, m, H-6), 2.13 (2H, t, J = 7 Hz, H-11), 6.46 (1H, dd, J = 6, 2 Hz, H-14), 5.56 (2H, dd, J = 6, 2 Hz, H-15).

Preparation of the (*R*)- and (*S*)-MTPA Esters of 4 The (*R*)-MTPA ester **4a** (1 mg) and (*S*)-MTPA ester **4b** (1 mg) were prepared from **4** (1 mg each) through the same procedure as described for the preparation of **5a** and **5b**.

4a: A colorless oil, FAB-MS *m/z*: 917 $(M+Na)^+$. High-resolution FAB-MS *m/z*: Calcd for $C_{50}H_{52}F_6NaO_8$: 917.3464. Found: 917.3475. ^{1}H-NMR (270 MHz, $CDCl_3$) δ: 2.59 (1H, d, J = 2 Hz, H-1), 7.53 (1H, m, H-3), 5.61 (1H, dd, J = 15, 7 Hz, H-4), 6.04 (1H, dt, J = 15, 6 Hz, H-5), 2.07 (2H, m, H-6), 2.35 (2H, t, J = 7 Hz, H-11), 2.88 (2H, s, H-15).

4b: A colorless oil, FAB-MS *m/z*: 917 $(M+Na)^+$. High-resolution FAB-MS *m/z*: Calcd for $C_{50}H_{52}F_6NaO_8$: 917.3464. Found: 917.3458. ^{1}H-NMR (270 MHz, $CDCl_3$) δ: 2.64 (1H, d, J = 1 Hz, H-1), 7.52 (1H, m, H-3), 5.50 (1H, dd, J = 15, 7 Hz, H-4), 6.00 (1H, dt, J = 15, 7 Hz, H-5), 2.06 (2H, m, H-6), 2.35 (2H, t, J = 7 Hz, H-11), 2.88 (2H, s, H-15).

Alkaline Hydrolysis of Adociacetylene C (3), Giving 5 A solution of **3** (4 mg) in tetrahydrofuran–water (1 : 1, 1 ml) was treated with 1 N aqueous LiOH (0.1 ml) and the whole was stirred at room temperature for 2 h. The reaction mixture was neutralized with Dowex 50W × 8 (H^+ form), and after removal of the resin by filtration, the whole was extracted with AcOEt. Work-up of the AcOEt extract in a usual manner followed by evaporation of the solvent under reduced pressure furnished **5** (3 mg) (identified by ^{1}H-NMR, MS, and $[\alpha]_D$ comparisons).

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References and Notes

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