

SUPPORTING INFORMATION

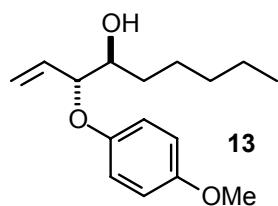
Total Synthesis of Aspercyclide C

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General: All reactions were carried out under Ar in flame-dried glassware. The solvents used were purified by distillation over the drying agents indicated and were transferred under Ar: THF, Et₂O (Mg-anthracene), CH₂Cl₂ (P₄O₁₀), hexane, toluene (Na/K). IR: Nicolet FT-7199 spectrometer, wavenumbers ($\tilde{\nu}$) in cm⁻¹. MS (EI): Finnigan MAT 8200 (70 eV), ESI-MS: Finnigan MAT 95, accurate mass determinations: Bruker APEX III FT-MS (7 T magnet). Melting points: Gallenkamp melting point apparatus (uncorrected). Elemental analyses: H. Kolbe, Mülheim/Ruhr. All commercially available compounds (Fluka, Lancaster, Aldrich) were used as received. NMR: Spectra were recorded on a Bruker AV 400 spectrometer in the solvents indicated; chemical shifts (δ) are given in ppm relative to TMS, coupling constants (*J*) in Hz. The solvent signals were used as references and the chemical shifts converted to the TMS scale (CDCl₃: $\delta_{\text{C}} \equiv 77.0$ ppm; residual CHCl₃ in CDCl₃: $\delta_{\text{H}} \equiv 7.24$ ppm).

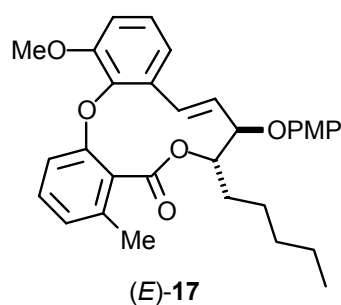


(3R,4S)-3-(4-Methoxyphenoxy)-1-nonen-4-ol (13). *sec*-BuLi (1.71 mL, 2.22 mmol, 1.3 M in cyclohexane) was added dropwise to a solution of 1-(allyloxy)-4-methoxybenzene **12** (365 mg, 2.22 mmol) in THF (12 mL) –78 °C and the resulting mixture was stirred for 40 min. The cold solution was then added via canula to a suspension of CpTiCl(S,S-taddol) (S,S-**14**, 1.57 g, 2.56 mmol) in Et₂O (5 mL) at –78 °C and stirring was continued for 3 h at this temperature. A solution of hexanal (171 mg, 0.21 mL, 1.71 mmol) in Et₂O (5 mL) was then added dropwise and the resulting mixture was stirred for 4 h at –78 °C. The reaction mixture was quenched with aq. sat. NH₄F (10 mL) and stirred for 16 h at ambient temperature, the aqueous phase was repeatedly extracted with *tert*-butyl methyl ether, the combined organic layers were washed with brine and dried over MgSO₄. Evaporation of the solvent followed by purification of the residue by flash chromatography using a *Combiflash*[®] system (hexanes/*tert*-butyl methyl ether gradient) gave product **13** as a yellow oil (*anti:syn* > 95:5, 313 mg, 69 %). $[\alpha]_{\text{D}}^{20} = -9.1^{\circ}$ (c 1, CHCl₃); ee = 92 % (HPLC); ¹H NMR (400 MHz, CDCl₃): δ 6.88–6.79 (m, 4 H), 5.88 (ddd, *J* = 17.4, 10.6, 6.8 Hz, 1 H), 5.34 (d, *J* = 9.6 Hz, 1 H), 5.32 (d, *J* = 17.3 Hz, 1 H), 4.45–4.43 (m, 1 H), 3.86–3.82 (m, 1 H), 3.76 (s, 3 H), 1.59–1.29 (m, 8 H), 0.90 (t, *J* = 6.8 Hz, 3 H); ¹³C NMR (100 MHz, CDCl₃): δ 154.3, 151.9, 134.1, 119.5, 117.6, 117.6, 114.6, 114.6, 83.6, 73.3, 55.7, 32.2, 31.8, 25.5, 22.6, 14.0; IR

(film): $\tilde{\nu}$ = 3438, 3063, 2953, 2932, 1643, 1591, 1507, 1227, 1039, 994, 928, 824 cm^{-1} ; MS (EI) m/z (rel. intensity): 264 ($[\text{M}^+]$, 7), 164 (11), 124 (100), 109 (12); HR-MS (EI) *calcd.*: 287.1623 ($[\text{M}+\text{Na}]^+$), *found*: 287.1618; elemental analysis *calcd.* for $\text{C}_{16}\text{H}_{24}\text{O}_3$: C 72.69, H 9.15, *found*: C 72.60, H 9.16.

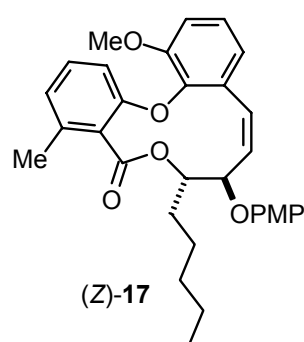
(7S,8R)-14-Methoxy-8-(4-methoxyphenoxy)-4-methyl-7-pentyl-7,8-dihydro-5H-dibenzo[b,j][1,5]dioxacycloundecin-5-one (17).

A solution of diene **15** (152.0 mg, 0.286 mmol) in toluene (2 mL) was added to a solution of the ruthenium complex **16** (24 mg, 0.03 mmol) in toluene (50 mL) and the resulting mixture was refluxed for 2 h. After that time, the same amount of catalyst (24 mg, 0.03 mmol), dissolved in the minimum amount of toluene (ca. 0.5 mL), was introduced via syringe and reflux was continued for another 2 h. For work up, the solvent was evaporated and the residue was purified by flash chromatography to give product **17** as a mixture of isomers (99.3 mg, 69%, *E:Z* = 5:1). (*E*)-**17** (> 95% pure, 65.1 mg, 45 %) could be obtained by subjecting this mixture to flash chromatography using a *Combiflash*[®] system (hexanes/*tert*-butyl methyl ether gradient), whereas preparative HPLC was required to obtain the corresponding (*Z*)-isomer (*Z*)-**17** (18.0 mg, 13 %) in analytically pure form.



(*E*)-**17**: white solid, mp 48-49 °C; $[\alpha]_{\text{D}}^{20}$ = +75.8° (c 1, CHCl_3); ^1H NMR (400 MHz, CDCl_3): δ 7.13-7.07 (m, 2 H), 6.93-6.80 (m, 6 H), 6.71 (d, J = 8.4 Hz, 1 H), 6.61 (d, J = 8.4 Hz, 1 H), 6.35 (d, J = 16.1 Hz, 1 H), 5.94 (dd, J = 16.1 Hz, J = 9.6 Hz, 1 H), 5.48 (dt, J = 9.3 Hz, J = 2.1 Hz, 1 H), 4.41 (m, 1 H), 3.89 (s, 3 H), 3.76 (s, 3 H), 2.38 (s, 3 H), 2.12-1.19 (m, 8 H), 0.92 (t, J = 7.1 Hz, 3 H); ^{13}C NMR (100 MHz, CDCl_3): δ 167.5, 154.3, 154.0, 153.6, 152.1, 143.0, 135.9, 134.7, 133.5, 129.8, 129.5, 128.5, 126.5, 125.4,

123.8, 121.5, 117.9, 117.9, 114.5, 114.5, 111.7, 83.6, 75.3, 56.0, 55.7, 32.1, 31.6, 25.3, 22.5, 19.3, 14.0; IR (film): $\tilde{\nu}$ = 3067, 2955, 2930, 2858, 1739, 1584, 1506, 1459, 1225, 1072, 956, 825, 779, 762 cm^{-1} ; MS (EI) m/z (rel. intensity): 502 ($[\text{M}^+]$, 5), 402 (1), 379 (23), 241 (100), 225 (13), 139 (45); HR-MS (EI) ($\text{C}_{31}\text{H}_{34}\text{O}_6$) *calcd.*: 525.2253, *found*: 525.2248 ($[\text{M}+\text{Na}]^+$); elemental analysis *calcd.* for $\text{C}_{31}\text{H}_{34}\text{O}_6$: C 74.08, H 6.82; *found*: C 73.89, H 6.74.



(*Z*)-**17**: colorless oil, $[\alpha]_{\text{D}}^{20}$ = -77.0° (c 1.1, CHCl_3); ^1H NMR (400 MHz, CDCl_3): δ 7.20-7.15 (m, 2 H), 6.97 (d, J = 8.1 Hz, 1 H), 6.92 (d, J = 7.5 Hz, 1 H), 6.75 (d, J = 8.3 Hz, 1 H), 6.70-6.66 (m, 3 H), 6.62-6.60 (m, 2 H), 6.42 (d, J = 11.8 Hz, 1 H), 5.67 (dd, J = 11.7 Hz, J = 9.8 Hz, 1 H), 5.23 (t, J = 7.4 Hz, 1 H), 4.83 (t, J = 8.5 Hz, 1 H), 3.88 (s, 3 H), 3.73 (s, 3 H), 2.46 (s, 3 H), 1.99-1.28 (m, 8 H), 0.87 (t, J = 6.9 Hz, 3 H); ^{13}C NMR (100 MHz, CDCl_3): δ 168.1, 156.4, 154.1, 153.1, 151.6, 142.7, 139.7, 132.9, 131.3, 131.0, 129.1, 125.4, 125.4, 123.8, 122.0, 117.1, 117.1, 116.4, 114.4,

114.4, 112.1, 77.8, 77.2, 55.9, 55.7, 31.6, 30.4, 25.2, 22.6, 20.3, 14.0; IR (film): $\tilde{\nu}$ = 3066, 2955, 2929, 2858, 1717, 1597, 1506, 1465, 1274, 1227, 1077, 826, 791, 762, 712 cm^{-1} ; MS (EI) m/z (rel. intensity): 502 ($[\text{M}^+]$, 7), 379 (32), 241 (100), 225 (23), 139 (63); HR-MS (EI) ($\text{C}_{31}\text{H}_{34}\text{O}_6$) *calcd.*: 525.2253, *found*: 525.2248 ($[\text{M}+\text{Na}]^+$).

