

HPLC conditions for compounds 8a-k: λ_{\max} = 254 nm; reverse phase ODR column, Daicel Chemical Industries. Solvent systems: acetonitrile: water (3:17, System A; 1:4, System B; 1:3, System C; 3:7, System D and 2:3, System E) and 0.1% TFA at a flow rate of 0.4 ml/ min.

Compound 8a:

Antibody 84G3 (12.5 mg/ml, 27.2 ml, 0.34 g; 0.00227 mmol) was added to a degassed solution of the compound (\pm)-**8a** (16.8 g; 75 mmol) in PBS buffer (1.55 l, pH 7.4) and CH₃CN (40 ml), and the mixture was incubated under argon atmosphere at 37 °C for 5 days. At more than 98% consumption of one enantiomer as judged by HPLC analysis, the mixture was filtered using amicon to recover the antibody. The filtrate was passed through a reverse phase column (C-18) to elute first water and then the compounds were isolated using methanol as eluants. The solvents were removed and the residue was purified over silica gel (hexane-ethyl acetate, 9:1 – 4:1) to afford compounds **8a** (7.6 g, 45%) and the aldehyde **9a** (5.29 g, 42%).

Retention time (R_t) of **8a**, 13.87 min and *ent*-**8a**, 15.28 min (solvent system A).

Physical data of **8a**: $[\alpha]_D -34.3^\circ$ ($c= 1.62$, CHCl₃); ¹H NMR (600 MHz): δ 6.89 (s, 1H), 6.55 (s, 1H), 4.58 (dd, $J = 9.3, 2.2$ Hz, 1H), 3.72 (br s, 1H), 2.72 (dd, $J = 16.7, 9.4$ Hz, 1H), 2.66 (s, 3H), 2.64 (dd, $J = 16.7, 3.0$ Hz, 1H), 2.18 (s, 3H), 1.98 (s, 3H); ¹³C NMR (150.9 MHz): δ 208.9, 164.7, 152.5, 140.5, 118.6, 115.7, 72.6, 48.7, 30.9, 19.0, 14.7; MS (FAB): 226 (MH⁺), 248 (MNa⁺).

Compound 8b:

R_t of **8b**, 27.07 min and *ent*-**8b**, 30.72 min (solvent system A).

Physical data of **8b**: ¹H NMR (400 MHz, CDCl₃): δ 6.90 (s, 1H), 6.56 (s, 1H), 4.59 (dd, $J = 8.6, 3.5$ Hz, 1H), 3.42 (br, 1H), 2.67 (s, 3H), 2.67 (m, 2H), 2.47 (q, $J = 7.3$ Hz, 2H), 2.00 (s, 3H), 1.04 (t, $J = 7.3$ Hz, 3H); ¹³C NMR (100.6 MHz, CDCl₃): δ 211.6, 164.8, 152.6, 140.7, 118.6, 115.7, 72.8, 47.5, 37.0, 19.1, 14.7, 7.5; MS: 240 (MH⁺), 262 (MNa⁺).

Compound 8c:

R_t of **8c**, 15.48 min and *ent-8c*, 17.18 min (solvent system D).

Physical data of **8c**: ^1H NMR (400 MHz, CDCl_3): δ 6.91 (s, 1H), 6.55 (s, 1H), 4.58 (dd, $J = 7.8, 4.4$ Hz, 1H), 3.20 (br, 1H), 2.67 (s, 3H), 2.67 (m, 2H), 2.42 (t, $J = 7.3$ Hz, 2H), 2.01 (s, 3H), 1.59 (m, 2H), 0.89 (t, $J = 7.4$ Hz, 3H); ^{13}C NMR (100.6 MHz, CDCl_3): δ 211.6, 164.7, 152.6, 140.4, 118.7, 115.8, 72.8, 47.7, 45.7, 19.1, 17.0, 14.8, 13.7; MS: 254 (MH^+), 276 (MNa^+).

Compound 8d:

R_t of **8d**, 15.87 min and *ent-8d*, 17.34 min (solvent system E).

Physical data of **8d**: ^1H NMR (400 MHz, CDCl_3): δ 6.90 (s, 1H), 6.55 (s, 1H), 4.58 (m, 1H), 3.40 (s, 1H), 2.67 (s, 3H), 2.67 (m, 2H), 2.44 (t, $J = 7.3$ Hz, 2H), 2.00 (s, 3H), 1.53 (m, 2H), 1.28 (m, 2H), 0.87 (t, $J = 7.3$ Hz, 3H); ^{13}C NMR (100.6 MHz, CDCl_3): δ 211.6, 164.6, 152.7, 140.3, 118.7, 115.8, 72.8, 47.7, 43.5, 25.6, 22.2, 19.1, 14.7, 13.8; MS: 268 (MH^+), 290 (MNa^+).

Compound 8e:

R_t of **8e**, 23.86 min and *ent-8e*, 26.56 min (solvent system E).

Physical data of **8e**: ^1H NMR (400 MHz, CDCl_3): δ 6.88 (s, 1H), 6.54 (s, 1H), 4.57 (d, $J = 8.9$ Hz, 1H), 3.71 (d, $J = 2.8$ Hz, 1H), 2.65 (s, 3H), 2.65 (m, 2H), 2.44 (t, $J = 7.6$ Hz, 2H), 1.98 (s, 3H), 1.54 (m, 2H), 1.24 (m, 4H), 0.83 (t, $J = 7.2$ Hz, 3H); ^{13}C NMR (100.6 MHz, CDCl_3): δ 211.4, 164.7, 152.6, 140.6, 118.6, 115.7, 72.8, 47.8, 43.8, 31.3, 23.2, 22.4, 19.1, 14.8, 13.9; MS: 282 (MH^+), 304 (MNa^+).

Compound 8f:

R_t of **8f**, 20.12 min and *ent-8f*, 22.51 min (solvent system D).

Physical data of **8f**: ^1H NMR (600 MHz, CDCl_3): δ 6.91 (s, 1H), 6.56 (s, 1H), 5.77 (m, 1H), 4.98 (m, 2H), 4.60 (d, $J = 8.5$ Hz, 1H), 3.42 (br s, 1H), 2.68 (s, 3H), 2.68 (m, 2H), 2.56 (t, $J = 7.1$ Hz, 2H), 2.31 (m, 2H), 2.01 (s, 3H); ^{13}C NMR (150.9 MHz, CDCl_3): δ 211.6, 165.6, 153.5, 141.3, 137.7, 119.6, 117.1, 116.3, 73.7, 48.8, 43.7, 28.3, 20.0, 15.6; MS: 266 (MH^+), 288 (MNa^+).

Compound 8g:

Compound (\pm)-**8g** (1.45 g, 6.0 mmol) in acetonitrile (4 ml) was incubated with the antibody 84G3 (12.5 mg/ml, 3.6 ml, 45 mg, 0.0003 mmol) in PBS (pH 7.4, 90 ml) buffer under argon atmosphere for 96 h at 37 °C. At more than 98% consumption of one enantiomer as judged by HPLC analysis, the mixture was filtered using amicon to recover the antibody. The filtrate was passed through a reverse phase column (C-18) to elute first water and then the compounds were isolated using methanol as eluants. Solvents were evaporated and the residue was purified over silica gel to afford compounds **8g** (0.69 g, 48%, >98% ee) and **9g** (0.44 g, 40%).

R_t of **8g**, 12.56 min and *ent*-**8g**, 14.38 min (solvent system B).

Physical data of **8g**: $[\alpha]_D -26.7^\circ$ ($c=0.9$, CHCl_3); $^1\text{H NMR}$ (500 MHz, CDCl_3): δ 7.07(s, 1H), 6.58 (s, 1H), 4.92 (s, 2H), 4.60 (m, 1H), 3.32 (br, 1H), 3.01 (br, 1H), 2.73 (m, 2H), 2.22 (s, 3H), 2.03 (s, 3H); $^{13}\text{C NMR}$ (125.75 MHz, CDCl_3): δ 209.2, 170.0, 152.8, 140.8, 118.5, 116.4, 72.6, 62.0, 48.6, 30.9, 14.8; MS: 264 (MNa^+).

Compound 8h:

R_t of **8h**, 19.68 min and *ent*-**8h**, 21.11 min (solvent system A).

Physical data of **8h**: $^1\text{H NMR}$ (600 MHz, CDCl_3): δ 6.93 (s, 1H), 6.60 (s, 1H), 4.93 (dd, $J = 25.2, 16.4$ Hz, 1H), 4.83 (dd, $J = 25.2, 16.4$ Hz, 1H), 4.63 (dd, $J = 9.4, 2.1$ Hz, 1H), 3.86 (br s, 1H), 2.81 (m, 1H), 2.68 (m, 1H), 2.66 (s, 3H), 1.99 (s, 3H); $^{13}\text{C NMR}$ (150.9 MHz, CDCl_3): δ 206.0 (d), 165.1, 152.3, 140.6, 118.8, 115.9, 85.3 (d), 72.3, 43.9, 19.0, 14.7.

Compound 8i:

R_t of **8i**, 35.15 min and *ent*-**8i**, 36.14 min (solvent system C).

Physical data of **8i**: $^1\text{H NMR}$ (400 MHz, CDCl_3): δ 6.46 (s, 1H), 6.34 (s, 1H), 4.57 (t, $J = 5.8$ Hz, 1H), 4.06 (s, 3H), 3.01 (br s, 1H), 2.71 (d, $J = 1.0$ Hz, 1H), 2.70 (s, 1H), 2.20 (s, 3H), 2.07 (d, $J = 1.1$ Hz, 3H); $^{13}\text{C NMR}$ (100.6 MHz, CDCl_3): δ 209.2, 173.8, 147.3, 139.4, 118.8, 109.3, 72.9, 58.3, 48.6, 30.9, 14.5; MS: 264 (MNa^+).

Compound 8j:

R_f of **8j**, 21.43 min and *ent*-**8j**, 20.66 min (solvent system D).

Physical data of **8j**: $[\alpha]_D = -35.2^\circ$ ($c = 2.05$, CHCl_3); $^1\text{H NMR}$ (400 MHz, CDCl_3): δ 6.93 (s, 1H), 6.50 (s, 1H), 4.58 (m, 1H), 3.14 (d, $J = 3.0$ Hz, 1H), 2.70 (d, $J = 6.1$ Hz, 2H), 2.67 (s, 3H), 2.20 (s, 3H), 2.06 (d, $J = 1.2$ Hz, 3H); $^{13}\text{C NMR}$ (100.6 MHz, CDCl_3): δ 209.2, 165.1, 153.3, 140.3, 118.1, 115.8, 72.8, 48.6, 30.9, 16.6, 14.8; MS: 258 (MH^+), 280 (MNa^+).

Compound 8k:

Antibody 84G3 (12.5 mg/ml, 1.6 ml, 0.02 g, 0.000133 mmol) was added to a degassed solution of the compound (\pm)-**8k** (5 g, 18.5 mmol) in PBS buffer (450 ml, pH 7.4) and CH_3CN (40 ml), and the mixture was incubated under argon atmosphere for 3 days at 37 $^\circ\text{C}$. An additional amount of (\pm)-**8k** (3.4 g, 12.5 mmol) in a degassed mixture of PBS buffer (300 ml, pH 7.4) and CH_3CN (10 ml) was added and the mixture was incubated under argon atmosphere for another 7 days at the same temperature. At more than 98% consumption of one enantiomer as judged by HPLC analysis, the mixture was first centrifuged. The residue was kept aside and the filtrate was passed through a reverse phase column (C-18) to elute first water and then the compounds were isolated using methanol as eluants. The solvents were removed and the combined residue was purified over silica gel (hexane-ethyl acetate, 9:1 – 4:1) to afford compounds **8k** (4.1 g, 49%) and the aldehyde **9k** (2.7 g, 41%).

R_f of **8k**, 33.20 min and *ent*-**8k**, 31.02 min (solvent system E).

Physical data of **8k**: $[\alpha]_D = -35.6^\circ$ ($c = 0.92$, CHCl_3); $^1\text{H NMR}$ (400 MHz, CDCl_3): δ 6.94 (s, 1H), 6.51 (s, 1H), 4.60 (t, $J = 6.2$ Hz, 1H), 3.15 (br, 1H), 2.68 (s, 3H), 2.68 (m, 2H), 2.48 (q, $J = 7.3$ Hz, 2H), 2.07 (s, 3H), 1.07 (t, $J = 7.3$ Hz, 3H); $^{13}\text{C NMR}$ (100.6 MHz, CDCl_3): δ 212.0, 165.1, 153.3, 140.4, 118.1, 115.8, 72.9, 47.3, 37.0, 16.6, 14.8, 7.5; MS: 272 (MH^+), 294 (MNa^+).

Compound 15:

$[\alpha]_D = -31.2^\circ$ ($c = 2.5$, CHCl_3); $^1\text{H NMR}$ (400 MHz, CDCl_3): δ 7.04 (s, 1H), 6.47 (s, 1H), 5.74 (m, 2H), 5.28 (t, $J = 6.7$ Hz, 1H), 5.08 (d, $J = 17.1$ Hz, 1H), 5.02 (d, $J = 10.2$ Hz, 1H), 4.97 (d, $J = 17.2$ Hz, 1H), 4.94 (s, 2H), 4.92 (d, $J = 10.3$ Hz, 1H), 4.33 (m, 1H), 3.72 (dd, $J = 7.0, 2.2$ Hz, 1H), 3.14 (m, 1H), 2.48 (m, 3H), 2.27 (dd, $J = 17.0, 6.1$ Hz, 1H), 2.05 (s, 3H), 1.98 (m, 2H), 1.50-1.10 (m, 5H), 1.22 (s, 3H), 1.02 (s, 3H), 1.02 (d, $J = 6.8$ Hz, 3H), 0.94 (s, 9H), 0.88 (s, 9H), 0.88 (d, $J = 6.8$ Hz, 3H), 0.86 (s, 9H), 0.11 (s, 6H), 0.09 (s, 3H), 0.04 (s, 3H), 0.02 (s, 6H); $^{13}\text{C NMR}$ (100.6 MHz): δ 217.7, 172.2, 171.1, 152.8, 138.9, 136.7, 133.4, 121.2, 117.8, 116.5, 114.4, 78.7, 77.6, 74.0, 63.2, 53.3, 45.2, 40.3, 38.8, 37.5, 34.3, 30.4, 27.0, 26.2, 26.0, 25.8, 23.2, 20.3, 18.5, 18.2, 17.6, 15.4, 14.5, -3.7, -3.8, -4.3, -4.7, -5.5; HRMS: ($\text{C}_{46}\text{H}_{85}\text{NO}_6\text{SSi}_3\text{Cs} = 996.4460$) found 996.4494 (MCs^+).