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# Supporting Information



69451 Weinheim, Germany

# Straightforward access to chiral protected *syn* α-amino-β-hydroxy-acid derivatives

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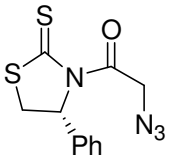
## Experimental Section

### General information:

$^1$H RMN (300 MHz) and $^{13}$C RMN (75 MHz) spectra were recorded on a Bruker DPX 300 instrument. Chemical shifts (δ) for $^1$H and $^{13}$C RMN are recorded in $CDCl_3$ as the solvent and quoted in ppm using $CHCl_3$ as reference. Elemental analyses were obtained on a Carlo-Erba 1106 analysor and Mass Spectra on a HP5890 (electronic impact 70eV) using GC-MS coupling with a Jeol AX 500.

### 2-Azido-1-[(4*R*)-phenyl-2-thioxo-thiazolidin-3-yl]-ethanone (1)



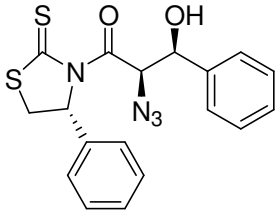

$^1$H NMR (300MHz, $CDCl_3$) δ 7.38 (m, 5H), 6.26 (d, *J*=7.9 Hz, 1H), 4.94 (d, *J*=18.3 Hz, 1H), 4.73 (d, *J*=18.3 Hz, 1H), 4.05 (dd, *J*=11.3 and 8.2 Hz, 1H), 3.17 (dd, *J*=11.3 and 1.0 Hz, 1H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 202.0, 168.8, 138.4, 129.2, 128.8, 125.4, 69.5, 55.3, 37.6. IR (ν $cm^{-1}$) 2105, 1685, 1355, 1315, 1235, 1175, 1050, 870, 700. $[\alpha]^{24}_D$ -334 (1.0, $CHCl_3$). Anal. calculated for $C_{11}H_{10}N_4OS_2$: C, 47,46; H, 3,62; N, 20,13; S, 23,04; Found: C, 47.82; H, 3.86; N, 19.81; S, 22.92. HRMS (ESI): calculated for $C_{11}H_{10}N_4OS_2Na$ $(M+Na)^+$ 301.0194 found 301.0204.

**Typical procedure for aldolisation followed by transesterification with methanol.**

To a solution of **1** (1 mmol) in $CH_2Cl_2$ (10 ml) at -78°C was introduced $TiCl_4$ (1.05 eq.) and the mixture stirred for 15 minutes before adding $iPrNEt_2$ (1.1 eq.) and stir for 1 hour at this temperature. NMP (2 eq.) is then added and the mixture stirred for 15 minutes before adding the aldehyde **3** (1.5 eq.). The mixture is allowed to slowly warm to -20°C (2-3 hours) before being hydrolysed at this temperature by concentrated $NH_4Cl$ (5 ml) and diluted with cold $Et_2O$. The layers were separated and the aqueous layer extracted twice with cold $Et_2O$. The combined organic layers were rapidly washed with aqueous solutions of 1N HCl, water and brine before being dried over $MgSO_4$, filtered and concentrated. The crude can be purified by flash-chromatography or best directly used in the next step.

Crude aldol was disolved in 10 ml of MeOH before adding 3-10 eq. of imidazole and stirred for 3 hours before hydrolysis with water and extraction with $CH_2Cl_2$. To simplify flash-chromatography purification, the de-acylated chiral auxiliary can be precipitated in cyclohexane (the desired methyl ester and the excess of aldehyde remaining in the cyclohexane layer).

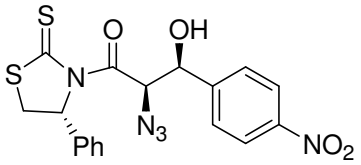
**(2*R*, 3*S*)-2-azido-3-hydroxy-3-phenyl-1-[(4*R*)-4-phenyl-2-thioxo-thiazolidin-3-yl]-propan-1-one (4b)**




$^1$H NMR (300MHz, $CDCl_3$) δ 7.44-7.35 (m, 10H), 6.26 (d, *J*=6.1 Hz, 1H), 5.61 (d, *J*=7.6 Hz, 1H), 5.15 (d, *J*=6.2 Hz, 1H), 3.34 (dd, *J*=11.1 and 7.7 Hz, 1H), 2.94 (d, *J*=11.0 Hz, 1H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 202.9, 169.8, 138.7, 137.8, 129.0, 128.8, 128.7, 128.6, 126.4, 125.1, 75.5, 70.3, 66.9, 37.6. IR (ν $cm^{-1}$) 3380, 2115, 1700, 1295, 1170, 1050, 700.

$[\alpha]^{24}_D$ -193 (1.0, $CHCl_3$). MS (ESI): 407 $(M+Na)^+$, 385 $(MH)^+$.

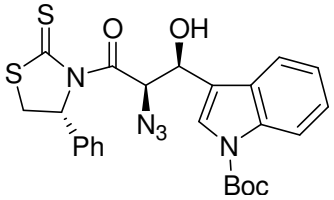
**(2*R*,3*S*)-2-azido-3-hydroxy-3-(4-nitro-phenyl)-1-[(4*R*)-4-phenyl-2-thioxo-thiazolidin-3-yl]-propan-1-one (4c)**



$^1$H NMR (300MHz, $CDCl_3$) δ 8.26 (d, *J*=8.8 Hz, 2H), 7.65 (d, *J*=8.7 Hz, 2H), 7.38 (m, 5H), 6.22 (d, *J*=3.7 Hz, 1H), 6.06 (dd, *J*=7.8 and 2.2 Hz, 1H), 5.50 (d, *J*=3.1 Hz, 1H), 3.81 (dd, *J*=11.4 and 7.9 Hz, 1H), 3.18 (dd, *J*=11.3 and 2.3 Hz, 1H), 2.94 (brs, 1H, OH). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 203.0, 169.3, 147.9, 146.2, 137.7, 129.2, 129.0, 127.1, 125.3, 123.8, 73.6, 70.8, 66.5, 37.4. IR (ν $cm^{-1}$) 3430, 2115, 1705, 1520, 1350, 1300, 1165, 1050, 700.

$[\alpha]^{24}_D$ -158 (1.0, $CHCl_3$). HRMS (ESI): calculated for $C_{18}H_{15}N_5O_4S_2Na$ $(M+Na)^+$ 452.0463 found 452.0479.

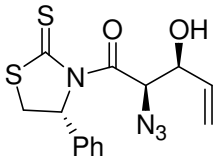
**(2*R*,3*S*)-3-[2-Azido-1-hydroxy-3-oxo-3-[(4*R*)-4-phenyl-2-thioxo-thiazolidin-3-yl]-propyl]-indole-1-carboxylic acid *tert*-butyl ester (4d)**




$^1$H NMR (300MHz, $CDCl_3$) δ 8.21 (d, *J*=8.2 Hz, 1H), 7.73 (s, 1H), 7.65 (d, *J*=7.8 Hz, 1H), 7.35 (m, 5H), 7.21 (d, *J*=7.9 Hz , 2H), 6.48 (d, *J*=6.5 Hz, 1H), 5.49 (d, *J*=7.3, 1H), 5.41 (d, *J*=6.4 Hz, 1H), 2.92 (dd, *J*=11.4 and 7.4 Hz, 1H), 2.81 (d, *J*=11.1 Hz, 1H), 2.70 (brs, 1H), 1.69 (s, 9H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 202.8, 169.5, 149.3, 137.9, 135.3, 129.0, 128.6, 127.8, 125.1, 124.9, 123.2, 119.4, 118.1, 115.3, 84.4, 70.3, 69.3, 65.8, 37.1, 28.1. IR (ν $cm^{-1}$) 3453, 2980, 2925, 2115, 1735, 1450, 1370, 1310, 1255, 1155, 1090, 1050, 750.

$[\alpha]^{24}_D$ -195 (1.0, $CHCl_3$). HRMS (ESI): calculated for $C_{25}H_{25}N_5O_4S_2Na$ $(M+Na)^+$ 546.1246 found 546.1237.

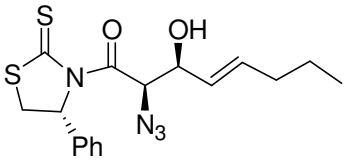
**(2*R*, 3*S*)-2-Azido-3-hydroxy-1-[(4*R*)-4-phenyl-2-thioxo-thiazolidin-3-yl]-pent-4-en-1-one (4e)**




$^1$H NMR (300MHz, $CDCl_3$) δ 7.37 (m, 5H), 6.13 (dd, *J*=7.9 and 1.5 Hz, 1H), 6.09 (d, *J*=3.6 Hz, 1H), 5.97 (ddd, *J*=17.0, 10.4 and 5.5 Hz), 5.45 (d, *J*=17.1Hz, 1H), 5.35 (d, *J*=10.6 Hz, 1H), 4.80 (brs, 1H), 3.98 (dd, *J*=11.3 and 7.9 Hz, 1H), 3.16 (dd, *J*=11.3 and 1.5 Hz, 1H), 2.23 (brs, 1H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 203.1, 169.3, 138.2, 135.8, 129.0, 128.5, 125.2, 117.8, 73.4, 70.7, 65.7, 37.5. IR (ν $cm^{-1}$) 3410, 2115, 1700, 1300, 1170, 1050, 755, 700.

$[\alpha]^{24}_D$ -224 (1, $CHCl_3$). MS (ESI): 357 $(M+Na)^+$. HRMS (ESI): calculated for $C_{14}H_{14}N_4O_2S_2Na$ $(M+Na)^+$ 357.0456 found 357.0448.

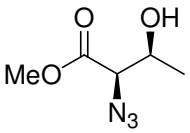
**(2*R*, 3*S*)-2-Azido-3-hydroxy-1-(4-phenyl-2-thioxo-thiazolidin-3-yl)-oct-4-en-1-one (4f)**




$^1$H NMR (300MHz, $CDCl_3$) δ 7.35 (m, 5H), 6.11 (d, *J*=6.9 Hz, 1H), 6.04 (d, *J*=3.7 Hz, 1H), 5.84 (dt, *J*= 155 and 6.7 Hz, 1H), 5.59 (ddt, *J*= 15.5, 6.5 and 1.3 Hz, 1H), 4.75 (dd, *J*= 5.8 and 3.6 Hz, 1H), 3.98 (dd, *J*= 11.3 and 7.8 Hz, 1H), 3.10 (dd, *J*= 11.1 and 1.5 Hz, 1H), 2.07 (q, *J*= 6.6 Hz, 2H), 1.42 (m, 2H), 0.91 (t, *J*= 7.4 Hz, 3H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 202.9, 169.5, 138.3, 135.2, 129.0, 128.6, 127.5, 125.2, 73.6, 70.7, 66.2, 37.5, 34.2, 22.0, 13.6. IR (ν $cm^{-1}$) 3400, 2925, 2110, 1650, 1455, 1170, 1045.

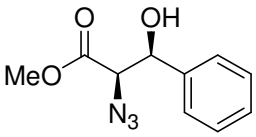
$[\alpha]^{24}_D$ -204 (1.0, $CHCl_3$). HRMS (ESI): calculated for $C_{17}H_{20}N_4O_2S_2Na$ $(M+Na)^+$ 399.0926 found 399.0936.

**(*2R*, 3*S*)-2-azido-3-hydroxy-butyric acid methyl ester (5a)**




$^1$H NMR (300MHz, $CDCl_3$) δ 4.22 (brs, 1H), 3.81 (s, 3H), 2.54 (brs, 1H), 1.28 (d, *J*=6.4 Hz, 3H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 169.5, 68.2, 67.1, 52.7, 19.8. IR (ν $cm^{-1}$) 3400, 2115, 1745, 1440, 1280, 1210. $[\alpha]^{24}_D$ +79 (1.0, $CHCl_3$). HRMS (ESI): calculated for $C_5H_9N_3O_3Na$ $(M+Na)^+$ 182.0542 found 182.0537.

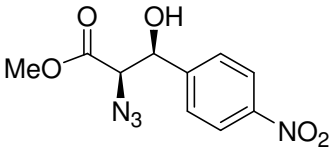
**(2*R*,3*S*)-2-azido-3-hydroxy-3-phenyl-propionic acid methyl ester (5b)**




$^1$H NMR (300MHz, $CDCl_3$) δ 7.39 (m, 5H), 5.22 (brs, 1H), 4.06 (d, *J*=4.4 Hz, 1H), 3.78 (s, 3H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 169.0, 139.1, 128.6, 126.1, 74.4, 67.6, 52.9. IR (ν $cm^{-1}$)

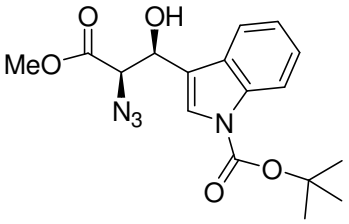
2120, 1745, 1455, 1435, 1350, 1280, 1210, 1180; 1015, 715. $[\alpha]^{24}_{D}$ +131 (1.0, $CHCl_3$). Anal. calculated for $C_{10}H_{11}N_3O_3$: C, 54.29; H, 5.01; N, 19.00; Found: C, 54.24; H, 5.14; N, 18.98. MS (ESI): 244 $(M+Na)^+$. Enantiomeric purity (>99%) was checked by chiral HPLC (see chromatogram at the end of the document).

**(*2R,3S*)-2-Azido-3-hydroxy-3-(4-nitro-phenyl)-propionic acid methyl ester (5c)**



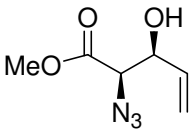

$^1$H NMR (300MHz, $CDCl_3$) δ 8.25 (d, *J*=8.8 Hz, 2H), 7.60 (d, *J*=8.4 Hz, 2H), 5.35 (brs, 1H), 4.09 (d, *J*=3.7 Hz, 1H), 3.84 (s, 3H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 168.7, 147.7, 146.5, 127.1, 123.7, 73.4, 66.9, 53.2. IR (ν $cm^{-1}$) 3435, 2120, 1745, 1520, 1350, 1210. $[\alpha]^{24}_{D}$ +134 (1.0, $CHCl_3$). Anal. calculated for $C_{10}H_{10}N_4O_5$: C, 45.12; H, 3.79; N, 21.05; Found: C, 45.58; H, 4.10; N, 20.70. MS (-ESI): 265 (M-H), 237 (M-H-$N_2$).

**(*2R, 3S*)-3-(2-Azido-1-hydroxy-2-methoxycarbonyl-ethyl)-indole-1-carboxylic acid *tert*-butyl ester (5d)**



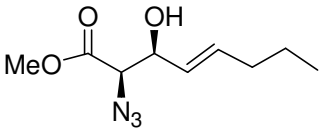

$^1$H NMR (300MHz, $CDCl_3$) δ 8.17 (d, *J*=8.1 Hz, 1H), 7.71 (s, 1H), 7.59 (d, *J*=7.7 Hz, 1H), 7.35 (dd, *J*=7.9 and 7.4 Hz, 1H), 7.26 (dd, *J*=7.7 and 7.3 Hz, 1H), 5.52 (d, *J*=3.8 Hz, 1H), 4.27 (d, *J*=3.8 Hz, 1H), 3.81 (s, 3H), 3.26 (brs, 1H), 1.70 (s, 9H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 169.0, 149.4, 135.3, 127.8, 124.6, 123.7, 122.7, 119.2, 118.9, 115.3, 84.0, 68.5, 66.0, 52.8, 28.0. IR (ν $cm^{-1}$) 3475, 2115, 1735; 1455, 1370, 1260, 1155, 1095, 750. $[\alpha]^{24}_{D}$ +72 (1.0, $CHCl_3$). HRMS (ESI): calculated for $C_{17}H_{20}N_4O_5Na$ $(M+Na)^+$ 383.1332 found 383.1327.

**(2*R*, 3*S*)-2-Azido-3-hydroxy-pent-4-enoic acid methyl ester (5e)**



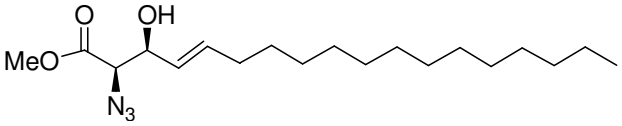
$^{1}$H NMR (300MHz, $CDCl_3$) δ 5.93 (ddd, *J*=17.2, 10.5 and 5.8 Hz, 1H), 5.43 (dt, *J*=17.3 and 1.2 Hz, 1H), 5.32 (dt, *J*=10.5 and 1.1 Hz, 1H), 4.60 (brs, 1H), 3.95 (d, *J*=1.2, 1H), 3.84 (s, 3H), 2.39 (brs, 1H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 169.0, 135.6, 118.0, 73.18, 65.99, 52.88. IR (ν $cm^{-1}$) 3400, 2115, 1745, 1440, 1275, 1210, 1015. $[\alpha]^{24}_{D}$ +32 (1.0, $CHCl_3$). HRMS (ESI): calculated for $C_6H_9N_3O_3Na$ $(M+Na)^+$ 194.0542 found 194.0535.

**(2*R*, 3*S*)-2-Azido-3-hydroxy-oct-4-enoic acid methyl ester (5f)**



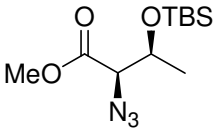

$^{1}$H NMR (300MHz, $CDCl_3$) δ 5.81 (dt, *J*=15.5 and 8.8 Hz, 1H), 5.54 (ddt, *J*=15.5, 7.0 and 1.3 Hz, 1H), 4.53 (dd, *J*=6.6 and 4.3 Hz, 1H), 4.01 (d, *J*=4.2 Hz, 1H), 3.81 (s, 3H), 2.26 (brs, 1H), 2.03 (q, *J*=7.3 Hz, 2H), 1.39 (hex, *J*=7.4 Hz, 2H), 0.89 (t, *J*=7.3 Hz, 3H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 169.1, 135.6, 127.4, 73.37, 66.5, 52.8, 34.2, 22.0, 13.6. IR (ν $cm^{-1}$) 3430, 2960, 2875, 2115, 1745, 1440, 1275, 1210, 1015, 970. $[\alpha]^{24}_{D}$ -16.6 (1.5, $CHCl_3$). HRMS (ESI): calculated for $C_9H_{15}N_3O_3Na$ $(M+Na)^+$ 236.1011 found 236.1009.

**(2*R*, 3*S*)-2-Azido-3-hydroxy-octadec-4-enoic acid methyl ester (5g)**



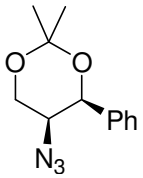

$^{1}$H NMR (300MHz, $CDCl_3$) δ 5.83 (dt, *J*=15.4 and 6.7 Hz, 1H), 5.55 (ddt, *J*= 15.4, 6.9 and 1.4 Hz, 1H), 4.53 (m, 1H), 3.88 (d, *J*=4.1 Hz, 1H), 3.82 (s, 3H), 2.13 (d, *J*=5.8 Hz, 1H, OH), 2.06 (q, *J*=6.9 Hz, 2H), 1.26 (brs, 22H), 0.88 (t, *J*=7.0 Hz, 3H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 169.1, 135.9, 127.1, 73.4, 66.5, 52.8, 32.2, 31.9, 29.7, 29.6, 29.5, 29.4, 29.1, 28.9, 22.7. IR (ν $cm^{-1}$) 3430, 2925, 2855, 2115, 1750, 1465, 1440, 1275, 1205, 1020. $[\alpha]^{24}_{D}$ +23 (1.0, $CHCl_3$). HRMS (ESI): calculated for $C_{19}H_{35}N_3O_3Na$ $(M+Na)^+$ 376.2576 found 376.2560.

**(*2R*, 3*S*)-2-azido-3-*tert*-butyldimethylsilyloxy-butyric acid methyl ester (6a)**



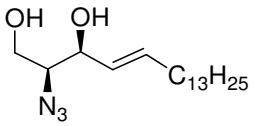
$^1$H NMR (300MHz, $CDCl_3$) δ 4.46 (qd, *J*=6.3 and 2.8 Hz, 1H), 3.79 (s, 3H), 3.38 (d, *J*=2.7 Hz, 1H), 1.31 (d, *J*=6.3 Hz, 3H), 0.86 (s, 9H), 0.07 (s, 3H), 0.02 (s, 3H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 169.9, 70.6, 67.0, 52.5, 25.4, 21.1, 17.8.-4.4, -5.4. IR (ν $cm^{-1}$) 2955, 2930, 2860, 2115, 1755, 1470, 1460, 1380, 1320, 1260, 1200, 1180, 1135, 1110, 1065, 990, 940, 840, 780. $[\alpha]^{24}_D$ -39 (1, $CHCl_3$), litt. enant.: $[\alpha]^{24}_D$ +41 (0.53, $CHCl_3$).[1] HRMS (ESI): calculated for $C_{11}H_{23}N_3O_3SiNa$ $(M+Na)^+$ 296.1407 found 296.1392.

**(*4S,5S*)-5-Azido-2,2-dimethyl-4-phenyl-[1,3]dioxane (7b)**




$^1$H NMR (300MHz, $CDCl_3$) δ 7.42-7.40 (m, 5H), 5.22 (brs, 1H), 4.41 (dd, *J*=12.4 and 2.0 Hz, 1H), 4.20 (dd, *J*=12.5 and 1.7 Hz, 1H), 3.02 (brs, 1H), 1.60 (s, 3H), 1.59 (s, 3H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ.138.5, 128.4, 127.9, 125.6, 99.8, 73.5, 64.5, 57.3, 28.6, 18.4. IR (ν $cm^{-1}$) 2290, 2870, 2115, 1450, 1386, 1365, 1300, 1235, 1200, 1160, 1100, 1075, 1025, 960, 875, 835, 745, 700, 635, 560, 530. $[\alpha]^{24}_D$ +241 (1, $CHCl_3$). Anal. calculated for $C_{12}H_{15}N_3O_2$: C, 61.71; H, 6.48; N, 18.01; Found: C, 61.83; H, 6.56; N, 17.84. HRMS (ESI): calculated for $C_{12}H_{15}N_3O_2Na$ $(M+Na)^+$ 206.1062 found 256.1056.

**(2*S*, 3*S*)- 2-Azido-octadec-4-ene-1,3-diol (10g)**



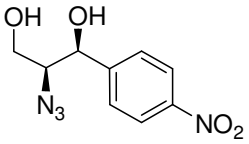

To a solution of crude **4g** (prepared from 0.4 mmol of hexadec-2-en-1-al) in $CH_2Cl_2$ (10 ml) at 0°C was added 2,6-lutidine (0.13 ml) followed by TMSOTf (0.11 ml) and the reaction mixture allowed to warm to room temperature. After 1 hour, the solution was hydrolysed by water. The layers were separated and the aqueous one washed with $CH_2Cl_2$. The combined organic layers were dried, filtered and concentrated. The crude material was purified by flash-chromatography (pet. ether/EtOAc 85/15) to give the silylated aldol with 80% yield (0.2 g) based on hexadec-2-en-1-al.

To a solution of the silylated derivative (0.12g, 0.2 mmol) in $Et_2O$ (5ml) was added MeOH (0.01 ml). The solution was cooled to 0°C before adding $LiBH_4$ (0.006g) and the reaction allowed to warm to room temperature. After 3 hours, the reaction was hydrolysed with water

and extracted twice with EtOAc. The combined organic extract were dried, filtered and concentrated before purification by column chromatography (pet. ether/EtOAc 90/10) to give 0.062 g (78%) of the alcohol. Alcohol was poured in THF (5ml) before adding TBAF (1M in THF, 0.17 ml) and the solution was stirred for 30 minutes before being hydrolysed by saturated $NaHCO_3$ and extracted with $Et_2O$ (3 times). The combined organic layers were dried, filtered and concentrated before purification by flash-chromatography (pet. ether/EtOAc 80/20) to give 0.046 g (92%) of azido-sphingosin **10g**.

$^1$H NMR (300MHz, $CDCl_3$) δ 5.79 (dt, *J*=15.1 and 6.7 Hz, 1H), 5.51 (dd, *J*=15.4 and 7.2 Hz, 1H), 4.21 (t, *J*=6.02 Hz, 1H), 3.82 (dd, *J*=11.5 and 4.1 Hz, 1H), 3.70 (dd, *J*=11.4 and 6.3 Hz, 1H), 3.47 (m, 1H), 2.19 (brs, 2H), 2.06 (q, *J*=6.7 Hz, 2H), 1.25 (brs, 22H), 0.88 (t, *J*=6.4 Hz, 3H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 135.6, 128.2, 73.6, 67.6, 62.9, 32.3, 31.9, 29.6, 29.4, 29.3, 29.2, 28.9, 22.7, 14.1. IR (ν $cm^{-1}$) 390, 2920, 2850, 2105, 1650, 1470, 1270, 1050, 970, 760. $[\alpha]^{24}_D$ +4.3 (0.53, $CHCl_3$), litt: $[\alpha]^{24}_D$ +3.1 (0.53, $CHCl_3$).[3] HRMS (ESI): calculated for $C_{18}H_{35}N_3O_2Na$ $(M+Na)^+$ 348.2627 found 348.2616.

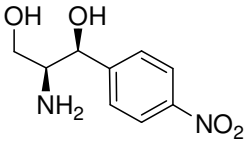
**(2*S*, 3*S*)-2-Azido-1-(4-nitro-phenyl)-propane-1,3-diol (11c)**




To the crude **4c** (prepared from 1 mmol of **1**) in 20 ml THF at -78°C was added DIBAL-H (1M in toluene, 4 ml). The disappearance of the starting material was followed by TLC (cyclohexane/EtOAc 7/3). Once all the starting material has been consumed, the reaction was hydrolysed by saturated $NH_4Cl$ then diluted by adding 1M HCl and 30 ml of $CH_2Cl_2$. The layers were separated and the remaining organic one washed with 1M HCl before drying over $MgSO_4$, filtration and concentration. The crude material was purified by flash-chromatography (cyclohexane/EtOAc 6/4) to give 0.179g (75%) of diol **12c**.

$^1$H NMR (300MHz, $CD_3OD$) δ 8.21 (d, *J*=8.8 Hz, 2H), 7.65 (d, *J*=8. Hz, 2H), 4.92 (d, *J*=4.3 Hz, 1H), 3.71 (m, 1H), 3.54 (m, 2H), 3.29 (brs, 1H). $^{13}$C NMR (75 MHz, $CD_3OD$) δ 151.0, 148.8, 128.7, 124.4, 73.6, 70.0, 62.8. IR (ν $cm^{-1}$) 3380, 2925, 2110, 1520, 1350. Anal. calculated for $C_9H_{10}N_4O_4$: C, 45.38; H, 4.23; N, 23.52; Found: C, 45.56; H, 3.08; N, 23.38 $[\alpha]^{24}_D$ -5 (1.85, MeOH); MS(-ESI) 283 (H-M+2Na).

**(2*S*, 3*S*)-2-Amino-1-(4-nitro-phenyl)-propane-1,3-diol (12c)**

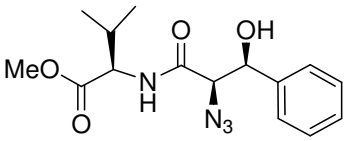


To a solution of **12c** (0.143g, 0.6 mmol) in THF was added $PPh_3$ (0.173g, 0.66 mmol) and the solution heated at 45°C for 6 hours. After this time (0.02 ml of $H_2O$ were added and the solution stirred at 45°C for 14 hours. After this time, the solvent was removed and the crude mixture dissolved in $CH_2Cl_2$ before washing with 1M HCl (20 ml). The aqueous layer was basified with 1M NaOH until pH=10 and extracted twice with $CH_2Cl_2$. The organic layer was then dried over $MgSO_4$, filtrated and concentrated to give pure **13c** (0.114g, 90%).

$^1$H NMR (300MHz, $CD_3OD$) TFA salt δ 8.31 (d, *J*=8.9 Hz, 2H), 7.75 (d, *J*=8.7 Hz, 2H), 4.97 (d, *J*=8.1 Hz, 1), 3.67 (dd, *J*=11.7 and 3.8 Hz, 1H), 3.47 (dd, *J*=11.7 and 5.5 Hz, 1H), 3.38 (m, 1H). $^{13}$C NMR (75 MHz, $CD_3OD$) TFA salt δ 150.4, 150.3, 130.0, 125.7, 71.9, 60.7, 60.5.

$[\alpha]^{24}_D$ +37 (1.1, 6M HCl), litt: $[\alpha]^{24}_D$ +31 (1, 6M HCl).[2]

**(2*R*, 3*S*)-(2-Azido-3-hydroxy-3-phenyl-propionyl)-D-Val-OMe (13b)**



The crude mixture of **4b** (prepared from 1.5 mmol of **1**) was dissolved in 20 ml of THF then were added D-valine methyl ester.HCl (0.3g, 1.8 mmol) followed by imidazole (1.0g, 15 mmol). After 1 hour, the reaction was hydrolysed by addition of saturated $NH_4Cl$ and extracted with $Et_2O$. The combined organic layers were washed with 1N HCl, water then brine before drying, filtration and concentration. The crude was purified by flash-chromatography ($CH_2Cl_2$ then $CH_2Cl_2$/EtOAc 95/5) to give 0.351g of **14b** (73%).

$^1$H NMR (300MHz, $CDCl_3$) δ 7.35 (m, 5H), 6.87 (d, *J*=8.5 Hz, 1H), 5.33 (dd, *J*=6.4 and 3.0 Hz, 1H), 4.49 (dd, *J*=8.9 and 4.9 Hz, 1H), 4.23 (d, *J*=3.2 Hz, 1H), 3.74 (s, 3H), 3.43 (d, *J*=6.6 Hz, 1H), 2.10 (m, 1H), 0.85 (d, *J*=2.2 Hz, 3H), 0.83 (d, *J*=2.3 Hz, 3H). $^{13}$C NMR (75 MHz, $CDCl_3$) δ 171.7, 167.7, 139.1, 128.6, 128.3, 126.0, 73.6, 68.6, 57.2, 52.3, 31.2, 18.7, 17.6. IR (ν $cm^{-1}$) 3405, 2965, 2115, 1740, 1165, 1530, 1455, 1440, 1315, 1270, 1215, 1150, 1060, 700.

$[\alpha]^{24}_D$ -28.9 (1.01, $CHCl_3$) ; MS(+ESI) 321 $(MH)^+$, 284, 228.

[1] K. C. Nicolaou, B. S. Safina, M. Zak, S. H. Lee, M. Nevalainen, M. Bella, A. A. Estrada, C. Funke, F. J. Zécri, S. Bulat, *J. Am. Chem. Soc*. **2005**, *127*, 11159-11175.

[2] www.sigmaaldrich.com, CAS n° [2964-48-9].

[3] T. C. Nugent, T. Hudlicky, *J. Org. Chem*. **1998**, *63*, 510-520.

**Chiral HPLC analysis of rac-5b and 5b.**
Column: DAICEL, Chiralcel OD-H, 250x4.6 mm; 5µm
Solvent: heptane/iPrOH 98/2
Flow: 1ml/min
Detection: 230 nm.