Supporting Information
for
Regio- and stereoselective synthesis of new
diaminocyclopentanols
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General information

$^1$H, $^{13}$C and the detailed 2D NMR spectra were determined on Varian Mercury Plus 400 spectrometer. Chemical shifts are reported in parts per million using solvent as the internal standard (CDCl$_3$, DMSO-$d_6$ or C$_5$D$_5$N). LRMS was run on Finnigan Surveyor MSQ mass spectrometer. HRMS spectra were obtained on Bruker MicrOTOF II mass spectrometer. Thin layer chromatography was performed on DC-Alufoilen Kieselgel 60F$_{254}$ 0.2 mm plates (Merck) and visualized under UV light and stained with ninhydrin or Seebach solution followed by heating. Column chromatography was done by using Kieselgel 60 (Merck) 60–200 mesh as the stationary phase. All reagents and solvents were purchased from commercial sources and used without further purification. Starting epoxides 3a,b and 6 previously described in the literature$^{1,2}$ were characterized by comparing their $^1$H NMR spectra to the published data. All yields reported in this publication refer to isolated ones of compounds and their purity was determined by $^1$H NMR. The stereochemistry displayed in the products is relative and not absolute.
General procedure for Lewis acid-catalyzed ring opening reactions of epoxides 3 and 6 as examplified by 8a

(1RS,2RS,5RS)-2-[Benzy1(methyl)amino]-5-(morpholin-4-yl)cyclopentanol (8a)

To the mixture of 3a (1.02 g, 5 mmol) and morpholine (0.57 g, 6.5 mmol) zinc(II) perchlorate hexahydrate (0.19 g, 10 mol%) was added, and the mixture was magnetically stirred at 100 °C for 2 h under nitrogen atmosphere. After completion of the reaction (disappearance of starting material monitored by TLC), the reaction mixture was diluted with CH$_2$Cl$_2$ (30 mL) and filtered through celite. The filtrate was washed with water (3×30 mL), dried over anhydrous Na$_2$SO$_4$ and concentrated in vacuo to give the crude product, which was purified by flash chromatography (35% EtOAc/hexane) to give the title compound 8a (1.10 g, 76%) as a colourless oil; d$_H$(400 MHz, DMSO-d$_6$) 7.34-7.18 (5H, m, Ph), 4.05 (1H, s, OH), 3.90 (1H, d, J 4.9 Hz, H-1), 3.64 (1H, d, J 13.3 Hz, CH$_2$Ph), 3.55 (4H, t, J 4.6 Hz, CH$_2$O), 3.47 (1H, d, J 13.3 Hz, CH$_2$Ph), 2.55 (1H, dt, J 12.2, 6.1 Hz, H-2), 2.50-2.47 (2H, m, CH$_2$N), 2.46-2.43 (1H, m, H-5), 2.39-2.32 (2H, m, CH$_2$N), 2.10 (3H, s, CH$_3$), 1.88-1.75 (2H, m, H-3 and H-4), 1.64-1.51 (1H, m, H-3), 1.38-1.25 (1H, m, H-4); d$_C$(100 MHz, DMSO-d$_6$, HSQC-DEPT) 128.2, 127.8, 126.3 (Ph), 73.8 (C-5), 71.2 (C-1), 67.4 (C-2), 65.9 (CH$_2$O), 59.0 (CH$_2$Ph), 51.3 (CH$_2$N), 39.2 (CH$_3$), 26.4 (C-3), 25.5 (C-4); LC-MS (APCI): m/z = 291.13 [M]$^+$. HRMS (ESI): m/z calcd for [C$_{17}$H$_{26}$N$_2$O$_2$]$^+$: 291.2067; found: 291.2071.

(1RS,2RS,5RS)-2-(4-Acetypiperazin-1-yl)-5-[benzy1(methyl)amino]cyclopentanol (8c)

This compound was isolated in 44% yield (0.73 g) as a pale yellow oil; d$_H$(400 MHz, DMSO-d$_6$) 7.33-7.18 (5H, m, Ph), 4.08 (1H, s, OH), 3.90 (1H, d, J 5.0 Hz, H-1), 3.64 (1H, d, J 13.3 Hz, CH$_2$Ph), 3.47 (1H, d, J 13.3 Hz, CH$_2$Ph), 3.42-3.34 (4H, m, CH$_2$N), 2.59-2.51 (1H, m, H-2), 2.49-2.46 (1H, m, H-5), 2.44-2.25 (4H, m, CH$_2$N), 2.10 (3H, s, NCH$_3$), 1.96 (3H, s, OCCH$_3$), 1.90-1.75 (2H, m, CH$_2$), 1.63-1.50 (1H, m, CH$_2$), 1.39-1.28 (1H, m, CH$_2$); d$_C$(100 MHz, DMSO-d$_6$) 167.8, 138.9, 128.5, 127.9, 126.6, 73.6, 71.6, 67.6, 59.2, 51.1, 50.5, 45.6, 40.8, 26.5, 26.0; LC-MS (APCI): m/z = 332.17 [M]$^+$. HRMS (ESI): m/z calcd for [C$_{19}$H$_{29}$N$_3$O$_2$]$^+$: 332.2333; found: 332.2334.
(1RS,2RS,5RS)-2-(Dibenzylamino)-5-(morpholin-4-yl)cyclopentanol (9a)

This compound was isolated in 48% yield (0.87 g) as a white solid, and regioisomer 10a was obtained in 24% yield (0.44 g) as a white solid; Compound 9a: $d_H$ (400 MHz, DMSO-$d_6$) 7.35-7.15 (10H, m, Ph), 4.25 (1H, d, $J$ 3.1 Hz, OH), 3.87 (1H, s, H-1), 3.72 (4H, s, CH$_2$Ph), 3.51 (4H, t, $J$ 4.6 Hz, CH$_2$O), 2.87-2.80 (1H, m, H-2), 2.46-2.42 (2H, m, CH$_2$N), 2.46-2.43 (1H, buried m, H-5), 2.34-2.26 (2H, m, CH$_2$N), 1.79-1.71 (1H, m, H-4), 1.69-1.63 (1H, m, H-3), 1.61-1.51 (1H, m, H-3), 1.22-1.10 (1H, m, H-4); $d_C$ (100 MHz, DMSO-$d_6$, HSQC-DEPT) 128.3, 127.9, 127.0 (Ph), 74.1 (C-5), 72.6 (C-1), 66.9 (CH$_2$O), 66.1 (C-2), 55.9 (CH$_2$Ph), 52.4 (CH$_2$N), 26.7 (C-3), 26.6 (C-4); LC-MS (APCI): $m/z$ = 367.22 [M$^+$. HRMS (ESI): $m/z$ calcd for [C$_{23}$H$_{30}$N$_2$O$_2$]$^+$: 367.2380; found: 367.2374. Compound 10a: $d_H$ (400 MHz, DMSO-$d_6$) 7.39-7.15 (10H, m, Ph), 4.42 (1H, d, $J$ 4.8 Hz, OH), 3.88 (1H, dd, $J$ 10.0, 5.0 Hz, H-1), 3.78 (2H, d, $J$ 13.8 Hz, CH$_2$Ph), 3.44 (2H, br s, CH$_2$O), 3.42 (2H, buried d, $J$ 13.8 Hz, CH$_2$Ph), 3.19 (2H, s, CH$_2$O), 3.02 (1H, q, $J$ 7.8 Hz, H-3), 2.60 (1H, dd, $J$ 7.1, 4.7 Hz, H-2), 2.46-2.39 (2H, m, CH$_2$N), 2.38-2.30 (2H, m, CH$_2$N), 1.81-1.69 (1H, m, H-4), 1.61-1.45 (3H, m, H-4 and H-5); $d_C$ (100 MHz, DMSO-$d_6$, HSQC-DEPT) 128.1, 127.4, 126.2 (Ph), 74.5 (C-2), 70.4 (C-1), 60.1 (C-3), 53.8 (CH$_2$O), 53.8 (CH$_2$Ph), 50.7 (CH$_2$N), 32.0 (C-4), 20.2 (C-5); LC-MS (APCI): $m/z$ = 367.31 [M$^+$. HRMS (ESI): $m/z$ calcd for [C$_{23}$H$_{30}$N$_2$O$_2$]$^+$: 367.2380; found: 367.2374.

(1RS,2RS,5RS)-2-(4-Acetyl-piperazin-1-yl)-5-(dibenzylamino)cyclopentanol (9c)

This compound was isolated in 43% yield (0.87 g) as a white solid, and regioisomer 10c was obtained in 21% yield (0.43 g) as a white solid; Compound 9c: $d_H$ (400 MHz, DMSO-$d_6$) 7.35-7.14 (10H, m, Ph), 4.25 (1H, d, $J$ 26.5 Hz, OH), 3.88 (1H, dd, $J$ 6.0, 2.5 Hz, H-1), 3.72 (4H, s, CH$_2$Ph), 3.44 (1H, dd, $J$ 14.0, 7.1 Hz, H-2), 3.36 (4H, s, CH$_2$N), 2.89-2.79 (1H, m, H-5), 2.50-2.21 (4H, m, CH$_2$N), 1.95 (3H, s, OCCH$_3$), 1.78-1.72 (1H, m, CH$_2$), 1.71-1.63 (1H, m, CH$_2$), 1.62-1.50 (1H, m, CH$_2$), 1.23-1.11 (1H, m, CH$_2$); $d_C$ (100 MHz, DMSO-$d_6$) 167.8, 139.9, 128.2, 127.9, 126.4, 73.4, 72.5, 64.2, 55.5, 51.1, 45.5, 40.8, 25.6, 25.4, 20.8; LC-MS (APCI): $m/z$ = 408.22 [M$^+$. HRMS (ESI): $m/z$ calcd for [C$_{25}$H$_{33}$N$_2$O$_2$]$^+$: 408.2646; found: 408.2641. Compound 10c: $d_H$ (400 MHz, DMSO-$d_6$) 7.39-7.14 (10H, m, Ph), 4.45 (1H, s, OH), 3.85 (1H, s, H-1), 3.78 (2H, d, $J$ 13.8 Hz, CH$_2$Ph), 3.41 (2H, d, $J$ 13.8 Hz, CH$_2$Ph), 3.34-3.12 (4H, m, CH$_2$N), 3.01 (1H, s, H-3), 2.65 (1H, s, H-2), 2.34 (4H, s, CH$_2$N), 1.94 (3H, s, OCCH$_3$), 1.82-1.68 (1H, m, H-4), 1.62-1.44 (3H, m, H-4 and H-5); $d_C$ (100 MHz, DMSO-$d_6$,
HSQC-DEPT) 128.1, 127.5, 126.2 (Ph), 73.9 (C-2), 70.5 (C-1), 59.8 (C-3), 53.7 (CH\textsubscript{2}Ph), 49.7 (CH\textsubscript{2}N), 40.7 (CH\textsubscript{2}N), 20.4 (CH\textsubscript{3}), 19.9 (C-5), 19.7 (C-4); LC-MS (APCI): \(m/z = 408.32\) [M]\(^+\). HRMS (ESI): \(m/z\) calcd for \([C\textsubscript{25}H\textsubscript{33}N\textsubscript{2}O\textsubscript{2}]^+\): 408.2646; found: 408.2651.

\((1RS,2RS,3SR)-2-[Benzyl(methyl)amino]-3-(morpholin-4-yl)cyclopentanol (14a)\)
This compound was isolated in 84% yield (1.22 g) as a yellow oil; \(d\textsubscript{H} (400 MHz, DMSO-d\textsubscript{6})\) 7.33-7.15 (5H, m, Ph), 4.42 (1H, d, \(J = 3.1\) Hz, OH), 4.11 (1H, s, H-1), 3.63 (2H, dd, \(J = 13.6\) Hz, CH\textsubscript{2}Ph), 3.54 (4H, t, \(J = 4.6\) Hz, CH\textsubscript{2}O), 2.84 (1H, dd, \(J = 7.0\) Hz, H-2), 2.68 (1H, dd, \(J = 14.7, 7.4\) Hz, H-3), 2.54-2.40 (4H, m, CH\textsubscript{2}N), 2.15 (3H, s, CH\textsubscript{3}), 1.67-1.55 (3H, m, H-4 and H-5), 1.54-1.43 (1H, m, H-5); \(d\textsubscript{C} (100 MHz, DMSO-d\textsubscript{6}, HSQC-DEPT)\) 128.5, 127.7, 126.1 (Ph), 74.1 (C-2), 69.1 (C-1), 66.1 (CH\textsubscript{2}O), 66.0 (C-3), 58.1 (CH\textsubscript{2}Ph), 50.7 (CH\textsubscript{2}N), 37.7 (CH\textsubscript{3}), 32.2 (C-4), 23.4 (C-5); LC-MS (APCI): \(m/z = 291.28\) [M]\(^+\). HRMS (ESI): \(m/z\) calcd for \([C\textsubscript{17}H\textsubscript{26}N\textsubscript{2}O\textsubscript{2}]^+\): 291.2067; found: 291.2074.

\((1RS,2RS,3SR)-2-[Dibenzylandino]-3-(morpholin-4-yl)cyclopentanol (14b)\)
This compound was isolated in 80% yield (1.46 g) as a white solid, and regioisomer 15 was obtained in 6% yield (0.11 g) as a white solid; Compound 14b: \(d\textsubscript{H} (400 MHz, DMSO-d\textsubscript{6})\) 7.40-7.14 (10H, m, Ph), 4.48 (1H, d, \(J = 4.5\) Hz, OH), 4.27-4.18 (1H, m, H-1), 3.73 (2H, d, \(J = 13.7\) Hz, CH\textsubscript{2}Ph), 3.57 (2H, d, \(J = 13.7\) Hz, CH\textsubscript{2}Ph), 3.47-3.36 (4H, m, CH\textsubscript{2}O), 2.92 (1H, dd, \(J = 7.3, 4.3\) Hz, H-2), 2.71 (1H, q, \(J = 7.6\) Hz, H-3), 2.27 (4H, t, \(J = 4.5\) Hz, CH\textsubscript{2}N), 1.70-1.60 (1H, m, H-5), 1.59-1.52 (2H, m, H-4), 1.51-1.41 (1H, m, H-5); \(d\textsubscript{C} (100 MHz, DMSO-d\textsubscript{6}, HSQC-DEPT)\) 128.3, 127.4, 126.0 (Ph), 79.5 (C-1), 69.1 (C-2), 66.2 (C-3), 66.0 (CH\textsubscript{2}O), 54.1 (CH\textsubscript{2}Ph), 50.4 (CH\textsubscript{2}N), 32.4 (C-5), 22.8 (C-4); LC-MS (APCI): \(m/z = 367.35\) [M]\(^+\). HRMS (ESI): \(m/z\) calcd for \([C\textsubscript{23}H\textsubscript{30}N\textsubscript{2}O\textsubscript{2}]^+\): 367.2380; found: 367.2373. Compound 15: \(d\textsubscript{H} (400 MHz, DMSO-d\textsubscript{6})\) 7.38-7.13 (10H, m, Ph), 4.46 (1H, d, \(J = 6.2\) Hz, OH), 3.95 (1H, dd, \(J = 13.6, 6.8\) Hz, H-1), 3.72 (2H, d, \(J = 14.2\) Hz, CH\textsubscript{2}Ph), 3.58 (2H, d, \(J = 14.2\) Hz, CH\textsubscript{2}Ph), 3.53 (4H, t, \(J = 4.6\) Hz, CH\textsubscript{2}O), 2.96 (1H, q, \(J = 7.9\) Hz, H-2), 2.58-2.49 (2H, m, CH\textsubscript{2}N), 2.44-2.36 (2H, m, CH\textsubscript{2}N), 2.33 (1H, dd, \(J = 14.3, 7.3\) Hz, H-5), 1.66-1.40 (4H, m, CH\textsubscript{2}); \(d\textsubscript{C} (100 MHz, DMSO-d\textsubscript{6}, HSQC-DEPT)\) 128.0, 127.4, 125.9 (Ph), 74.9 (C-1), 69.6 (C-5), 66.0 (C-2), 65.9 (CH\textsubscript{2}O), 53.7 (CH\textsubscript{2}Ph), 50.7 (CH\textsubscript{2}N), 23.5 (CH\textsubscript{2}), 21.5 (CH\textsubscript{2}); LC-MS (APCI): \(m/z = 367.26\) [M]\(^+\). HRMS (ESI): \(m/z\) calcd for \([C\textsubscript{23}H\textsubscript{30}N\textsubscript{2}O\textsubscript{2}]^+\): 367.2380; found: 367.2378.
General procedure for ring opening reactions of epoxides 3 and 6 under basic conditions as exemplified by 8b

(1RS,2RS,5RS)-2-[Benzy1(methyl)amino]-5-(2-methyl-1H-imidazol-1-yl)cyclopentanol (8b)

To a solution of 3a (1.02 g, 5 mmol) and 2-methyl-1H-imidazole (0.53 g, 6.5 mmol) in DMSO (10 mL) cesium carbonate (0.16 g, 10 mol %) was added. The mixture was heated at 120 °C for 2 h under vigorous stirring. After completion of the reaction as monitored by TLC, the reaction mixture was diluted with CH₂Cl₂ (30 mL) and water (30 mL). The organic layer was washed with water (3×30 mL), dried over anhydrous Na₂SO₄. The solvent was evaporated in vacuo to give the crude product, which was purified by flash chromatography (50% EtOAc/hexane) to give the title compound 8b (1.07 g, 75%) as a colourless oil; dH (400 MHz, DMSO-d₆) 7.34-7.18 (5H, m, Ph), 7.02 (1H, d, J 0.9 Hz, CH), 6.73 (1H, d, J 0.7 Hz, CH), 4.63 (1H, s, OH), 4.35 (1H, td, J 7.8, 2.9 Hz, H-5), 3.91 (1H, dd, J 4.8, 2.9 Hz, H-1), 3.66 (1H, d, J 13.3 Hz, CH₂Ph), 3.52 (1H, d, J 13.3 Hz, CH₂Ph), 2.86 (1H, dt, J 10.4, 6.4 Hz, H-2), 2.31 (3H, s, CH₃), 2.29-2.25 (1H, m, H-3), 2.13 (3H, s, CH₃), 2.09-1.97 (1H, m, CH₂), 1.86-1.67 (2H, m, CH₂); dC (100 MHz, DMSO-d₆) 143.9, 139.0, 128.5, 127.9, 126.6, 116.0, 76.3, 66.1, 62.7, 59.3, 28.2, 26.2, 12.9; LC-MS (APCI): m/z = 286.16 [M]+. HRMS (ESI): m/z calcd for [C₁₇H₂₃N₃O]+: 286.1914; found: 286.1920.

(1RS,2RS,5RS)-2-(6-Amino-9H-purin-9-yl)-5-[benzy1(methyl)amino]cyclopentanol (8d)

This compound was isolated in 65% yield (1.10 g) as a brown solid; dH (400 MHz, DMSO-d₆) 8.15 (1H, s, CH), 8.13 (1H, s, CH), 7.35-7.18 (5H, m, Ph), 7.04 (2H, s, NH₂), 4.75 (1H, td, J 8.3, 3.2 Hz, H-2), 4.70 (1H, s, OH), 4.30-4.22 (1H, m, H-1), 3.68 (1H, d, J 13.3 Hz, CH₂Ph), 3.56 (1H, d, J 13.3 Hz, CH₂Ph), 3.11 (1H, dt, J 12.0, 6.1 Hz, H-5), 2.37-2.26 (1H, m, H-3), 2.15 (3H, s, CH₃), 2.12-2.00 (2H, m, H-3 and H-4), 1.90-1.80 (1H, m, H-4); dC (100 MHz, DMSO-d₆, HSQC-DEPT) 128.0, 127.5, 126.3 (Ph), 74.8 (C-1), 65.6 (C-5), 61.7 (C-2), 58.9 (CH₂Ph), 39.2 (CH₃), 27.2 (C-3), 26.0 (C-4); LC-MS (APCI): m/z = 339.27 [M]+. HRMS (ESI): m/z calcd for [C₁₈H₂₂N₆O]+: 339.1928; found: 339.1923.
(1RS,2RS,5RS)-2-(Dibenzylamino)-5-(2-methyl-1H-imidazol-1-yl)cyclopentanol (9b)
This compound was isolated in 64% yield (1.15 g) as a yellow oil, and regioisomer 10b was obtained in 26% yield (0.47 g) as a white solid; Compound 9b: $d_4$ (400 MHz, DMSO-$d_6$) 7.39-7.14 (10H, m, Ph), 6.90 (1H, d, $J$ 1.1 Hz, CH), 6.69 (1H, s, CH), 4.99 (1H, s, OH), 4.29 (1H, t, $J$ 8.4, 4.8 Hz, H-5), 3.98 (1H, d, $J$ 5.1 Hz, H-1), 3.81 (2H, d, $J$ 14.2 Hz, CH$_2$Ph), 3.75 (2H, d, $J$ 14.2 Hz, CH$_2$Ph), 3.20-3.12 (1H, m, H-2), 2.30 (3H, s, CH$_3$), 2.16-2.05 (1H, m, CH$_2$), 1.94-1.75 (2H, m, CH$_2$), 1.66-1.53 (1H, m, CH$_2$); $d_C$ (100 MHz, DMSO-$d_6$) 154.5, 144.2, 140.3, 128.4, 128.0, 126.6, 115.8, 77.0, 63.1, 61.6, 55.5, 28.0, 25.2, 13.1; LC-MS (APCI): $m/z$ = 362.29 [M]$^+$.

HRMS (ESI): $m/z$ calcd for [C$_{23}$H$_{27}$N$_3$O]: 362.2227; found: 362.2227. Compound 10b: $d_4$ (400 MHz, DMSO-$d_6$) 7.25-7.07 (10H, m, Ph), 6.76 (1H, s, CH), 6.74 (1H, s, CH), 4.98 (1H, d, $J$ 4.0 Hz, OH), 4.20 (1H, dd, $J$ 9.3, 7.8 Hz, H-2), 3.95-3.84 (1H, m, H-1), 3.61 (2H, d, $J$ 14.3 Hz, CH$_2$Ph), 3.52 (2H, d, $J$ 14.3 Hz, CH$_2$Ph), 3.38 (1H, dd, $J$ 17.7, 8.6 Hz, H-3), 2.23 (3H, s, CH$_3$), 1.97-1.73 (3H, m, H-4 and H-5), 1.64-1.52 (1H, m, H-4); $d_C$ (100 MHz, DMSO-$d_6$, HMBC) 127.5, 127.4, 126.0 (Ph), 125.8 (CH), 115.6 (CH), 74.4 (C-1), 64.1 (C-2), 62.4 (C-3), 53.2 (CH$_2$Ph), 30.0 (C-4), 20.0 (C-5), 12.8 (CH$_3$); LC-MS (APCI): $m/z$ = 362.29 [M]$^+$.

HRMS (ESI): $m/z$ calcd for [C$_{23}$H$_{27}$N$_3$O]: 362.2227; found: 362.2222.

(1RS,2RS,5RS)-2-(6-Amino-9H-purin-9-yl)-5-(dibenzylamino)cyclopentanol (9d)
This compound was isolated in 46% yield (0.95 g) as a brown solid, and regioisomer 10d was obtained in 23% yield (0.47 g) as a brown solid; Compound 9d: $d_4$ (400 MHz, DMSO-$d_6$) 8.06 (2H, s, CH), 7.41-7.14 (10H, m, Ph), 7.02 (2H, s, NH$_2$), 5.03 (1H, d, $J$ 6.9 Hz, OH), 4.66 (1H, dd, $J$ 13.0, 8.1 Hz, H-2), 4.38 (1H, t, $J$ 5.5 Hz, H-1), 3.79 (4H, dd, $J$ 29.2, 14.2 Hz, CH$_2$Ph), 3.43 (1H, dt, $J$ 23.4, 8.3 Hz, H-5), 2.21-2.10 (1H, m, H-3), 2.02-1.91 (2H, m, H-3 and H-4), 1.89-1.80 (1H, m, H-4); $d_C$ (100 MHz, DMSO-$d_6$, HMBC) 151.8 (CH), 139.5 (CH), 128.2, 127.9, 126.3 (Ph), 75.1 (C-2), 62.6 (C-1), 61.1 (CH$_2$Ph), 55.2 (C-5), 26.9 (C-4), 25.1 (C-3); LC-MS (APCI): $m/z$ = 415.28 [M]$^+$. HRMS (ESI): $m/z$ calcd for [C$_{24}$H$_{26}$N$_6$O]: 415.2241; found: 415.2248. Compound 10d: $d_4$ (400 MHz, DMSO-$d_6$) 8.02 (1H, s, CH), 7.92 (1H, s, CH), 7.10-6.92 (10H, m, Ph), 7.00 (2H, buried s, NH$_2$), 5.02 (1H, d, $J$ 4.6 Hz, OH), 4.61 (1H, dd, $J$ 9.8, 7.9 Hz, H-2), 4.53 (1H, dd, $J$ 11.5, 7.1 Hz, H-1), 3.71 (1H, dd, $J$ 18.3, 8.7 Hz, H-3), 3.62 (2H, d, $J$ 13.9 Hz, CH$_2$Ph), 3.44 (2H, d, $J$ 13.9 Hz, CH$_2$Ph), 2.05-1.96 (1H, m, H-5), 1.94-1.74 (2H, m, H-4), 1.69-1.56 (1H, m, H-5); $d_C$ (100 MHz, DMSO-$d_6$,
HMBC) 155.8 (CH), 139.3 (CH), 128.1, 127.7, 126.4 (Ph), 71.1 (C-2), 61.0 (C-1), 52.9 (C-3), 52.1 (CH₂Ph), 30.1 (C-4), 20.1 (C-5); LC-MS (APCI): \( m/z = 415.34 \) [M]+. HRMS (ESI): \( m/z \) calcd for \([\text{C}_{24}\text{H}_{26}\text{N}_6\text{O}]^+\): 415.2241; found: 415.2229.

\( (1\text{SR},2\text{SR},5\text{RS})-2-\text{(6-Amino-9H-purin-9-yl)}-5-\text{[benzyl(methyl)amino]cyclopentanol (13a)} \)

This compound was isolated in 68% yield (1.15 g) as a yellow solid; \( \text{d}_H\) (400 MHz, \text{C}_{5}\text{D}_{5}\text{N}) 8.60 (1H, s, CH), 8.32 (1H, s, CH), 7.83 (2H, s, NH₂), 7.52-7.22 (5H, m, Ph), 5.08 (1H, t, \( J = 8.1 \text{ Hz} \), H-1), 4.85 (1H, dd, \( J = 18.0, 8.6 \text{ Hz} \), H-2), 4.63 (1H, s, OH), 3.87 (2H, q, \( J = 13.6 \text{ Hz} \), CH₂Ph), 3.29 (1H, dd, \( J = 16.3, 7.9 \text{ Hz} \), H-5), 2.50-2.40 (1H, m, H-3), 2.37 (3H, s, CH₃), 2.27-2.13 (1H, m, H-3), 2.10-1.89 (2H, m, H-4); \( \text{d}_C\) (100 MHz, \text{C}_{5}\text{D}_{5}\text{N}, HMBC) 151.0 (CH), 140.7 (CH), 128.6, 127.2, 123.6 (Ph), 77.5 (C-2), 69.2 (CH₃), 63.2 (C-1), 60.0 (C-5), 38.8 (CH₂Ph), 26.7 (C-4), 23.5 (C-3); LC-MS (APCI): \( m/z = 338.71 \) [M]+. HRMS (ESI): \( m/z \) calcd for \([\text{C}_{18}\text{H}_{22}\text{N}_6\text{O}]^+\): 339.1928; found: 339.1930.

\( (1\text{SR},2\text{SR},5\text{RS})-2-\text{(6-Amino-9H-purin-9-yl)}-5-\text{(dibenzylamino)cyclopentanol (13b)} \)

This compound was isolated in 55% yield (1.14 g) as a brown solid; \( \text{d}_H\) (400 MHz, DMSO-\text{d}_6) 8.15 (1H, s, CH), 8.10 (1H, s, CH), 7.44-7.14 (10H, m, Ph), 7.00 (2H, s, NH₂), 5.21 (1H, d, \( J = 5.4 \text{ Hz} \), OH), 4.68 (1H, dd, \( J = 13.8, 8.4 \text{ Hz} \), H-1), 4.43 (1H, dd, \( J = 18.2, 9.0 \text{ Hz} \), H-2), 3.84 (2H, d, \( J = 14.1 \text{ Hz} \), CH₂Ph), 3.67 (2H, d, \( J = 14.2 \text{ Hz} \), CH₂Ph), 3.17-3.10 (1H, m, H-5), 2.19-1.98 (2H, m, H-3), 1.95-1.74 (2H, m, H-4); \( \text{d}_C\) (100 MHz, DMSO-\text{d}_6, HSQC-DEPT) 151.3 (CH), 139.5 (CH), 128.0, 127.6, 126.1 (Ph), 74.9 (C-1), 63.3 (C-5), 60.3 (C-2), 53.6 (CH₂Ph), 25.6 (C-3), 20.7 (C-4); LC-MS (APCI): \( m/z = 415.27 \) [M]+. HRMS (ESI): \( m/z \) calcd for \([\text{C}_{24}\text{H}_{26}\text{N}_6\text{O}]^+\): 415.2241; found: 415.2229.
References