Electronic Supplementary Material (ESI) for Organic & Biomolecular Chemistry
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Electronic Supplementary Information

Stereoselective synthesis of *N*-aryl proline amides by a biotransformation/Ugi-Smiles sequence

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General Information

Starting materials and solvents were purchased from ABCR and Sigma-Aldrich and were used without treatment. 3-Azabicylo[3,3,0]octane hydrochloride was purchased from AK Scientific. (1*R*,2*S*,6*R*,7*S*)-4-methyl-4-azatricyclo[5.2.1.$0^{2,6}$]dec-8-ene was prepared according to literature procedure.[1] Column chromatography was performed on silica gel. ^{1}H and ^{13}C NMR spectra were recorded on a Bruker Avance 400 (400.13 MHz for ^{1}H and 100.61 MHz for ^{13}C) or Bruker Avance 500 (500.23 MHz for ^{1}H and 125.78 MHz for ^{13}C) in $CDCl_3$. Chemical shifts are reported in δ values (ppm) downfield from tetramethylsilane. Electrospray Ionisation (ESI) mass spectrometry was carried out using a Bruker micrOTOF-Q instrument in positive ion mode (capillary potential of 4500 V). Thin Layer Chromatography was performed using TLC plates from Merck (SiO_2, Kieselgel 60) and was visualized by UV detection. Flash chromatography was performed using the indicated solvents and Silicycle Silia-P Flash Silica Gel (particle size 40-63 µm, pore diameter 60 Å). Infrared (IR) spectra were recorded neat on a Shimadzu 6400s FTIR spectrometer and wavelengths are reported in cm^{-1}. Optical rotations were measured on an Optical Activity AA-10 and a Perkin Elmer 241 polarimeter with a sodium lamp and are reported as follows: $[\alpha]_D^{20}$ (c = g/100 mL, solvent). Optical rotations were measured on a polarimeter with a sodium lamp. 1-Azido-2-isocyanoethane,[2] (isocyanomethyl)benzene,[3] 3-(isocyanomethyl)pyridine[3] and 2-bromo-4-nitrophenol[4] were synthesized according to literature procedures.

General Procedure 1: Preparation of optically active imines (3*S*,7*R*)-8, azabicyclo-[3,3,0]oct-2-ene (32) and (3*S*,7*R*)-36

Unless stated otherwise: imines were synthesized according to literature procedure with minor adjustments. 0.7 g of freeze-dried MAO-N D5 *E. coli* were rehydrated for 30 min. in 20 ml of KPO_4 buffer (100 mM, pH = 8,0) at 37 °C. Subsequently 1 mmol of bridged amine or azabicyclo-[3,3,0]oct-2-ene) in 30 ml of KPO_4 buffer (100 mM, pH = 8.0) was prepared. The pH of the solution was adjusted to 8.0 by addition of NaOH and then added to the rehydrated cells. After 16-17 h the reaction was stopped (conversions were > 95 %) and worked up. For workup the reaction mixture was centrifuged at 4000 rpm and 4 °C until the supernatant had clarified (40 – 60 minutes). The pH of the supernatant was then adjusted to 10-11 by addition of aq. NaOH and the supernatant was subsequently extracted with *t*-butyl methyl ether or dichloromethane (4 × 70 mL). The combined organic phases were dried with Na_2SO_4 and concentrated at the rotary evaporator.

General procedure 2: **Preparation of optically active Ugi-Smiles derivatives 10-32, 33-35**

Unless stated otherwise: To a solution of optically imine (0.5 mmol, 2.0 equiv.) in 2 ml methanol nitrophenol or thiol (0.25 mmol, 1.0 equiv.) was added, followed by the isocyanide (0.375 mmol, 1.5 equiv.). The reaction mixture was stirred at 40°C for 24 h. The mixture was concentrated *in vacuo* and the crude product was purified by column chromatography (SiO_2, $CHCl_2$). After concentration *in vacuo* a bright colored oil or solid was obtained. Diastereomeric ratios were determined by ^{1}H NMR.

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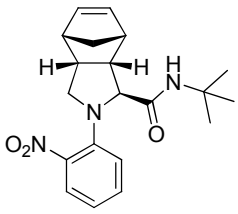
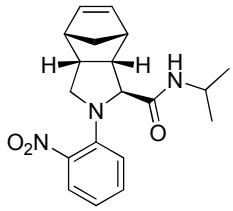
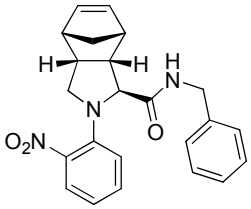


(1*S*,3a*R*,4*S*,7*R*,7a*S*)-*N*-(*tert*-butyl)-2-(2-nitrophenyl)-2,3,3a,4,7,7a-hexahydro-1*H*-4,7-methanoisoindole-1-carboxamide (11): General procedure 2 was followed using imine (3*S*,7*R*)-**8** (60 mg, 0.45 mmol, 2.0 equiv.), 2-nitrophenol (31 mg, 0.22 mmol, 1.0 equiv.) and *tert*-butyl isocyanide (28 mg, 0.038 ml, 0.34 mmol, 1.5 equiv.) giving a yield of 57 mg (0.16 mmol, 73%) of a bright orange solid. $[\alpha]_D^{20}$ = −1043.1° (c = 0.51, $CHCl_3$); ^{1}H NMR (500.23 MHz, $CDCl_3$): δ = 7.65 (dd, *J* = 8.5 Hz, *J* = 1.5 Hz, 1H), 7.29 (m, 1H), 6.91 (d, *J* = 8.0 Hz), 6.78 (m 1H), 6.67 (bs, 1H), 6.14 (m, 1H), 5.79 (m, 1H) 4.00 (d, *J* = 3.0 Hz, 1H), 3.52 (dd, *J* = 10.8 Hz, *J* = 9.0, 1H), 3.17 (m, 1H), 3.02 (m, 1H), 2.89 (m, 1H), 2.79 (m, 1H) 2.20 (dd, *J* = 3.0 Hz, *J* = 11.0 Hz, 1H), 1.49 (d, *J* = 8.5 Hz, 1H), 1.37 (d, *J* = 8.5 Hz, 1H), 1.19 (s, 9H); ^{13}C NMR (125.78 MHz, $CDCl_3$): δ = 171.8, 141.3, 139.3, 135.5, 135.3, 133.3, 126.4, 118.4, 117.4, 65.9, 54.7, 51.9, 51.1, 51.0, 50.8, 48.2, 47.7, 46.6, 54.4, 45.2, 45.0, 28.5, 28.5, 28.5; IR (neat): ν_{max} (cm^{-1}) = 3383, 2959, 2868, 1668, 1504, 852, 737; HR-MS (ESI, 4500 V): m/z calcd for $C_{20}H_{26}N_3O_3$ ($[M+H]^+$): 356.1969, found 356.1959;



(1*S*,3a*R*,4*S*,7*R*,7a*S*)-*N*-isopropyl-2-(2-nitrophenyl)-2,3,3a,4,7,7a-hexahydro-1*H*-4,7-methanoisoindole-1-carboxamide 12: General procedure 2 was followed using imine (3*S*,7*R*)-**8** (67 mg, 0.5 mmol, 2.0 equiv.), 2-nitrophenol (35 mg, 0.25 mmol, 1.0 equiv.) and isopropyl isocyanide (26 mg, 0.035 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 51 mg (0.15 mmol, 60%) of a bright sticky orange oil. $[\alpha]_D^{20}$ = −828.8° (c = 0.56, $CHCl_3$); ^{1}H NMR (500.23 MHz, $CDCl_3$): δ = 7.65 (dd, *J* = 3.5 Hz, *J* = 9.75 Hz, 1H), 7.29 (m, 1H), 6.91 (d, *J* = 9.0 Hz, 1H), 6.78 (m, 2H), 6.14 (m, 1H), 5.79 (m, 1H), 4.10 (m, 1H), 3.86 (m, 1H), 3.48 (m, 1H), 3.19 (m, 1H), 3.03 (m, 1H), 2.86 (m, 1H), 2.79 (m, 1H), 2.20 (dd, *J* = 4.0 Hz, *J* = 11.0 Hz, 1H), 1.48 (m, 1H), 1.36 (m, 1H), 1.07 (dd, *J* = 2.0 Hz, *J* = 6.5 Hz, 3H), 0.89 (dd, *J* = 2.0 Hz, *J* = 6.5 Hz, 3H); ^{13}C NMR (125.78 MHz, $CDCl_3$): δ = 171.6, 141.2, 139.4, 135.6, 135.2, 133.3, 126.4, 118.5, 117.7, 65.4, 54.6, 51.8, 50.6, 47.7, 46.6, 45.1, 41.3, 22.4, 22.4; IR (neat): ν_{max} (cm^{-1}) = 3369, 2968, 2868, 1657, 1508, 741, 633, 493; HR-MS (ESI, 4500 V): m/z calcd for $C_{19}H_{24}N_3O_3$ ($[M+H]^+$): 342.1812, found 342.1799.



(1*S*,3a*R*,4*S*,7*R*,7a*S*)-*N*-benzyl-2-(2-nitrophenyl)-2,3,3a,4,7,7a-hexahydro-1*H*-4,7-methanoisoindole-1-carboxamide (13): General procedure 2 was followed using imine (3*S*,7*R*)-**8** (67 mg, 0.5 mmol, 2.0 equiv.), 2-nitrophenol (35 mmol, 0.25 mmol, 1.0 equiv.) and benzyl isocyanide (44 mg, 0.046 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 49 mg (01.26 mmol, 51%) of a sticky orange oil. $[\alpha]_D^{20}$ = −942.3° (c = 0.52, $CHCl_3$); ^{1}H NMR (500.23 MHz, $CDCl_3$): δ = 7.61 (dd, *J* = 8.0 Hz, *J* = 1.5 Hz, 1H), 7.30 (m, 1H), 7.16 (m, 4H), 7.14 (m, 2H), 6.94 (m, 1H), 6.17 (m, 1H), 5.84 (m, 1H), 4.35 (d, *J* = 6.0 Hz, 1H), 4.28 (d, 5.5 Hz, 1H), 4.17 (d, *J* = 3.0 Hz, 1H), 3.52 (dd, *J* = 10.8 *J* = 8.5, 1H), 3.22 (m, 1H), 3.07 (m, 1H), 2.90 (m, 1H), 2.80 (m, 1H), 2.22 (dd, *J* = 11.0 Hz *J* = 3.0, 1H), 1.51 (d, *J* = 8.5 Hz, 1H), 1.38 (d, *J* = 8.5 Hz, 1H); ^{13}C NMR (125.78 MHz, $CDCl_3$): δ = 172.7, 141.1, 141.1, 137.9, 135.8, 135.3, 133.3, 128.6, 127.2, 126.4, 118.8, 117.7, 65.6, 54.6, 51.9, 50.9, 47.6, 46.6, 45.2, 43.2; IR (neat): ν_{max} (cm^{-1}) = 3377, 2962, 2866, 1664, 1506, 1259, 1014, 796; HR-MS (ESI, 4500 V): m/z calcd for $C_{23}H_{24}N_3O_3$ ($[M+H]^+$): 390.1812, found 390.1794.

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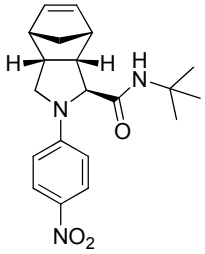
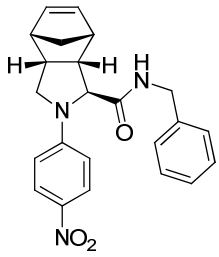
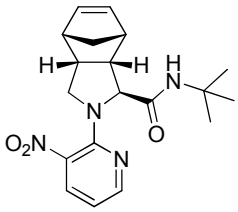


(1*S*,3a*R*,4*S*,7*R*,7a*S*)-*N*-(*tert*-butyl)-2-(4-nitrophenyl)-2,3,3a,4,7,7a-hexahydro-1*H*-4,7-methanoisoindole-1-carboxamide (14): General procedure 2 was followed using imine (3*S*,7*R*)-**8** (67 mg, 0.5 mmol, 2.0 equiv.), 4-nitrophenol (35 mg, 0.25 mmol, 1.0 equiv.) and *tert*-butyl isocyanide (31 mg, 0.042 ml, 0.375 mmol 1.5 equiv.) giving a yield of 45 mg (0.13 mmol, 51%) of a yellow solid.
$[\alpha]_D^{20}$ = −42.7° (c = 0.52, $CHCl_3$); ^{1}H NMR (500.23 MHz, $CDCl_3$): δ = 8.03 (d, *J* = 9.0 Hz, 2H), 6.34 (d, *J* = 9.0 Hz, 2H), 6.08 (t, *J* = 4.0 Hz, 2H), 5.36 (bs, 1H), 3.56 (t, *J* = 2.0 Hz, 1H), 3.53 (s, 1H), 3.15 (s, 1H), 3.03 (m, 3H), 2.95 (s, 1H), 1.58 (d, *J* = 8.5 Hz, 1H), 1.44 (d, *J* = 8.5 Hz, 1H) 1.19 (s, 9H); ^{13}C NMR (100.61 MHz, $CDCl_3$): δ = 171.6, 150.5, 138.3, 136.0, 135.9, 126.1, 126.1, 111.6, 111.6, 67.4, 52.7, 52.4, 52.0, 51.3, 47.4, 46.7, 44.1, 28.6, 28.6, 28.6; IR (neat): ν_{max} (cm^{-1}) = 3298, 2966, 2858, 1595, 1302, 1109, 823, 656; HR-MS (ESI, 4500 V): m/z calcd for $C_{20}H_{26}N_3O_3$ ($[M+H]^+$): 356.1969, found 356.1956.



(1*S*,3a*R*,4*S*,7*R*,7a*S*)-*N*-benzyl-2-(4-nitrophenyl)-2,3,3a,4,7,7a-hexahydro-1*H*-4,7-methanoisoindole-1-carboxamide (**15)**: General procedure 2 was followed using imine (3*S*,7*R*)-**8** (67 mg, 0.5 mmol, 2.0 equiv.), 4-nitrophenol (35 mg, 0.25 mmol, 1.0 equiv.) and benzyl isocyanide (44 mg, 0.046 ml, 0.375 mmol and 1.5 equiv.) giving a yield of 56 mg (0.14 mmol, 58%) of a yellow solid.
$[\alpha]_D^{20}$ = −49.0° (c = 0.49, $CHCl_3$); ^{1}H NMR (500.23 MHz, $CDCl_3$): δ = 8.00 (d, *J* = 9.5 Hz, 2H), 7.18 (m, 3H), 7.02 (m, 2H), 6.34 (d, *J* = 9.0 Hz, 2H), 6.10 (m, 2H), 5.92 (s, 1H), 4.33 (d, *J* = 6.0 Hz, 2H), 3.74 (d, *J* = 3.0 Hz, 1H), 3.58 (m, 1H), 3.19 (s, 1H), 3.06 (m, 3H), 2.96 (s, 1H), 1.59 (d, *J* = 8.5 Hz, 1H), 1.45 (d, *J* = 8.5 Hz, 1H); ^{13}C NMR (125.78 MHz, $CDCl_3$): δ =172.4, 150.4, 138.4, 137.7, 136.0, 135.9, 128.7, 128.7, 127.7, 127.5, 127.5, 126.1, 126.1, 111.7, 111.7 66.8, 52.8, 52.5, 52.0, 47.4, 45.8, 44.1, 43.3; IR (neat): ν_{max} (cm^{-1}) = 3312, 2962, 2869, 1651, 1597, 1300, 1109, 825, 690; HR-MS (ESI, 4500 V): m/z calcd for $C_{23}H_{24}N_3O_3$ ($[M+H]^+$): 390.1812, found 390.1794.



(1*S*,3a*R*,4*S*,7*R*,7a*S*)-*N*-(*tert*-butyl)-2-(3-nitropyridin-2-yl)-2,3,3a,4,7,7a-hexa-hydro-1*H*-4,7-methanoisoindole-1-carboxamide (**16):** General procedure 2 was followed using imine (3*S*,7*R*)-**8** (67 mg, 0.5 mmol, 2.0 equiv.), 3-nitropyridin-2-ol (35 mg, 0.25 mmol, 1.0 equiv.) and *tert*-butyl isocyanide (31 mg, 0.042 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 36 mg (0.10 mmol, 40%) of a dark yellow solid.
$[\alpha]_D^{20}$ = −474.6° (c = 0.51, $CHCl_3$); ^{1}H NMR (500.23 MHz, $CDCl_3$): δ = 8.23 (dd, *J* = 2.0 Hz, *J* = 4.5 Hz, 1H), 8.03 (dd, *J* = 1.5 Hz, *J* = 8.0 1H), 6.69 (dd, *J* = 4.5 Hz, *J* = 8.5 1H), 6.33 (bs, 1H), 5.94 (m, 1H), 5.56 (m, 1H), 5.03 (s, 1H), 3.49 (dd, *J* = 8.5, *J* = 12 Hz, 1H), 3.13 (m, 1H), 2.76 (m, 1H), 2.16 (dd, *J* = 2.0, *J* = 12.0 Hz, 1H), 1.39 (d, *J* = 8.0 Hz, 1H), 1.31 (d, *J* = 8.5 Hz, 1H), 1.22 (s, 9H); ^{13}C NMR (125.78 MHz, $CDCl_3$): δ = 171.5, 151.7, 150.1, 150.1, 135.8, 134.7, 133.6, 113.1, 63.6, 53.8, 51.3, 51.0, 48.5, 47.8, 46.8, 44.8, 28.6; IR (neat): ν_{max} (cm^{-1}) = 3398, 2959, 2872, 1668, 1448, 716, 557; HR-MS (ESI, 4500 V): m/z calcd for $C_{19}H_{24}N_4O_3$ ($[M+H]^+$): 357.1921, found 357.1905.

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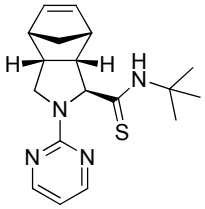
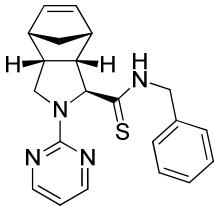
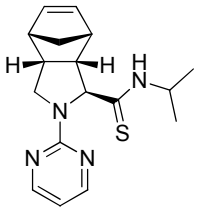


(1*S*,3a*R*,4*S*,7*R*,7a*S*)-*N*-(*tert*-butyl)-2-(pyrimidin-2-yl)-2,3,3a,4,7,7a-hexahydro-1*H*-4,7-methanoisoindole-1-carbothioamide (17): General procedure 2 was followed using imine (3*S*,7*R*)-**8** (67 mg, 0.5 mmol, 2.0 equiv.), 2-mercaptopyrimidine (28 mg, 0.25 mmol, 1.0 equiv.) and *tert*-butyl isocyanide (31 mg, 0.042 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 50 mg (0.15 mmol, 61%) of a light yellow solid.
$[\alpha]_D^{20}$ = −80.8° (c = 0.495, $CHCl_3$); ^{1}H NMR (500.23 MHz, $CDCl_3$): δ = 8.23 (d, *J* = 4.5 Hz, 2H), 7.99 (bs, 1H), 6.48 (t, *J* = 5.0 Hz, 1H), 5.98 (t, *J* = 7.0 Hz, 2H), 4.39 (d, *J* = 2.5 Hz, 1H), 3.60 (dd, *J* = 3.5 Hz, *J* = 11.5 Hz, 1H), 3.50 (dd, *J* = 8.5 Hz, *J* = 11.8 Hz, 1H), 3.37 (m, 1H), 3.10 (m, 1H), 2.92 (m, 1H), 2.88 (m, 1H), 1.46 (d, *J* = 8.5 Hz, 1H), 1.38 (m, 10H); ^{13}C NMR (125.78 MHz, $CDCl_3$): δ = 202.6, 159.8, 157.7, 157.7, 135.6, 135.4, 110.6, 72.9, 55.0, 53.4, 51.7, 50.1, 47.5), 46.9, 44.2, 27.6, 27.6, 27.6; IR (neat): ν_{max} (cm^{-1}) = 3303, 2964, 2856, 1680, 1377, 797, 719, 627; HR-MS (ESI, 4500 V): m/z calcd for $C_{18}H_{25}N_4S$ ($[M+H]^+$): 329.1794, found 329.1783.



(1*S*,3a*R*,4*S*,7*R*,7a*S*)-*N*-benzyl-2-(pyrimidin-2-yl)-2,3,3a,4,7,7a-hexahydro-1*H*-4,7-methanoisoindole-1-carbothioamide (18): General procedure 2 was followed using imine (3*S*,7*R*)-**8** (67 mg, 0.5 mmol, 2.0 equiv.), 2-mercaptopyrimidine (28 mg, 0.25 mmol, 1.0 equiv.) and benzyl isocyanide (44 mg, 0.046 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 57 mg (0.16 mmol, 63%) of a off-white solid.
$[\alpha]_D^{20}$ = −60.0° (c = 0.6, $CHCl_3$); ^{1}H NMR (500.23 MHz, $CDCl_3$): δ = 8.38 (bs, 1H), 8.17 (d, *J* = 5.0 Hz, 2H), 7.21 (m, 3H), 7.10 (t, *J* = 5.5 Hz, 2H) 6.45 (t, *J* = 5.0 Hz, 1H), 5.98 (s, 1H), 4.82 (m, 1H), 4.67 (m, 1H), 4.61 (s, 1H), 3.64 (m, 1H), 3.46 (m, 2H), 3.13 (s, 1H), 2.96 (m, 1H), 2.89 (s, 1H), 1.49 (d, *J* = 8.5 Hz, 1H), 1.41 (d, *J* = 8.0 Hz, 1H); ^{13}C NMR (125.78 MHz, $CDCl_3$): δ = 203.7, 158.8, 156.7, 156.7, 135.2, 134.5, 134.4, 134.4, 127.7, 127.7, 127.7, 126.7, 126.7, 109.7, 70.2, 52.5, 50.6, 49.0, 48.4, 46.4, 45.9, 43.2; IR (neat): ν_{max} (cm^{-1}) = 3175, 2966, 2870, 1585, 1493, 795, 696; HR-MS (ESI, 4500 V): m/z calcd for $C_{21}H_{23}N_4S$ ($[M+H]^+$): 363.1638, found 363.1632.



(1*S*,3a*R*,4*S*,7*R*,7a*S*)-*N*-isopropyl-2-(pyrimidin-2-yl)-2,3,3a,4,7,7a-hexahydro-1*H*-4,7-methanoisoindole-1-carbothioamide (19): General procedure 2 was followed using imine (3*S*,7*R*)-**8** (67 mg, 0.5 mmol, 2.0 equiv.), 2-mercaptopyrimidine (28 mg, 0.25 mmol, 1.0 equiv.) and isopropyl isocyanide (26 mg, 0.035 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 54 mg (0.17 mmol, 68%) of light orange solid.
$[\alpha]_D^{20}$ = −173.7° (c = 0.50, $CHCl_3$); ^{1}H NMR (500.23 MHz, $CDCl_3$): δ = 8.51 (dd, *J* = 5.0 Hz, *J* = 10.0 Hz, 1 H), 8.22 (d, *J* = 5.0 Hz, 2H), 7.92 (bs, 1H), 6.47 (t, *J* = 4.5 Hz, 1H), 5.98 (m, 2H), 4.53 (m, 1H), 4.49 (d, *J* = 2.5 Hz, 1H), 3.64 (dd, *J* = 3.0 Hz, *J* = 12 Hz, 1H), 3.48 (dd, *J* = 3.0 Hz, *J* = 12 Hz, 1H), 3.40 (m, 1H), 3.11 (m, 1H), 2.94 (m, 1H), 2.89 (m, 1H), 1.47 (d, *J* = 8.5 Hz, 1H), 1.39 (d, *J* = 8.5 H, 1H), 1.07 (m, 6H); ^{13}C NMR (125.78 MHz, $CDCl_3$): δ = 202.5, 159.9, 157.7, 157.7, 135.4, 135.4, 110.6, 71.4, 53.3, 51.7, 50.0, 47.4, 46.9, 46.7, 44.2, 21.3, 21.1; IR (neat): ν_{max} (cm^{-1}) = 3329, 2966, 2868, 1666, 1580, 1445, 804, 721; HR-MS (ESI, 4500 V): m/z calcd for $C_{17}H_{23}N_4S$ ($[M+H]^+$): 315.1638, found 315.1634.

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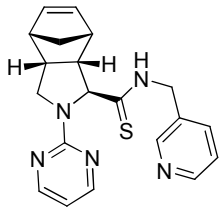
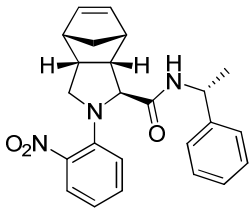
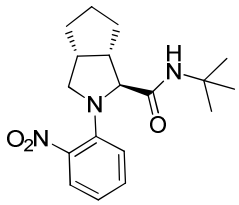


(1*S*,3a*R*,4*S*,7*R*,7a*S*)-*N*-(pyridin-3-ylmethyl)-2-(pyrimidin-2-yl)-2,3,3a,4,7,7a-hexahydro-1*H*-4,7-methanoisoindole-1-carbothioamide (20): General procedure A was followed using imine (3*S*,7*R*)-**8** (67 mg, 0.5 mmol, 2.0 equiv.), 2-mercaptopyrimidine (28 mg, 0.25 mmol, 1.0 equiv.) and 3-(isocyanomethyl)-pyridine(44 mg, 0.375 mmol, 1.5 equiv.) giving a yield of 34 mg (0.09 mmol, 37%) of an orange solid.
$[\alpha]_D^{20}$ = −106.1° (c = 0.51, $CHCl_3$); ^{1}H NMR (400.16 MHz, $CDCl_3$): δ = 8.59 (bs, 1H), 8.41 (m, 2H), 8.16 (d, *J* = 4.4 Hz, 2H), 7.47 (d, *J* = 7.6 Hz, 1H), 7.11 (dd, *J* = 4.8 Hz, *J* = 7.8 Hz, 1H), 6.46 (t, *J* = 4.8 Hz, 1H), 5.98 (m, 2H), 4.89 (dd, *J* = 6.0 Hz, *J* = 15.2 Hz, 1H), 4.70 (dd, *J* = 6.0 Hz, *J* = 15.2 Hz, 1H), 4.58 (d, *J* = 2.4 Hz, 1H), 3.63 (m, 1H), 3.42 (m, 2H), 3.11 (m, 1H), 2.94 (m, 2H), 1.48 (d, *J* = 8.4 Hz, 1H), 1.40 (d, *J* = 8.4 Hz, 1H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 204.7, 158.9, 156.7, 148.1, 134.5, 134.3, 131.1, 122.5, 109.8, 70.3, 52.6, 50.7, 49.1, 46.4, 46.0, 43.2, 41.2; IR (neat): ν_{max} (cm^{-1}) = 3173, 2976, 2204, 1499, 922, 725, 642; HR-MS (ESI, 4500 V): m/z calcd for $C_{20}H_{22}N_5S$ ($[M+H]^+$): 364.1590, found 364.1575.



(1*S*,3a*R*,4*S*,7*R*,7a*S*)-2-(2-nitrophenyl)-*N*-((*R*)-1-phenylethyl)-2,3,3a,4,7,7a-hexahydro-1*H*-4,7-methanoisoindole-1-carboxamide (21): General procedure A was followed using (3*S*,7*R*)-**8** (67 mg, 0.5 mmol, 2.0 equiv.), 2-nitrophenol (35 mg, 0.25 mmol, 1.0 equiv.) and (*S*)-(-)-methylbenzyl isocyanide (49 mg, 0.051 ml, 0.375 mmol, 1.5 equiv giving a yield of 53 mg (0.13 mmol, 53%) of an orange solid.
$[\alpha]_D^{20}$ = −756.4° (c = 0.55, $CHCl_3$); ^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 7.63 (d, *J* = 8.0 Hz, 1H), 7.26 (m, 2H), 7.02 (m, 3H), 6.88 (m, 3H), 6.79 (t, *J* = 7.5 Hz, 1H), 6.15 (m, 1H), 5.84 (m, 1H), 4.92 (m, 1H), 4.09 (s, 1H), 3.56 (dd, *J* = 8.5 Hz, *J* = 10.5 Hz, 1H), 3.20 (s, 1H), 3.09 (m, 1H), 2.95 (m, 1H), 2.81 (s, 1H), 2.26 (dd, *J* = 3.0, *J* = 10.8, 1H), 1.51 (m, 1H), 1.39 (m, 1H), 1.37 (d, *J* = 7.0 Hz); ^{13}C NMR (100.61 MHz, $CDCl_3$): δ = 171.7, 143.4, 141.1, 139.7, 135.8, 135.3, 133.3, 128.3 , 128.3, 126.9, 126.3, 125.7, 125.7, 118.9, 117.9, 65.5, 54.5, 52.0, 50.7, 48.8, 47.6, 46.6, 45.2, 22.5; IR (neat): ν_{max} (cm^{-1}) = 3379, 3312, 2966, 1655, 1502, 739, 698; HR-MS (ESI, 4500 V): m/z calcd for $C_{20}H_{26}N_3O_3$ ($[M+H]^+$): 404.1969, found 404.1949.



(1*S*,3a*R*,6a*S*)-*N*-(*tert*-butyl)-2-(2-nitrophenyl)octahydrocyclopenta[*c*]pyrrole-1-carboxamide (22): General procedure 2 was followed using 3-azabicyclo[3.3.0]oct-2-ene **32** (55 mg, 0.5 mmol, 2.0 equiv.), 2-nitrophenol (35 mg, 0.25 mmol, 1.0 equiv.) and *tert*-butyl isocyanide (31 mg, 0.042 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 61 mg (0.18 mmol, 72%) of a bright sticky orange oil.
(*Note: Minor diastereomer is given in italic).* $[\alpha]_D^{20}$ = −734° (c = 0.52, $CHCl_3$);[5] ^{1}H NMR (500.23 MHz, $CDCl_3$): δ = 7.67 (m, 2H), 7.33 (m, 1H), 7.00 (d, *J* = 8.0 Hz, 1H), 6.86 (m, 1H), 6.56 (bs, 1H), 3.88 (d, *J* = 6.0 Hz, 1H), 3.71 (m, 1H), 2.73 (m, 1H), 2.62 (m, 1H), 2.49 (dd, *J* = 3.0 Hz, *J* = 10.3 Hz, 1H), 1.88 (m, 2H), 1.70 (m, 2H), 1.66 (m, 1H), 1.21 (m, 1H), 1.18 (s, 9H); ^{13}C NMR (125.78 MHz, $CDCl_3$): δ = 171.7, 142.1, 140.4, 135.5, 126.1, 119.5, 117.8, 69.6), 58.4, 50.8), 49.8), 43.2, 32.2, 31.7, 28.5, 28.5, 28.5, 24.9; *^{1}H NMR (500.23 MHz, $CDCl_3$): δ = 7.67 (m, 2H), 7.33 (m, 1H), 7.00 (d, J = 8.0 Hz, 1H), 6.86 (m, 1H), 6.48 (bs, 1H), 4.36 (d, J = 7.6 Hz, 1H), 4.00 (m, 1H), 2.73 (m, 1H), 2.62 (m, 1H), 2.49 (dd, J = 3.0 Hz, J = 10.3 Hz, 1H), 1.88 (m, 2H), 1.70 (m, 2H), 1.66 (m, 1H), 1.21 (m, 1H), 1.18 (s, 9H); ^{13}C NMR (125.78 MHz, $CDCl_3$): δ = 171.7, 142.1, 140.4, 135.2, 125.8, 119.8, 117.7, 70.1, 59.2), 50.8, 46.9, 42.8, 34.6, 29.7, 28.5, 28.5, 28.5, 25.9*; IR (neat): ν_{max} (cm^{-1}) = 3689, 3352, 2957, 1655, 1506, 1265, 746, 710; HR-MS (ESI, 4500 V): m/z calcd for $C_{18}H_{26}N_3O_3$ ($[M+H]^+$): 332.1969, found 332.1958;

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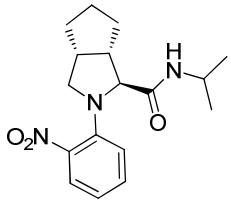
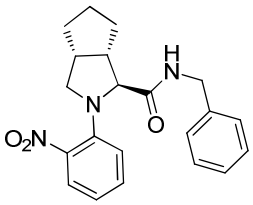
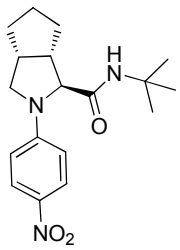


(1*S*,3a*R*,6a*S*)-*N*-isopropyl-2-(2-nitrophenyl)octahydrocyclopenta[*c*]pyrrole-1-carboxamide (23): General procedure 2 was followed using 3-azabicyclo[3.3.0]oct-2-ene **32** (55 mg, 0.5 mmol, 2.0 equiv.), 2-nitrophenol (35 mg, 0.25 mmol, 1.0 equiv.) and isopropyl isocyanide (26 mg, 0.035 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 56 mg (0.18 mmol, 71%) of a sticky orange oil.
(*Note: Minor diastereomer is given in italic).* $[\alpha]_D^{20}$ = −722.9° (c = 0.55, $CHCl_3$);[5] ^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 7.62 (dd, *J* = 1.5 Hz, *J* = 8.0 Hz, 1H), 7.33 (m, 1H), 7.10 (m, 4H), 7.02 (d, *J* = 8.5 Hz, 1H), 6.96 (t, *J* = 3.8 Hz, 2H), 6.87 (t, *J* = 7.5 Hz, 1H), 4.30 (d, *J* = 6.0 Hz, 2H), 4.05 (d, *J* = 6.5 Hz, 1H), 3.72 (dd, *J* = 7.5 Hz, *J* = 10.3 Hz, 1H), 2.77 (m, 1H), 2.63 (m, 1H), 2.51 (dd, *J* = 3.5 Hz, *J* = 10.0 Hz, 1H), 1.91 (m, 2H), 1.72 (m, 2H), 1.61 (m, 1H), 1.21 (m, 1H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 170.5, 141.0, 139.7, 132.5, 125.0, 119.1, 117.1, 68.2, 57.5, 48.7, 42.2, 40.0, 31.2, 30.8, 24.0, 21.4, 21.3; *^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 7.66 (dd, J = 1.5 Hz, J = 8.0 Hz, 1H), 7.33 (m, 1H), 7.00 (d, J = 8.5 Hz, 1H), 6.86 (t, J = 7.5 Hz, 1H), 6.50 (bs, 1H), 4.45 (d, J = 7.6 Hz, 2H), 3.88 (m, 1H), 3.70 (dd, J = 7.0 Hz, J = 10.0 Hz, 1H), 3.49 (m, 1H), 3.72 (m, 1H), 2.99 (m, 1H), 2.81 (m, 2H), 2.50 (dd, J = 3.5 Hz, J = 10.0 Hz, 1H), 1.88 (m, 1H), 1.62 (m, 1H), 1.21 (m, 1H), 1.12 (m, 3H), 0.79 (m, 3H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 170.5, 141.0, 139.7, 132.2, 124.7, 118.7, 117.0, 65.6, 58.3, 45.8, 42.0, 40.0, 33.6, 29.0, 25.0, 21.7, 21.3*; IR (neat): ν_{max} (cm^{-1}) = 3371, 2962, 2860, 1651, 1506, 1277, 773, 741; HR-MS (ESI, 4500 V): m/z calcd for $C_{17}H_{24}N_3O_3$ ($[M+H]^+$): 318.1812, found 318.1799.



(1*S*,3a*R*,6a*S*)-*N*-benzyl-2-(2-nitrophenyl)octahydrocyclopenta[*c*]pyrrole-1-carboxamide (24): General procedure 2 was followed using 3-azabicyclo[3.3.0]oct-2-ene **32** (55 mg, 0.5 mmol, 2.0 equiv.), 2-nitrophenol (35 mg, 0.25 mmol, 1.0 equiv.) and benzylisocyanide (44 mg, 0.046 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 69 mg (0.19 mmol, 76%) of a sticky orange oil.
(*Note: Minor diastereomer is given in italic).* $[\alpha]_D^{20}$ = −650.9° (c = 0.55, $CHCl_3$);[5] ^{1}H NMR (500.23 MHz, $CDCl_3$): δ = 7.62 (dd, *J* = 1.5 Hz, *J* = 8.0 Hz, 1H), 7.33 (m, 1H), 7.10 (m, 4H), 7.02 (d, *J* = 8.5 Hz, 1H), 6.96 (t, *J* = 3.8 Hz, 2H), 6.87 (t, *J* = 7.5 Hz, 1H), 4.30 (d, *J* = 6.0 Hz, 2H), 4.05 (d, *J* = 6.5 Hz, 1H), 3.72 (dd, *J* = 7.5 Hz, *J* = 10.3 Hz, 1H), 2.77 (m, 1H), 2.63 (m, 1H), 2.51 (dd, *J* = 3.5 Hz, *J* = 10.0 Hz, 1H), 1.91 (m, 2H), 1.72 (m, 2H), 1.61 (m, 1H), 1.21 (m, 1H); ^{13}C NMR (125.78 MHz, $CDCl_3$): δ = 171.5, 140.9, 139.7, 137.0, 132.5, 127.5, 127.5, 126.3, 126.3, 126.2, 125.1, 118.9, 117.1), 68.2, 57.4, 48.9, 42.3, 41.9, 30.9, 30.6, 23.8; *^{1}H NMR (500.23 MHz, $CDCl_3$): δ = 7.62 (dd, J = 1.5 Hz, J = 8.0 Hz, 1H), 7.33 (m, 1H), 7.10 (m, 4H), 7.02 (d, J = 8.5 Hz, 1H), 6.96 (t, J = 3.8 Hz, 2H), 6.87 (t, J = 7.5 Hz, 1H), 4.55 (d, J = 7.6 Hz, 2H), 4.05 (d, J = 6.5 Hz, 1H), 3.72 (dd, J = 7.5 Hz, J = 10.3 Hz, 1H), 3.17 (m, 1H), 3.01 (m, 1H), 2.51 (dd, J = 3.5 Hz, J = 10.0 Hz, 1H), 1.91 (m, 2H), 1.72 (m, 2H), 1.61 (m, 1H), 1.21 (m, 1H); ^{13}C NMR (125.78 MHz, $CDCl_3$): δ = 169.7, 141.1, 139.7, 136.8, 132.3, 127.4, 127.4, 126.2, 126.2, 126.1, 124.8, 119.2, 116.9, 65.7, 58.3, 45.9, 42.3, 33.6, 28.9, 26.7, 24.9*; IR (neat): ν_{max} (cm^{-1}) = 3373, 2945, 2868, 1655, 1508, 1277, 740, 598; HR-MS (ESI, 4500 V): m/z calcd for $C_{21}H_{24}N_3O_3$ ($[M+H]^+$): 366.1812, found 366.1801.



(1*S*,3a*R*,6a*S*)-*N*-(*tert*-butyl)-2-(4-nitrophenyl)octahydrocyclopenta[*c*]pyrrole-1-carboxamide (25): General procedure 2 was followed using 3-azabicyclo[3.3.0]oct-2-ene **32** (55 mg, 0.5 mmol, 2.0 equiv.), 4-nitrophenol (35 mg, 0.25 mmol, 1.0 equiv.) and *tert*-butyl isocyanide (31 mg, 0.042 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 80 mg (0.23 mmol, 90%) of a yellow solid.
(*Note: Minor diastereomer is given in italic).* $[\alpha]_D^{20}$ = −67.4° (c = 0.48, $CHCl_3$);[5] ^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 8.04 (m, 2H), 6.46 (m, 2H), 5.61 (bs, 1H), 3.81 (m, 2H), 3.12

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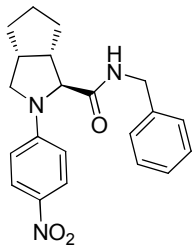
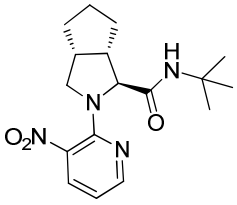
(dd, *J* = 6.8 Hz, *J* = 10.4 Hz, 1H), 2.83 (m, 1H), 2.73 (m, 1H), 2.01 (m, 1H), 1.84 (m, 1H), 1.73 (m, 1H), 1.63 (m, 1H), 1.53 (m, 2H), 1.21 (s, 9H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 170.3, 150.6, 137.6, 124.8, 124.8, 110.7, 110.7, 69.9, 54.7, 50.4, 49.2, 40.7, 31.6, 30.5, 27.6, 27.6, 23.8; *^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 8.04 (m, 2H), 6.87 (m, 2H), 5.61 (bs, 1H), 4.12 (m, 2H), 3.34 (dd, J = 6.8 Hz, J = 10.4 Hz, 1H), 3.66 (m, 1H), 3.35 (m, 1H), 2.01 (m, 1H), 1.84 (m, 1H), 1.73 (m, 1H), 1.63 (m, 1H), 1.53 (m, 2H), 1.21 (s, 9H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 168.3, 150.6, 137.6, 124.6, 124.6, 111.4, 111.4, 66.7, 55.4, 50.4, 46.4, 41.5, 30.0, 28.7, 26.9, 26.9, 25.2*; IR (neat): ν_{max} (cm^{-1}) = 3298, 2957, 2864, 1597, 1296, 1109, 825, 752; HR-MS (ESI, 4500 V): m/z calcd for $C_{18}H_{26}N_3O_3$ ($[M+H]^+$): 332.1969, found 332.1957.



(1*S*,3a*R*,6a*S*)-*N*-benzyl-2-(4-nitrophenyl)octahydrocyclopenta[*c*]pyrrole-1-carboxamide (26): General procedure 2 was followed using 3-azabicyclo[3.3.0]oct-2-ene **32** (55 mg, 0.5 mmol, 2.0 equiv.), 4-nitrophenol (35 mg, 0.25 mmol, 1.0 equiv.) and benzylisocyanide (44 mg, 0.046 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 69 mg (0.19 mmol, 76%) of a sticky yellow oil.
(*Note: Minor diastereomer is given in italic).* $[\alpha]_D^{20}$ = −90.9° (c = 0.55, $CHCl_3$);[5] ^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 7.97 (d, *J* = 2.0 Hz, 2H), 7.19 (m, 3H), 7.06 (t, *J* = 5.6 Hz, 2H), 6.42 (m, 2H), 6.25 (bs, 1H), 4.34 (m, 2H), 3.99 (d, *J* = 2.4 Hz, 1H), 3.80 (dd, *J* = 8.4 Hz, *J* = 10.0 Hz, 1H), 3.11 (dd, *J* = 6.8 Hz, *J* = 10.0 Hz, 1H), 2.80 (m, 1H), 2.04 (m, 1H), 1.83 (m, 1H), 1.75 (m, 1H), 1.64 (m, 1H), 1.55 (m, 3H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 172.0, 151.5, 138.6, 137.9, 128.7, 128.7, 127.9, 127.9, 127.7, 126.2, 126.2, 112.1, 112.1, 70.2, 55.6, 50.3, 43.3, 38.6, 32.4, 30.8, 24.8; *^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 7.97 (d, J = 2.0 Hz, 2H), 7.19 (m, 3H), 7.06 (t, J = 5.6 Hz, 2H), 6.79 (m, 2H), 6.25 (bs, 1H), 4.34 (m, 2H), 3.99 (d, J = 2.4 Hz, 1H), 3.64 (dd, J = 8.4 Hz, J = 10.0 Hz, 1H), 3.32 (dd, J = 6.8 Hz, J = 10.0 Hz, 1H), 3.46 (m, 1H), 2.04 (m, 1H), 1.83 (m, 1H), 1.75 (m, 1H), 1.64 (m, 1H), 1.55 (m, 3H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 170.4, 152.0, 138.6, 137.7, 128.7, 127.7, 127.7, 127.5, 126.0, 126.0, 112.4, 112.4, 67.3, 56.3, 47.4), 43.4, 42.7, 30.8, 26.1, 24.9*; IR (neat): ν_{max} (cm^{-1}) = 3283, 2949, 2866, 1653, 1597, 1294, 1109, 750; HR-MS (ESI, 4500 V): m/z calcd for $C_{21}H_{24}N_3O_3$ ($[M+H]^+$): 366.1812, found 366.1804.



(1*S*,3a*R*,6a*S*)-*N*-(*tert*-butyl)-2-(3-nitropyridin-2-yl)octahydrocyclopenta[*c*]-pyrrole-1-carboxamide (27): General procedure 2 was followed using 3-azabicyclo[3.3.0]oct-2-ene **32** (55 mg, 0.5 mmol, 2.0 equiv.), 3-nitropyridin-2-ol (35 mg, 0.25 mmol, 1.0 equiv.) and *tert*-butyl isocyanide (31 mg, 0.042 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 61 mg (0.18 mmol, 73%) of a sticky orange oil.
(*Note: Minor diastereomer is given in italic).* $[\alpha]_D^{20}$ = −652.4° (c = 0.52, $CHCl_3$);[5] ^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 8.25 (dd, *J* = 2.0 Hz, *J* = 4.6, 1H), 8.04 (dd, *J* = 1.6 Hz, *J* = 8.0 Hz, 1H), 6.24 (bs, 1H), 4.86 (d, *J* = 4.4 Hz, 1H), 3.70 (dd, *J* = 7.6 Hz, *J* = 11.2 Hz, 1H), 2.82 (m, 1H), 2.68 (m, 1H), 2.54 (dd, *J* = 2.8 Hz, *J* = 11.2 Hz, 1H), 1.94 (m, 1H), 1.72 (m, 2H), 1.57 (m, 2H), 1.23 (s, 9H), 1.14 (m, 1H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 170.5, 150.9, 149.8, 133.7, 131.5, 112.5, 67.0), 56.1, 49.3, 46.7, 42.3, 31.7, 31.4, 31.1, 24.1, 24.1, 24.1; *^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 8.25 (dd, J = 2.0 Hz, J = 4.6, 1H), 8.04 (dd, J = 1.6 Hz, J = 8.0 Hz, 1H), 6.07 (bs, 1H), 5.04 (d, J = 7.6 Hz, 1H), 3.70 (dd, J = 7.6 Hz, J = 11.2 Hz, 1H), 3.24 (m, 1H), 2.95 (m, 1H), 2.54 (dd, J = 2.8 Hz, J = 11.2 Hz, 1H), 1.94 (m, 1H), 1.72 (m, 2H), 1.57 (m, 2H), 1.23 (s, 9H), 1.14 (m, 1H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 169.0, 150.9, 149.8, 133.4, 131.5, 112.7, 64.6, 56.2, 49.3, 45.1, 42.6, 31.4, 28.7, 25.9, 25.9, 25.9, 24.32*; IR (neat): ν_{max} (cm^{-1}) = 3396, 2953, 2868, 1664, 1456, 763, 540; HR-MS (ESI, 4500 V): m/z calcd for $C_{17}H_{25}N_4O_3$ ($[M+H]^+$): 333.1921, found 333.1907.

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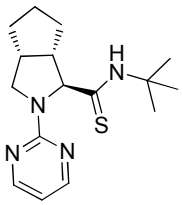
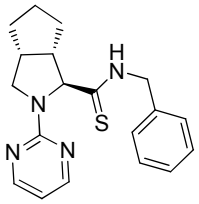
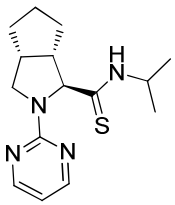


(1*S*,3a*R*,6a*S*)-*N*-(*tert*-butyl)-2-(pyrimidin-2-yl)octahydrocyclopenta[*c*]pyrrole-1-carbothioamide (28): General procedure 2 was followed using 3-azabicyclo[3.3.0]oct-2-ene **32** (55 mg, 0.5 mmol, 2.0 equiv.), 2-mercaptopyrimidine (28 mg, 0.25 mmol, 1.0 equiv.) and *tert*-butyl isocyanide (31 mg, 0.042 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 61 mg (0.20 mmol, 80%) of a off-white solid.
(*Note: Minor diastereomer is given in italic).* $[\alpha]_D^{20}$ = −129.4° (c = 0.51, $CHCl_3$);[5] ^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 8.28 (d, *J* = 4.8 Hz, 2H), 8.07 (bs, 1H), 6.53 (t, *J* = 4.8 Hz, 1H), 4.67 (d, *J* = 2.8 Hz, 1H), 3.97 (dd, *J* = 8.4 Hz, *J* = 11.4 Hz, 1H), 3.58 (dd, *J* = 6.4 Hz, *J* = 11.4 Hz, 1H) 3.03 (m, 1H), 2.84 (m, 1H) 2.05 (m, 1H), 1.85 (m, 1H), 1.73 (m, 1H), 1.60 (m, 2H), 1.51 (m, 1H), 1.24 (s, 9H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 202.3, 160.9, 157.7, 157.7, 111.1, 46.5, 54.1, 51.7, 41.6, 32.8, 31.5, 27.6, 27.6, 27.6, 25.1; *^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 8.28 (d, J = 4.8 Hz, 2H), 7.50 (bs, 1H), 7.08 (t, J = 4.8 Hz, 1H), 4.97 (d, J = 2.8 Hz, 1H), 4.28 (dd, J = 8.4 Hz, J = 11.4 Hz, 1H), 3.58 (dd, J = 6.4 Hz, J = 11.4 Hz, 1H) 3.30 (m, 1H), 3.16 (m, 1H) 2.05 (m, 1H), 1.85 (m, 1H), 1.73 (m, 1H), 1.60 (m, 2H), 1.51 (m, 1H), 1.24 (s, 9H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 199.5, 160.9, 157.7, 157.7, 111.7, 75.3, 54.9, 49.5, 41.7, 29.7, 27.2, 27.6, 27.6, 27.6, 25.8*; IR (neat): ν_{max} (cm^{-1}) = 3312, 2961, 2872, 1580, 1460, 1076, 798, 635; HR-MS (ESI, 4500 V): m/z calcd for $C_{16}H_{25}N_4S$ ($[M+H]^+$): 305.1794, found 305.1780.



(1*S*,3a*R*,6a*S*)-*N*-benzyl-2-(pyrimidin-2-yl)octahydrocyclopenta[*c*]pyrrole-1-carbothioamide (29): General procedure 2 was followed using 3-azabicyclo[3.3.0]oct-2-ene **32** (55 mg, 0.5 mmol, 2.0 equiv.), 2-mercaptopyrimidine (28 mg, 0.25 mmol, 1.0 equiv.) and benzyl isocyanide (44 mg, 0.046 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 49 mg (0.15 mmol, 58%) of a white solid.
(*Note: Minor diastereomer is given in italic).* $[\alpha]_D^{20}$ = −66.7° (c = 0.48, $CHCl_3$);[5] ^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 8.46 (bs, 1H), 8.21 (d, *J* = 4.8 Hz, 2H), 7.18 (m, 3H), 7.11 (m, 2H), 6.50 (t, *J* = 4.4 Hz, 1H), 4.83 (m, 2H), 4.70 (dd, *J* = 5.2 Hz, *J* = 15.2, 1H), 3.79 (dd, *J* = 8.4 Hz, *J* = 11.4 Hz, 1H), 3.58 (dd, *J* = 6.4 Hz, *J* = 11.4 Hz, 1H) 3.04 (m, 1H), 2.81 (m, 1H) 2.05 (m, 1H), 1.80 (m, 1H), 1.59 (m, 2H), 1.50 (m, 2H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 204.4, 160.9, 157.8, 157.8, 136.4, 128.7, 128.0, 127.8, 111.1, 74.8, 54.1, 51.8, 49.3, 41.7, 32.7, 31.4, 25.1; *^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 7.87 (bs, 1H), 8.27 (d, J = 4.8 Hz, 2H), 7.18 (m, 3H), 7.11 (m, 2H), 6.50 (t, J = 4.4 Hz, 1H), 5.15 (d, 1H), 4.83 (m, 1H), 4.98 (dd, J = 5.2 Hz, J = 15.2, 1H), 4.21 (dd, J = 8.4 Hz, J = 11.4 Hz, 1H), 4.04 (dd, J = 6.4 Hz, J = 11.4 Hz, 1H) 3.16 (m, 1H), 2.67 (m, 1H) 2.05 (m, 1H), 1.80 (m, 1H), 1.59 (m, 2H), 1.50 (m, 2H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 202.0, 161.5, 157.7, 157.7, 136.4, 128.6, 127.8, 127.8, 111.7, 73.9, 54.8, 49.6, 48.8, 42.1, 29.5, 27.4, 25.7*; IR (neat): ν_{max} (cm^{-1}) = 3196, 2947, 2862, 1491, 964, 744, 696; HR-MS (ESI, 4500 V): m/z calcd for $C_{19}H_{23}N_4S$ ($[M+H]^+$): 339.1638, found 339.1626.



(1*S*,3a*R*,6a*S*)-*N*-isopropyl-2-(pyrimidin-2-yl)octahydrocyclopenta[*c*]pyrrole-1-carbothioamide (30): General procedure 2 was followed using 3-azabicyclo[3.3.0]oct-2-ene **32** (55 mg, 0.5 mmol, 2.0 equiv.), 2-mercaptopyrimidine (28 mg, 0.25 mmol, 1.0 equiv.) and isopropyl isocyanide (26 mg, 0.035 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 62 mg (0.21 mmol, 85%) of a off-white sticky oil.
(*Note: Minor diastereomer is given in italic).* $[\alpha]_D^{20}$ = −102.9° (c = 0.51, $CHCl_3$);[5] ^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 8.26 (d, *J* = 4.8 Hz, 2H), 7.95 (bs, 1H), 6.53 (t, *J* = 4.8 Hz, 1H), 4.69 (d, *J* = 2.8 Hz, 1H), 4.57 (m, 1H), 3.82 (dd, *J* = 8.4 Hz, *J* = 11.4 Hz, 1H), 3.52 (dd, *J* = 6.0 Hz, *J* = 11.4 Hz, 1H) 2.98 (m, 1H), 2.79 (m, 1H) 2.00 (m, 1H), 1.79 (m, 1H), 1.57 (m, 2H), 1.50 (m, 2H), 1.05 (m, 6H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 202.2, 160.9, 157.7, 157.7, 111.1, 75.0, 54.1, 51.6, 46.5, 41.7, 32.7, 31.4), 25.1, 20.9; *^{1}H NMR*

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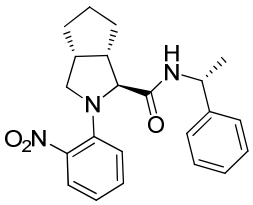
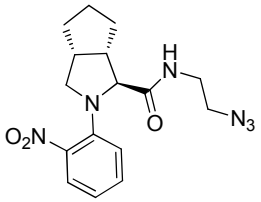
(400.13 MHz, $CDCl_3$): δ = 8.26 (d, J = 4.8 Hz, 2H), 7.39 (bs, 1H), 7.02 (t, J = 4.8 Hz, 1H), 4.69 (d, J = 2.8 Hz, 1H), 4.24 (m, 1H), 3.82 (dd, J = 8.4 Hz, J = 11.4 Hz, 1H), 3.52 (dd, J = 6.0 Hz, J = 11.4 Hz, 1H) 3.24 (m, 1H), 3.11 (m, 1H) 2.00 (m, 1H), 1.79 (m, 1H), 1.57 (m, 2H), 1.50 (m, 2H), 1.05 (m, 6H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 199.6, 161.5, 157.9, 157.9, 111.7, 73.8, 54.9, 49.5, 46.2, 41.9, 29.6, 27.1, 25.7, 21.5, 21.1; IR (neat): ν_{max} (cm^{-1}) ν = 3190, 2961, 2866, 1583, 1499, 795; HR-MS (ESI, 4500 V): m/z calcd for $C_{15}H_{23}N_4S$ ($[M+H]^+$): 291.1638, found 291.1628.



(1*S*,3a*R*,6a*S*)-2-(2-nitrophenyl)-*N*-((*R*)-1-phenylethyl)octahydrocyclopenta[*c*]-pyrrole-1-carboxamide (**31**): General procedure 2 was followed using 3-azabicyclo[3.3.0]oct-2-ene **32** (55 mg, 0.5 mmol, 2.0 equiv.), 2-nitrophenol (35 mg, 0.25 mmol, 1.0 equiv.) and (S)-(−)-α-methylbenzyl isocyanide (49 mg, 0.051 ml, 0.375 mmol, 1.5 equiv.) giving a yield of 80 mg (0.23 mmol, 90%) of a sticky orange oil.

(*Note: Minor diastereomer is given in italic).* $[\alpha]_D^{20}$ = −650.0° (c = 0.72, $CHCl_3$);[5] ^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 7.61 (d, *J* = 1.6 Hz, 1H), 7.22 (m, 2H), 6.98 (m, 1H), 6.85 (m, 5H), 4.91 (m, 1H), 3.96 (d, *J* = 6.0 Hz, 1H) 3.73 (dd, *J* = 7.2 Hz, *J* = 10.0 Hz, 1H), 2.77 (m, 1H), 2.65 (m, 1H), 2.51 (dd, *J* = 3.6 Hz, *J* = 10.0 Hz, 1H), 1.88 (m, 2H), 1.66 (m, 3H), 1.34 (d, *J* = 7.2 Hz, 3H), 1.21 (m, 2H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 170.6, 142.3, 140.8, 140.1, 132.5, 127.2, 125.8, 124.8, 124.6, 119.0, 117.4, 68.2, 57.4, 48.8, 47.4, 42.3, 31.0, 30.7, 23.9, 21.2; *^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 7.61 (d, J = 1.6 Hz, 1H), 7.36 (m, 2H), 6.98 (m, 1H), 6.85 (m, 5H), 4.91 (m, 1H), 4.49 (d, J = 6.0 Hz, 1H) 3.73 (dd, J = 7.2 Hz, J = 10.0 Hz, 1H), 3.16 (m, 1H), 2.94 (m, 1H), 2.51 (dd, J = 3.6 Hz, J = 10.0 Hz, 1H), 1.88 (m, 2H), 1.66 (m, 3H), 1.34 (d, J = 7.2 Hz, 3H), 1.21 (m, 2H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 168.7, 142.3, 140.8, 140.1, 132.4, 127.7, 126.3, 125.1, 124.7, 119.3, 117.1, 65.6, 58.3, 47.4, 45.9, 42.0, 29.0, 28.7, 26.5, 20.1*; IR (neat): ν_{max} (cm^{-1}) = 3367, 2941, 2866, 1657, 1508, 741, 698; HR-MS (ESI, 4500 V): m/z calcd for $C_{22}H_{26}N_3O_3$ ($[M+H]^+$): 380.1969, found 380.1953.



(1*S*,3a*R*,6a*S*)-*N*-(2-azidoethyl)-2-(2-nitrophenyl)octahydrocyclopenta[*c*]-pyrrole-1-carboxamide 33: General procedure 2 was followed using 3-azabicyclo[3.3.0]oct-2-ene **32** (55 mg, 0.5 mmol, 1.3 equiv.), 2-nitrophenol (70 mg, 0.5 mmol, 1.3 equiv.) and 1-azido-2-isocyanoethane (36 mg, 0.375 mmol, 1.0 equiv.) giving a yield of 93 mg (0.27 mmol, 72%) of an orange solid.

(*Note: Minor diastereomer is given in italic).* $[\alpha]_D^{20}$ = −575.8° (c = 0.66, $CHCl_3$);[5] ^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 7.66 (d, *J* = 8.0 Hz, 1H), 7.33 (m, 1H), 7.02 (m, 1H), 6.87 (m, 1H), 4.04 (d, *J* = 5.6 Hz, 1H), 3.74 (m, 1H), 3.25 (m, 4H), 2.75 (m, 1H), 2.65 (m, 1H), 2.52 (dd, *J* = 3.6 Hz, *J* = 10.2 Hz, 1H), 1.89 (m, 2H), 1.65 (m, 3H), 1.26 (m, 2H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 172.1, 140.9, 139.9, 132.6, 125.2, 119.1, 117.0, 68.2, 57.6, 49.6, 48.8, 42.5, 37.7, 30.9, 30.5, 24.7; *^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 7.66 (d, J = 8.0 Hz, 1H), 7.21 (m, 1H), 7.02 (m, 1H), 6.87 (m, 1H), 4.52 (d, J = 5.6 Hz, 1H), 3.74 (m, 1H), 3.25 (m, 4H), 3.00 (m, 1H), 2.65 (m, 1H), 2.52 (dd, J = 3.6 Hz, J = 10.2 Hz, 1H), 1.89 (m, 2H), 1.65 (m, 3H), 1.26 (m, 2H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 170.3, 141.0, 139.9, 132.3, 124.9, 119.4, 116.8, 65.6, 58.5), 49.7, 45.9, 42.0, 37.3, 28.9, 26.7, 25.0*; IR (neat): ν_{max} (cm^{-1}) = 3367, 2951, 2870, 2098, 1664, 1510, 1277, 729, 541; HR-MS (ESI, 4500 V): m/z calcd for $C_{16}H_{21}N_6O_3$ ($[M+H]^+$): 345.1670, found 345.1654.

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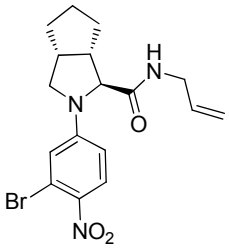
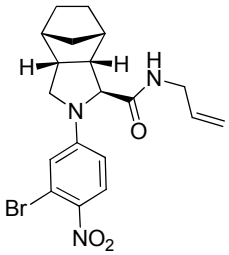


(1*S*,3a*R*,6a*S*)-*N*-allyl-2-(3-bromo-4-nitrophenyl)octahydrocyclopenta[*c*]-pyrrole-1-carboxamide (34): General procedure 2 was followed using 3-azabicyclo[3.3.0]oct-2-ene **32** (55 mg, 0.5 mmol, 2.0 equiv.), 4-nitro-3-bromophenol (54 mg, 0.25 mmol, 1.0 equiv.) and allyl isocyanide (27 mg, 0.4 mmol, 1.6 equiv.) giving a yield of 54 mg (0.14 mmol, 55%) of a sticky orange oil.
(*Note: Minor diastereomer is given in italic).* $[\alpha]_D^{20}$ = −122.1° (c = 0.48, $CHCl_3$);[5] ^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 7.91 (d, *J* = 9.2 Hz, 1H), 6.75 (d, *J* = 2.8 Hz, 1H), 6.40 (dd, *J* = 2.8 Hz, *J* = 9.2 Hz, 1H), 6.03 (bs, 1H), 5.69 (m, 1H), 5.03 (m, 2H), 3.94 (d, *J* = 2.4 Hz, 1H), 3.80 (m, 3H), 3.12 (dd, *J* = 6.8 Hz, *J* = 10.2 Hz, 1H), 2.75 (m, 2H), 2.04 (m, 1H), 1.75 (m, 2H), 1.60 (m, 3H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 170.5, 149.5, 137.7, 132.5), 127.4, 117.2, 116.9, 115.7, 110.3, 69.1, 54.6, 49.3, 40.7, 40.7, 31.4, 30.5, 23.8; *^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 7.85 (d, J = 9.2 Hz, 1H), 7.09 (d, J = 2.8 Hz, 1H), 6.40 (dd, J = 2.8 Hz, J = 9.2 Hz, 1H), 7.30 (bs, 1H), 5.69 (m, 1H), 5.03 (m, 2H), 4.27 (d, J = 2.4 Hz, 1H), 3.66 (m, 3H), 3.12 (dd, J = 6.8 Hz, J = 10.2 Hz, 1H), 3.33 (m, 2H), 2.04 (m, 1H), 1.75 (m, 2H), 1.60 (m, 3H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 169.0, 149.9, 137.7, 132.6, 127.3, 117.6, 116.7, 116.0, 110.5, 66.0, 55.4, 46.4, 41.7, 33.6, 29.8, 27.1, 24.5*; IR (neat): ν_{max} (cm^{-1}) = 3286, 2951, 2866, 1589, 1302, 727, 646; HR-MS (ESI, 4500 V): m/z calcd for $C_{17}H_{21}BrN_3O_3$ ($[M+H]^+$): 394.0761, found 394.0754.



(1*S*,3a*R*,4*R*,7*S*,7a*S*)-*N*-allyl-2-(3-bromo-4-nitrophenyl)octahydro-1*H*-4,7-methano-isoindole-1-carboxamide (35): General procedure 2 was followed using saturated bridged (3*S*,7*R*)-**36** (68 mg, 0.5 mmol, 2.0 equiv.), 3-bromo-4-nitrophenol (54 mg, 0.25 mmol, 1.0 equiv.) and allyl isocyanide (27 mg, 0.040 ml, 0.4 mmol, 1.5 equiv.), giving a yield of 35 mg (0.08 mmol, 34%) of a yellow solid.
$[\alpha]_D^{20}$ = −90.6° (c = 0.53, $CHCl_3$); ^{1}H NMR (400.13 MHz, $CDCl_3$): δ = 7.95 (d, *J* = 9.2 Hz, 1H), 6.83 (d, *J* = 2.8 Hz, 1H), 6.49 (dd, *J* = 2.8 Hz, *J* = 9.2 Hz, 1H), 5.70 (m, 2H), 5.03 (m, 3H), 4.14 (s, 1H), 3.78 (m, 2H), 3.56 (d, *J* = 1.6 Hz, 1H), 3.47 (m, 1H), 2.74 (m, 1H), 2.41 (m, 1H), 2.24 (m, 1H), 1.51 (m, 2H), 1.14 (m, 4H); ^{13}C NMR (100.62 MHz, $CDCl_3$): δ = 172.0, 149.6, 138.3, 133.6, 128.9, 118.3, 117.8, 116.6, 110.9, 63.5, 50.5, 49.3, 42.5, 42.0, 41.8$_2$), 41.8, 41.2, 22.8, 22.1; IR (neat): ν_{max} (cm^{-1}) = 3283, 2953, 2869, 1651, 1589, 1304, 837, 744; HR-MS (ESI, 4500 V): m/z calcd for $C_{19}H_{23}BrN_3O_3$ ($[M+H]^+$): 420.0917, found 420.0897.

References:

(1) S. Michaelis and S. Blechert, *Chem. Eur. J*. 2007, **13**, 2358–2368.
(2) F. E. Hahn, V. Langenhahn and T. Pape, *Chem. Comm.* 2005, **43**, 5390-5392.
(3) J. Zhu, X. Wu and S. J. Danishefsky, *Tetrahedron Lett*. 2009, **50**, 577–579.
(4) K. Hornberger, M. Cheung, M. A. Pobanz, K. A. Emmitte, K. W. Kuntz and J. G. Badiang, WO2007/30366 A1, 2007.
(5) Optical rotation determined for diastereomeric mixture. Value is reported for comparative purposes.

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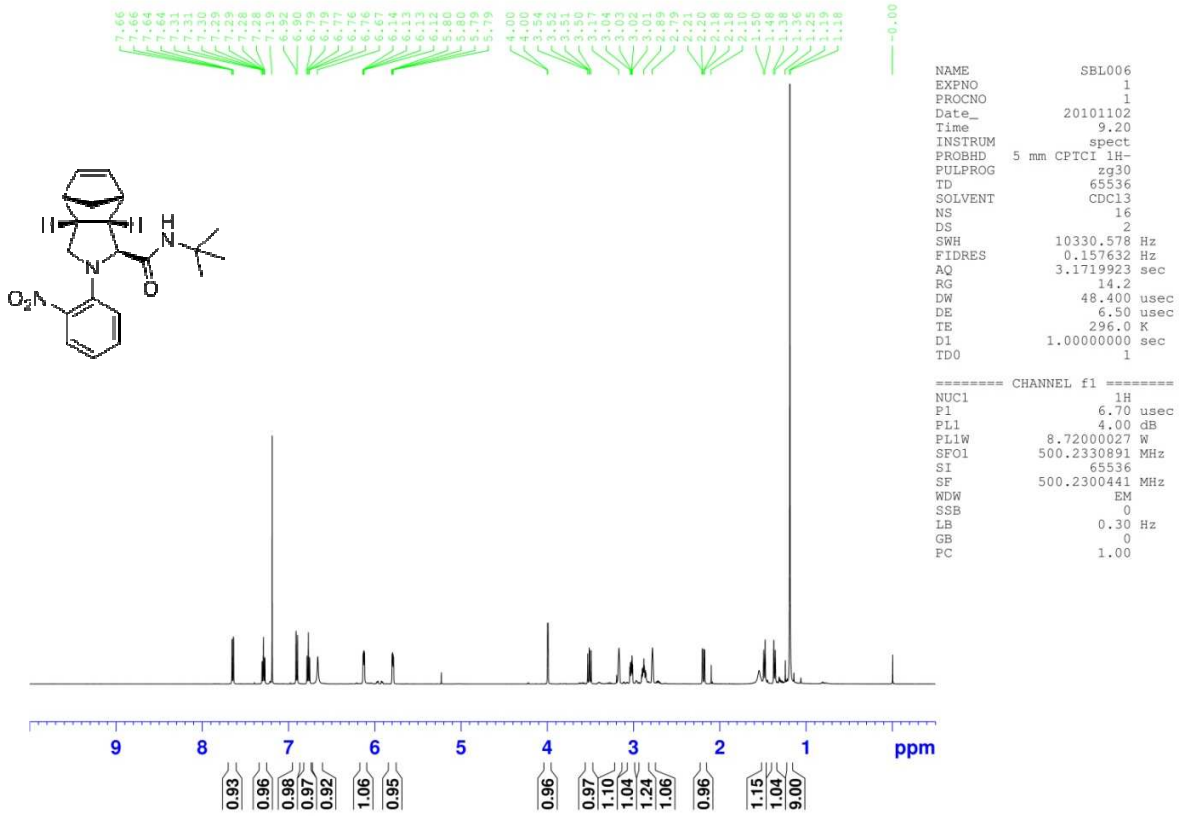
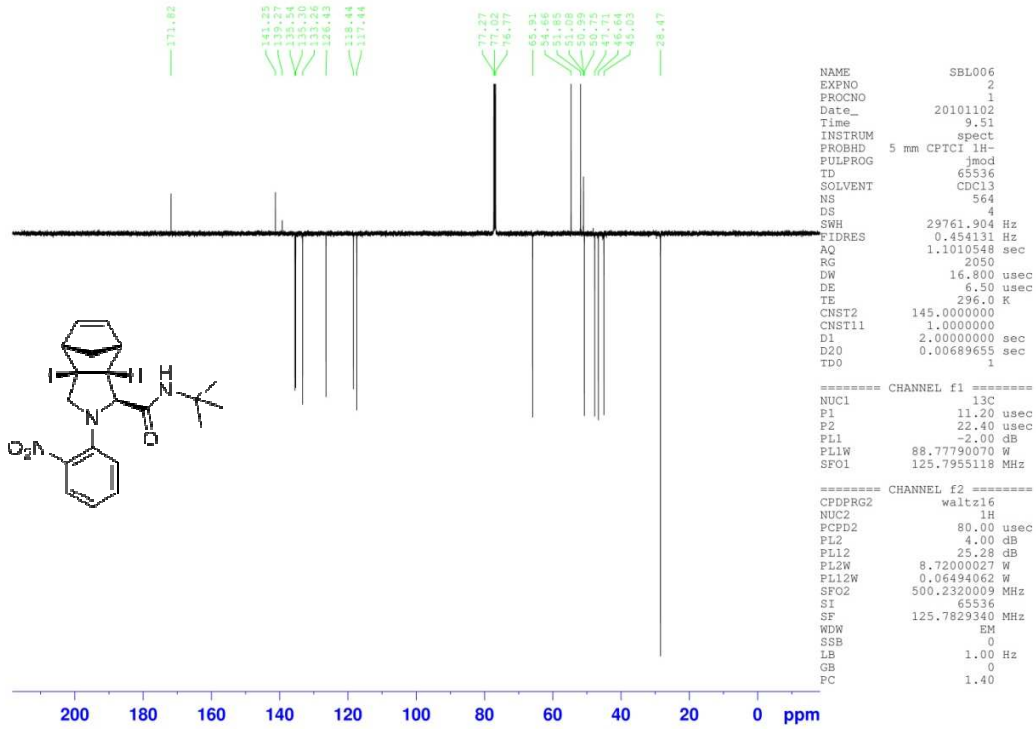
Compound 11





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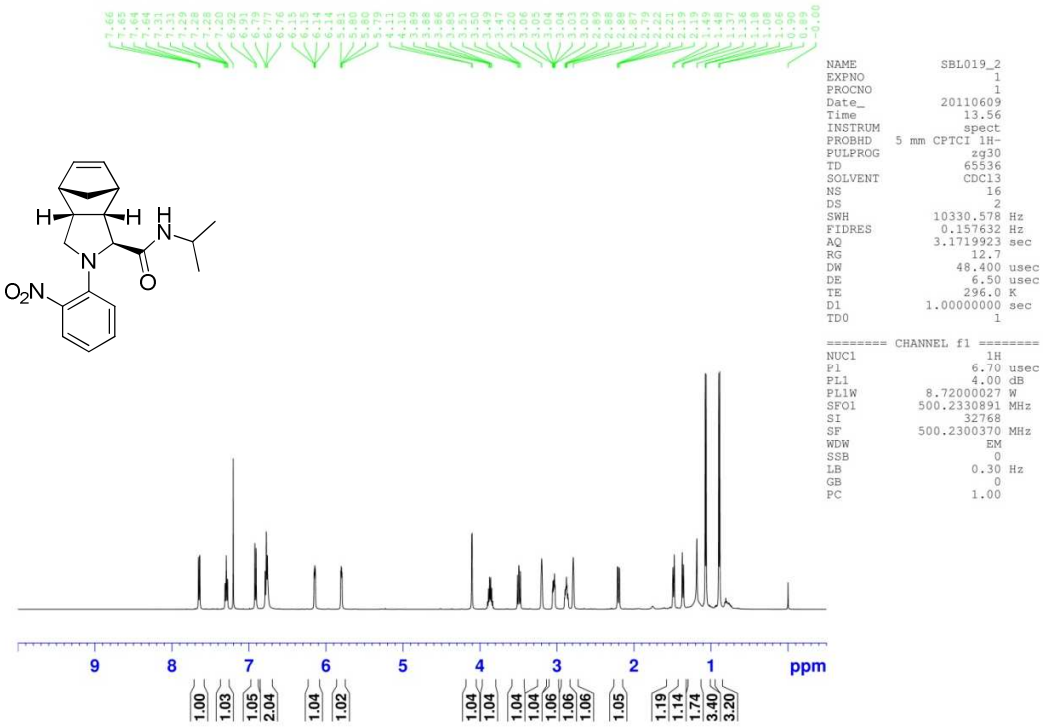
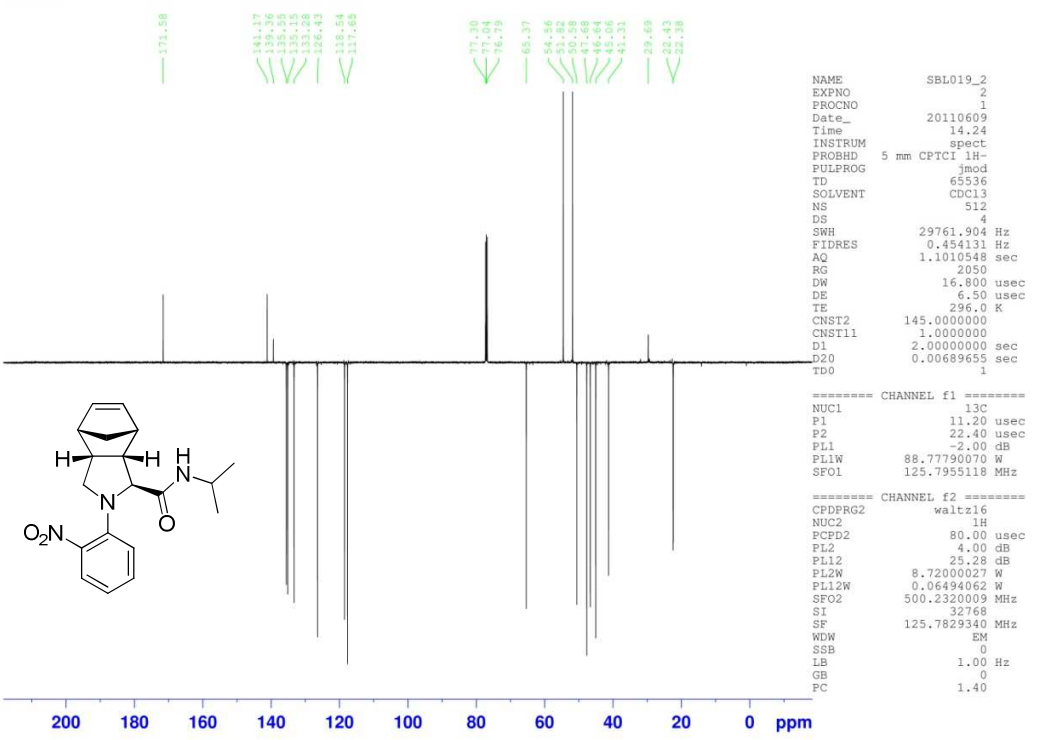
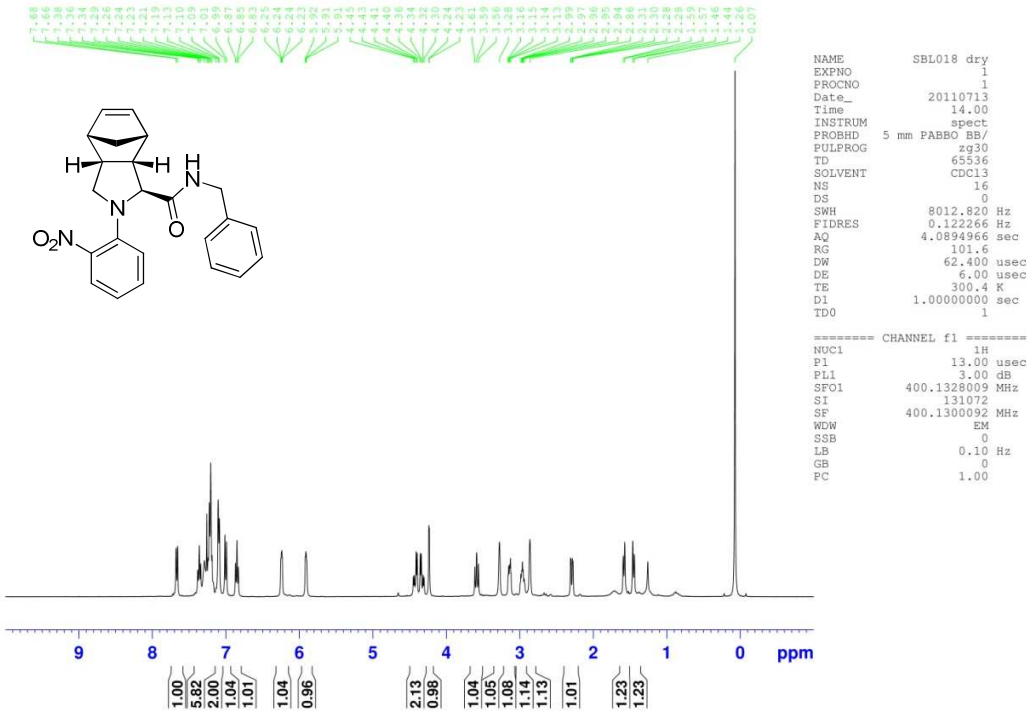
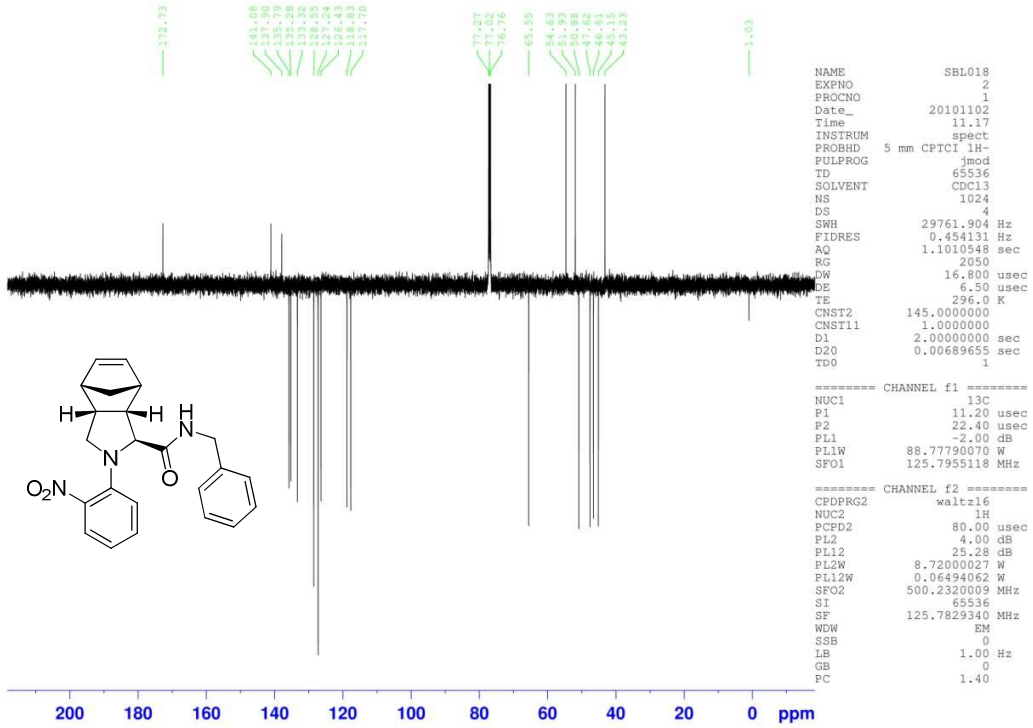
Compound 12



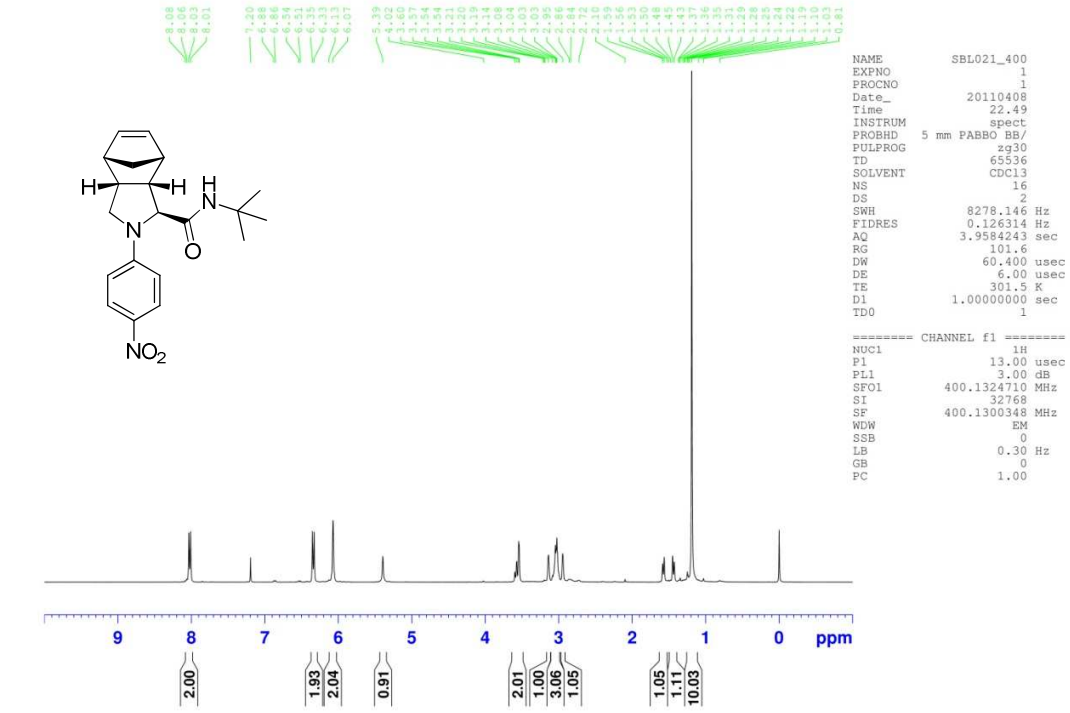


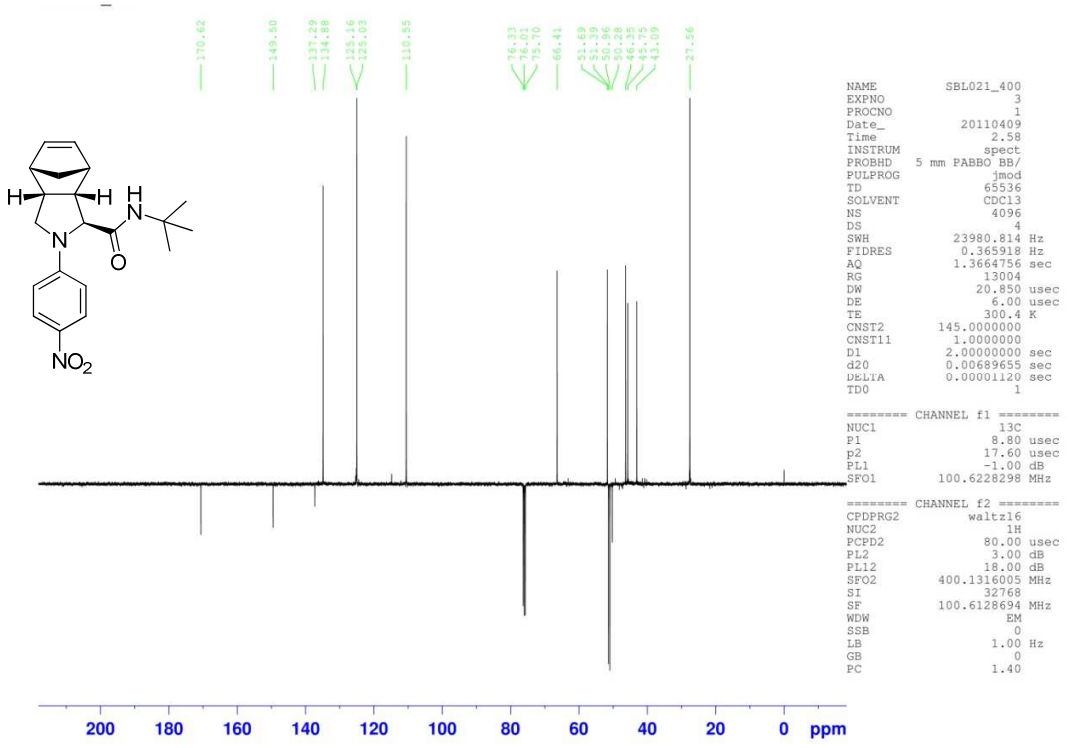
Compound 13


NAME SBL018 dry
EXPNO 1
PROCNO 1
Date_ 20110713
Time 14.00
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 0
SWH 8012.820 Hz
FIDRES 0.122266 Hz
AQ 4.0894966 sec
RG 101.6
DW 62.400 usec
DE 6.00 usec
TE 300.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 13.00 usec
PL1 3.00 dB
SFO1 400.1328009 MHz
SI 131072
SF 400.1300092 MHz
WDW EM
SSB 0
LB 0.10 Hz
GB 0
PC 1.00
9 8 7 6 5 4 3 2 1 0 ppm
1.00 5.82 2.00 1.04 1.01 1.04 0.96 2.13 0.98 1.04 1.05 1.08 1.14 1.13 1.01 1.23 1.23

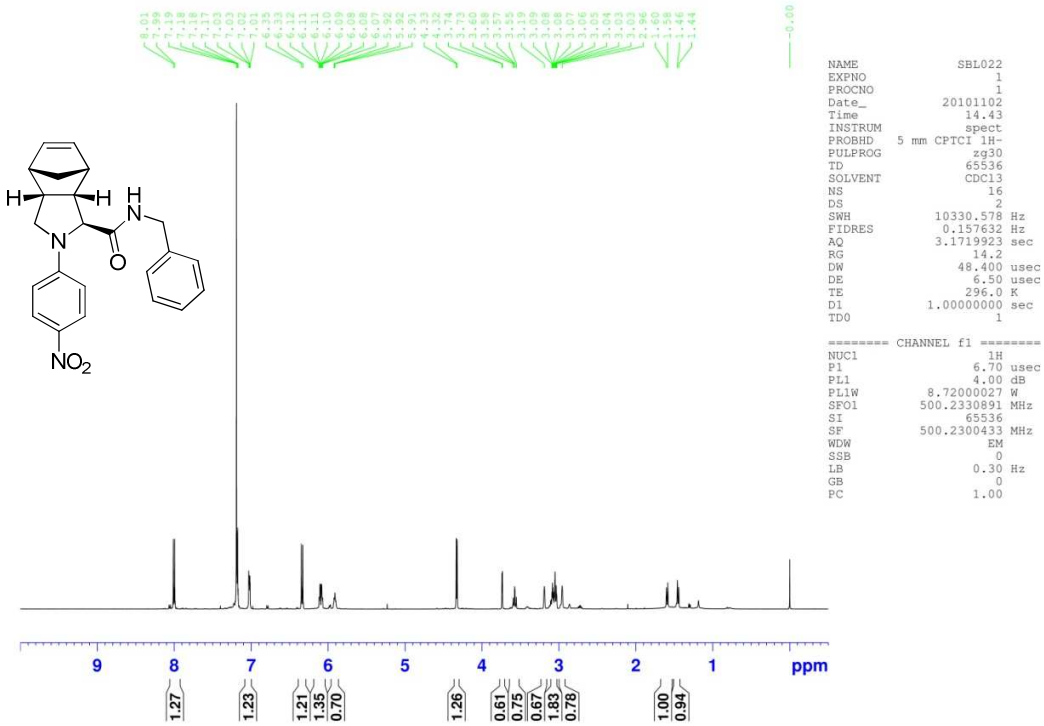

172.73
161.08
137.90
135.79
135.28
133.32
128.55
127.24
126.83
126.43
117.70
77.27
77.02
76.76
65.55
54.63
52.83
52.38
47.62
46.61
45.15
43.23
1.03
NAME SBL018
EXPNO 2
PROCNO 1
Date_ 20101102
Time 11.17
INSTRUM spect
PROBHD 5 mm CPTCI 1H-
PULPROG jmod
TD 65536
SOLVENT CDCl3
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 296.0 K
CNST2 145.0000000
CNST11 1.0000000
D1 2.00000000 sec
D20 0.00689655 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 11.20 usec
P2 22.40 usec
PL1 -2.00 dB
PL1W 88.77790070 W
SFO1 125.7955118 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 4.00 dB
PL12 25.28 dB
PL2W 8.72000027 W
PL12W 0.06494062 W
SFO2 500.2320009 MHz
SI 65536
SF 125.7829340 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

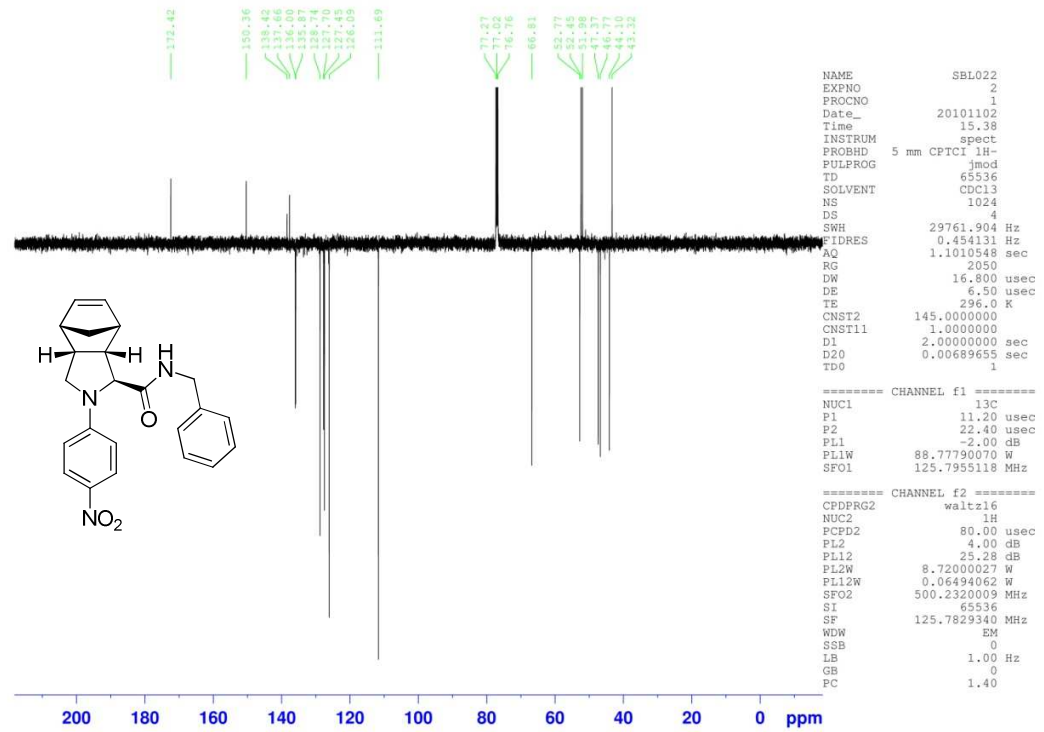
Compound 14


NAME SBL021_400
EXPNO 1
PROCNO 1
Date_ 20110408
Time 22.49
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 101.6
DW 60.400 usec
DE 6.00 usec
TE 301.5 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 13.00 usec
PL1 3.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300348 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9 8 7 6 5 4 3 2 1 0 ppm
2.00 1.93 2.04 0.91 2.01 1.00 3.06 1.05 1.05 1.11 10.03


NAME SBL021_400
EXPNO 3
PROCNO 1
Date_ 20110409
Time 2.58
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG jmod
TD 65536
SOLVENT CDCl3
NS 4096
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 13004
DW 20.850 usec
DE 6.00 usec
TE 300.4 K
CNST2 145.0000000
CNST11 1.0000000
D1 2.00000000 sec
d20 0.00689655 sec
DELTA 0.00001120 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.80 usec
p2 17.60 usec
PL1 -1.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 3.00 dB
PL12 18.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6128694 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

Compound 15


NAME SBL022
EXPNO 1
PROCNO 1
Date_ 20101102
Time 14.43
INSTRUM spect
PROBHD 5 mm CPTCI 1H-
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 14.2
DW 48.400 usec
DE 6.50 usec
TE 296.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 6.70 usec
PL1 4.00 dB
PL1W 8.72000027 W
SFO1 500.2330891 MHz
SI 65536
SF 500.2300433 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9 8 7 6 5 4 3 2 1 ppm
1.27 1.23 1.21 1.35 0.70 1.26 0.61 0.75 0.67 1.83 0.78 1.00 0.94


NAME SBL022
EXPNO 2
PROCNO 1
Date_ 20101102
Time 15.38
INSTRUM spect
PROBHD 5 mm CPTCI 1H-
PULPROG jmod
TD 65536
SOLVENT CDC13
NS 1024
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 296.0 K
CNST2 145.0000000
CNST11 1.0000000
D1 2.00000000 sec
D20 0.00689655 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 11.20 usec
P2 22.40 usec
PL1 -2.00 dB
PL1W 88.77790070 W
SFO1 125.7955118 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 4.00 dB
PL12 25.28 dB
PL2W 8.72000027 W
PL12W 0.06494062 W
SFO2 500.2320009 MHz
SI 65536
SF 125.7829340 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

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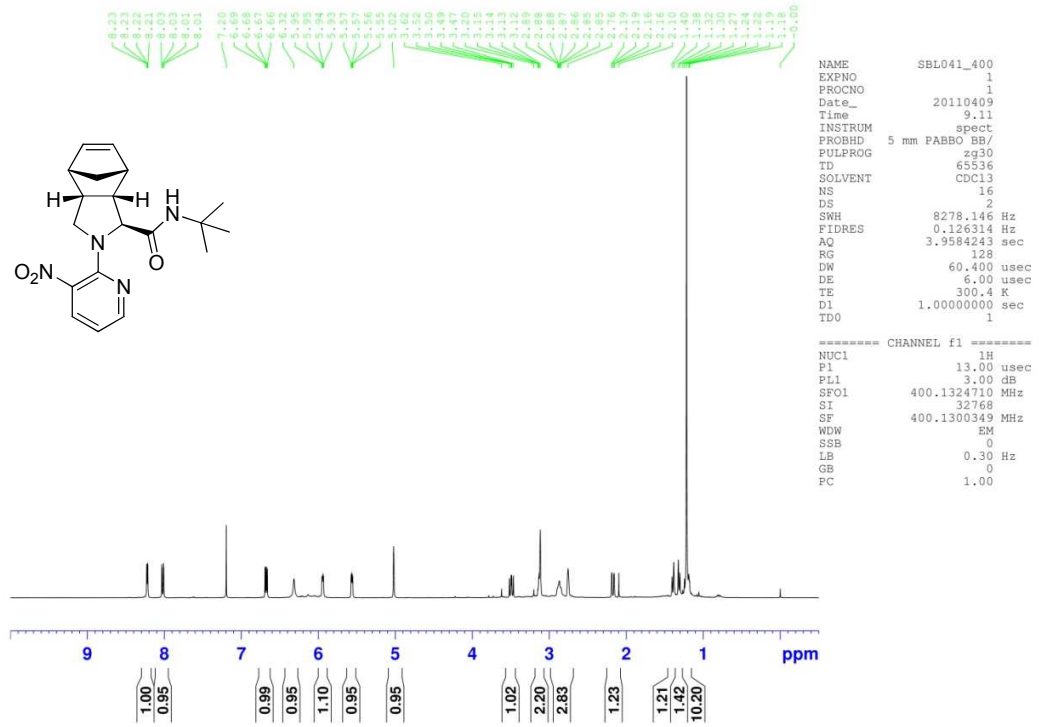
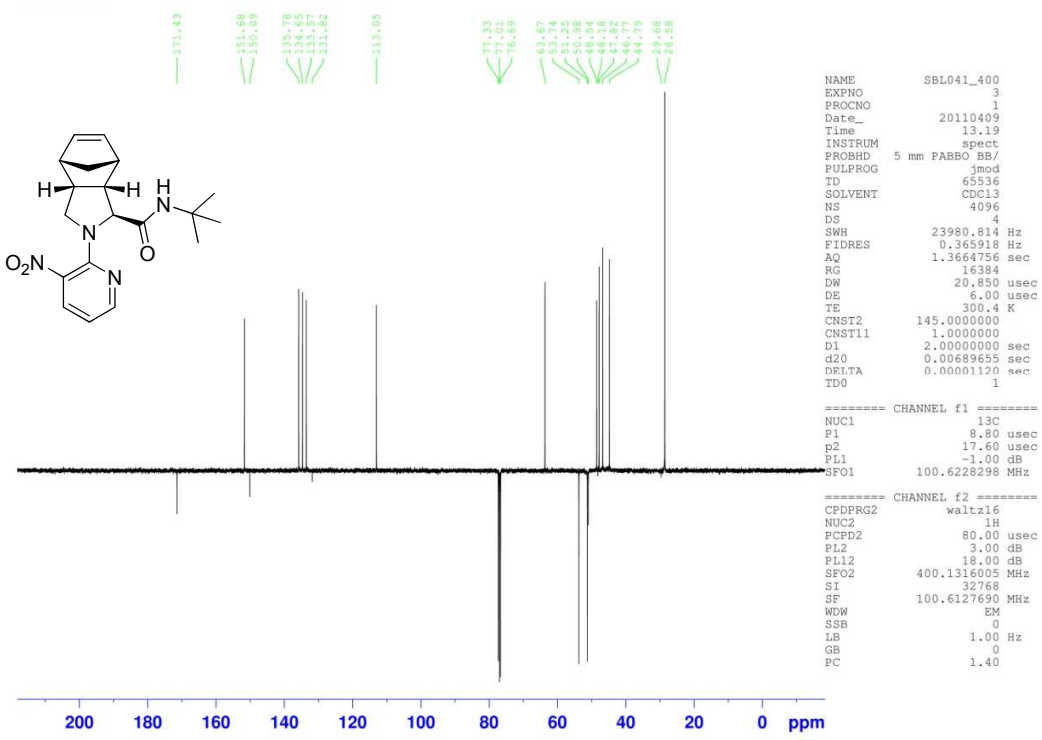
Compound 16





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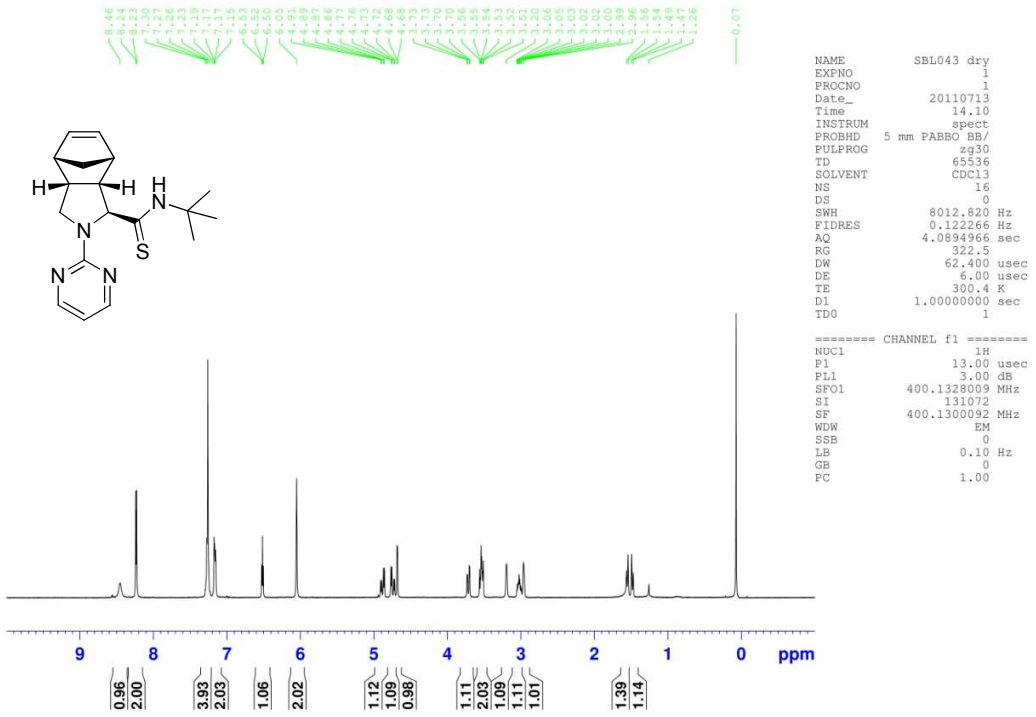
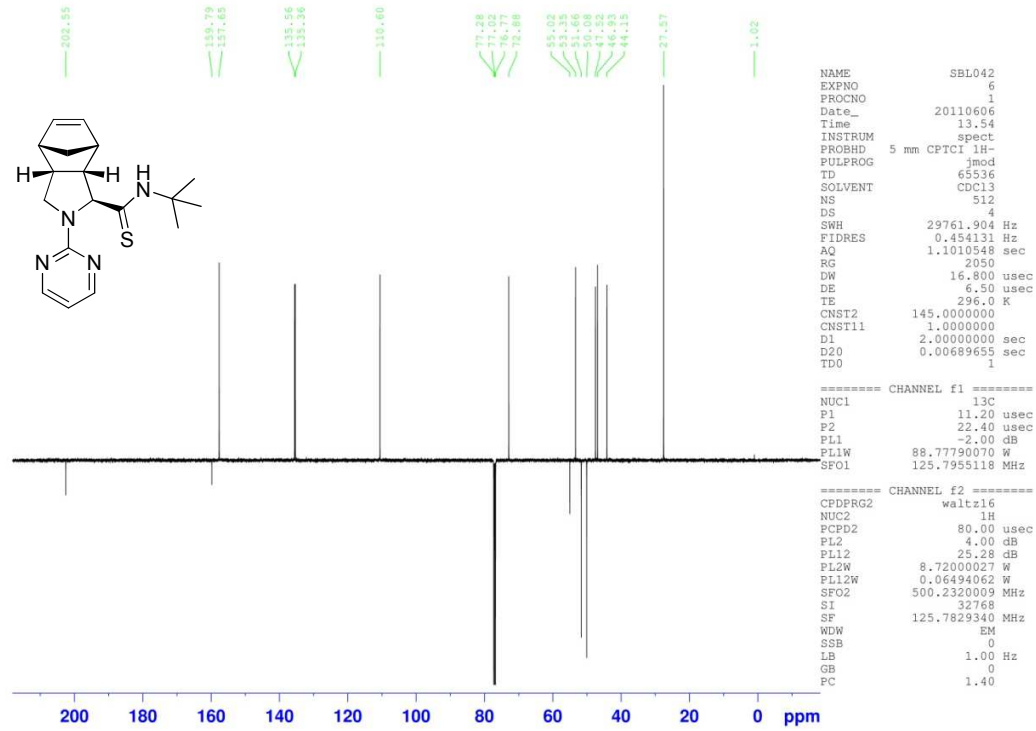
Compound 17





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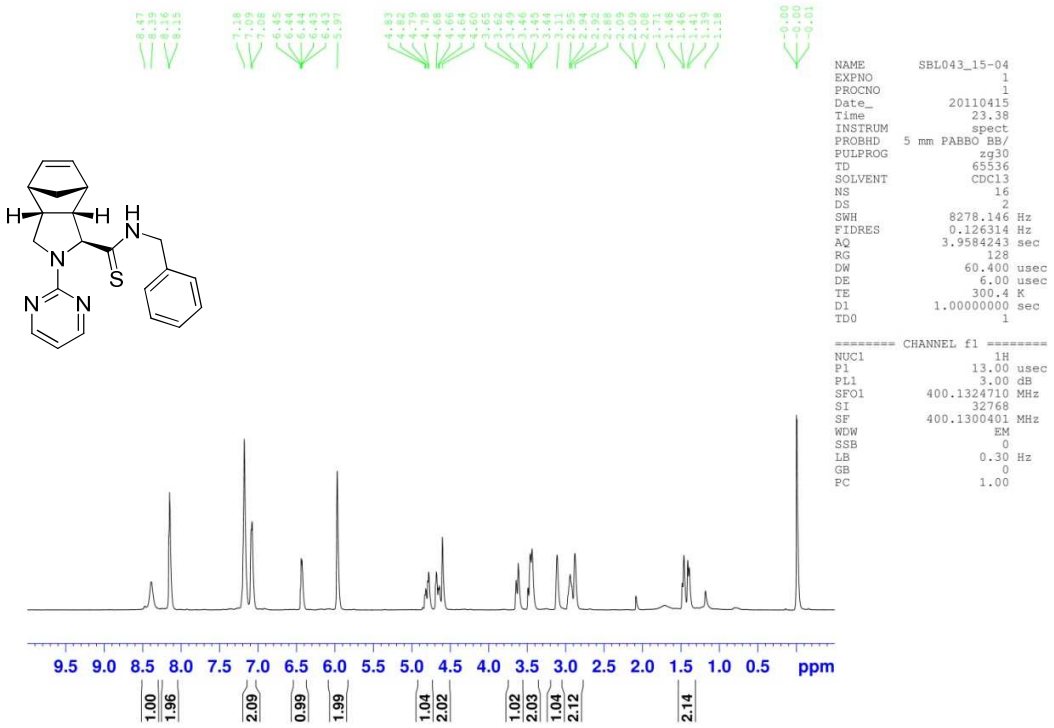
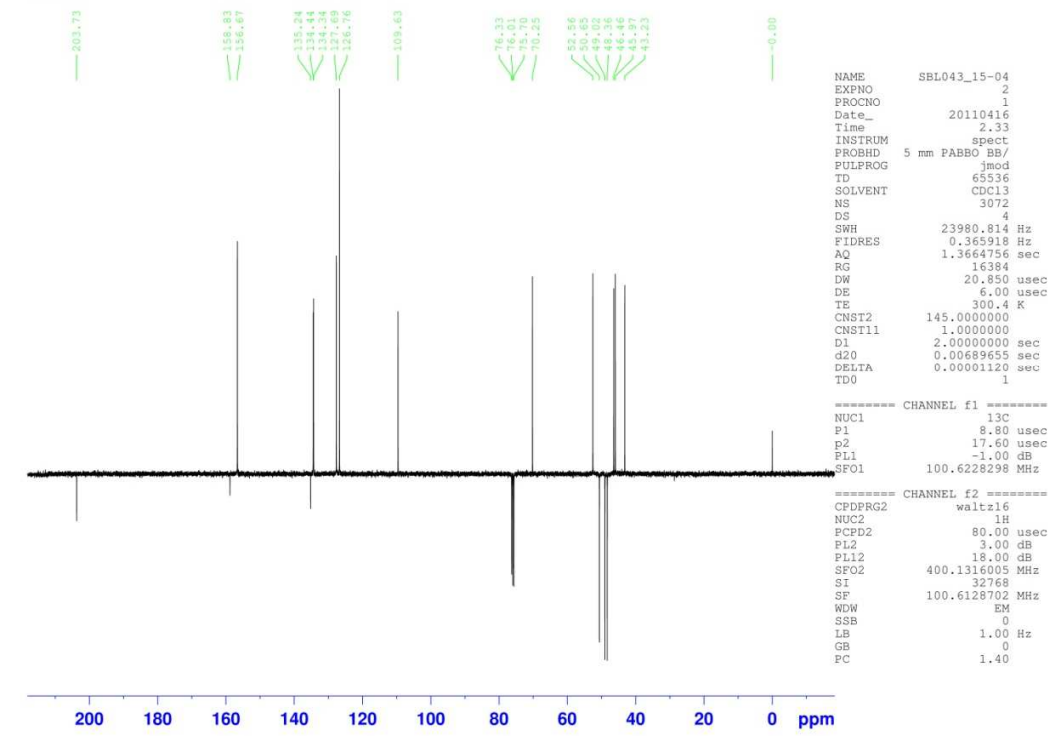
Compound 18





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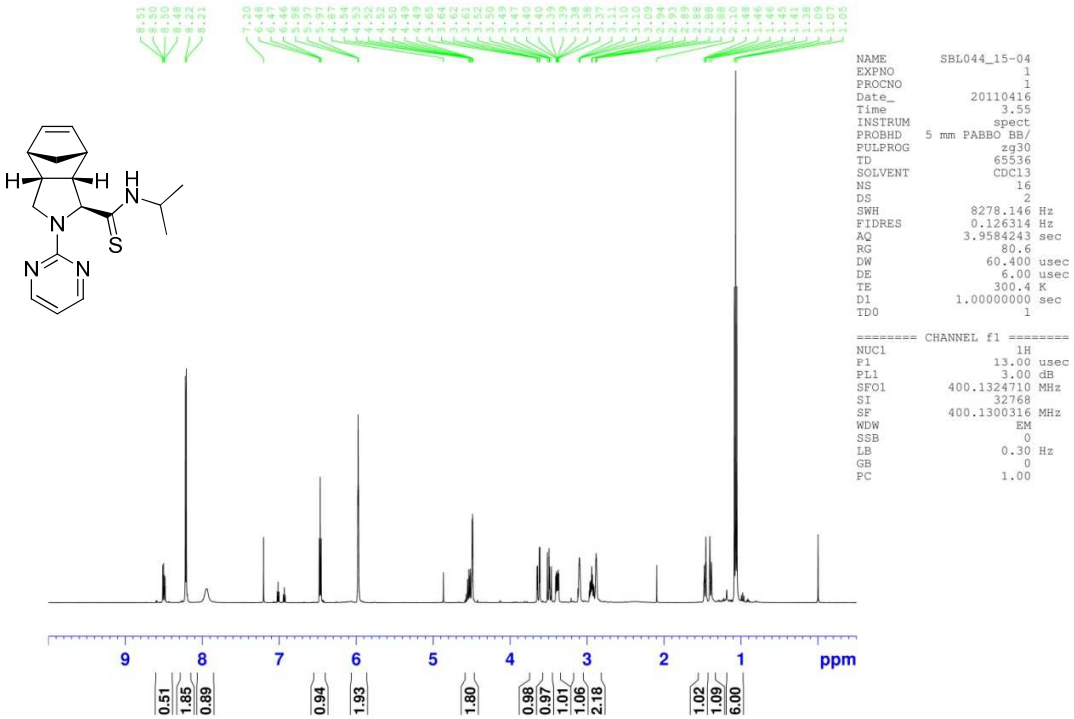
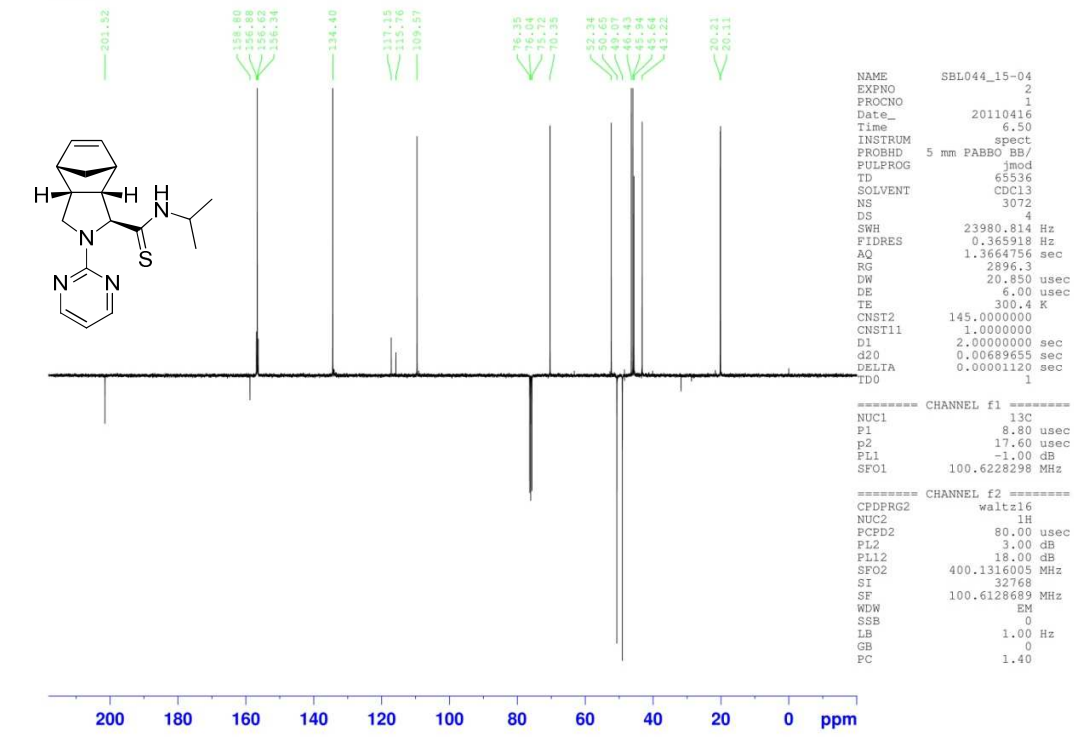
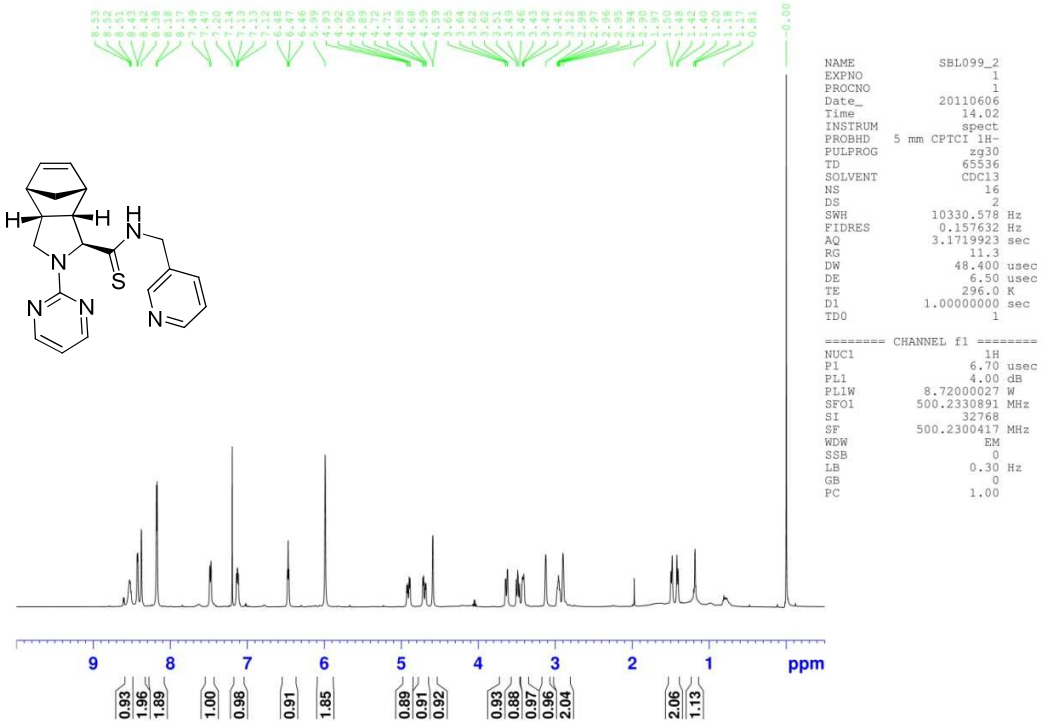
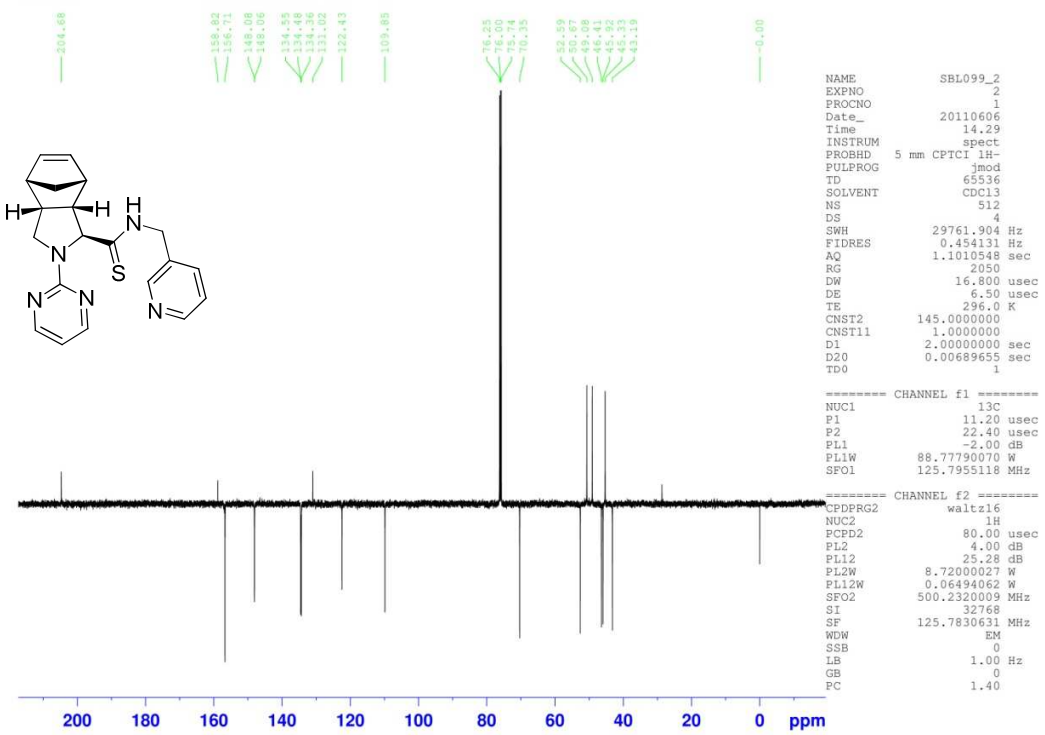
Compound 19





Compound 20


NAME SBL099_2
EXPNO 1
PROCNO 1
Date_ 20110606
Time 14.02
INSTRUM spect
PROBHD 5 mm CPTCI 1H-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 11.3
DW 48.400 usec
DE 6.50 usec
TE 296.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 6.70 usec
PL1 4.00 dB
PL1W 8.72000027 W
SFO1 500.2330891 MHz
SI 32768
SF 500.2300417 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9 8 7 6 5 4 3 2 1 ppm
0.93 1.96 1.89 1.00 0.98 0.91 1.85 0.89 0.91 0.92 0.93 0.88 0.97 0.96 2.04 2.06 1.13


NAME SBL099_2
EXPNO 2
PROCNO 1
Date_ 20110606
Time 14.29
INSTRUM spect
PROBHD 5 mm CPTCI 1H-
PULPROG jmod
TD 65536
SOLVENT CDCl3
NS 512
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 296.0 K
CNST2 145.0000000
CNST11 1.0000000
D1 2.00000000 sec
D20 0.00689655 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 11.20 usec
P2 22.40 usec
PL1 -2.00 dB
PL1W 88.77790070 W
SFO1 125.7955118 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 4.00 dB
PL12 25.28 dB
PL2W 8.72000027 W
PL12W 0.06494062 W
SFO2 500.2320009 MHz
SI 32768
SF 125.7830631 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

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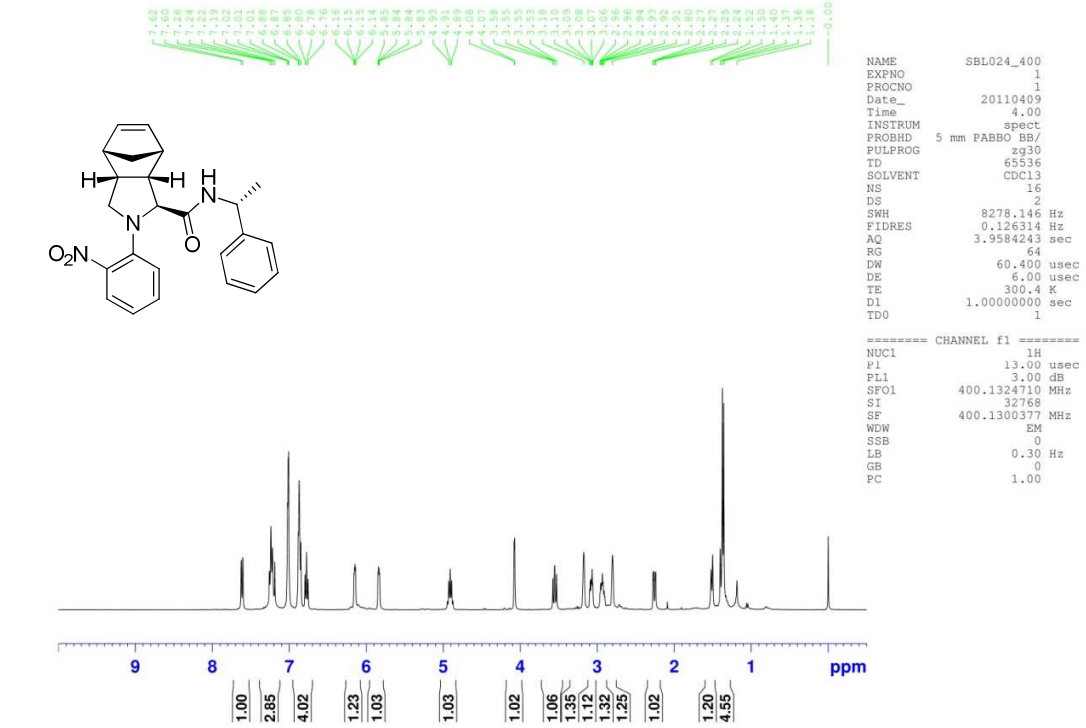
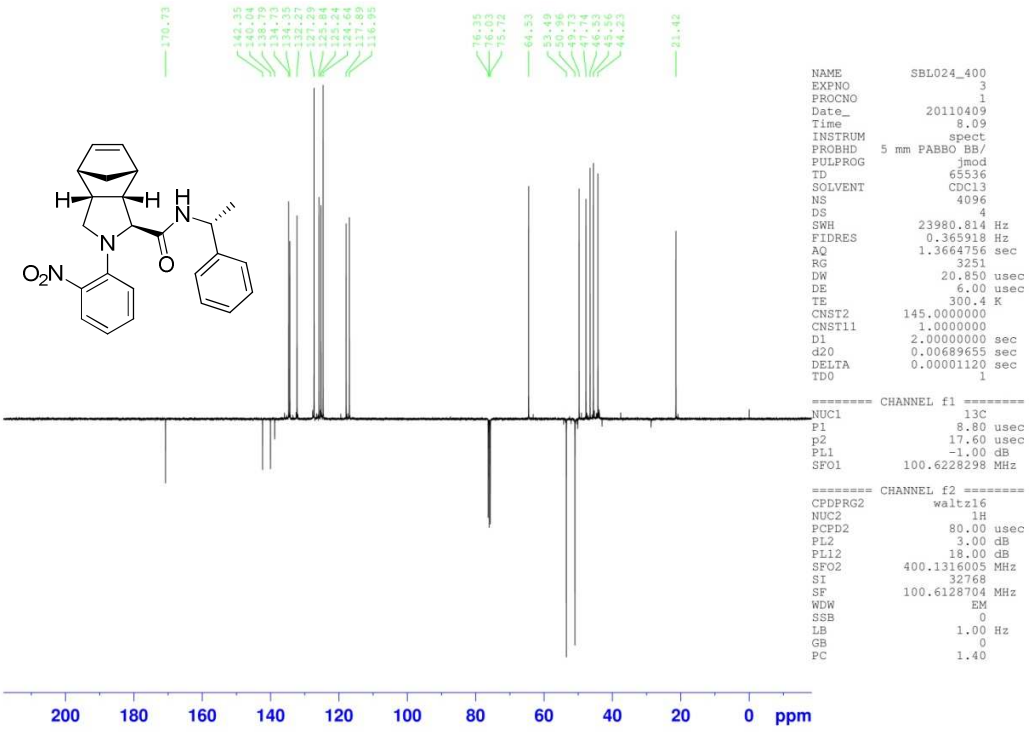
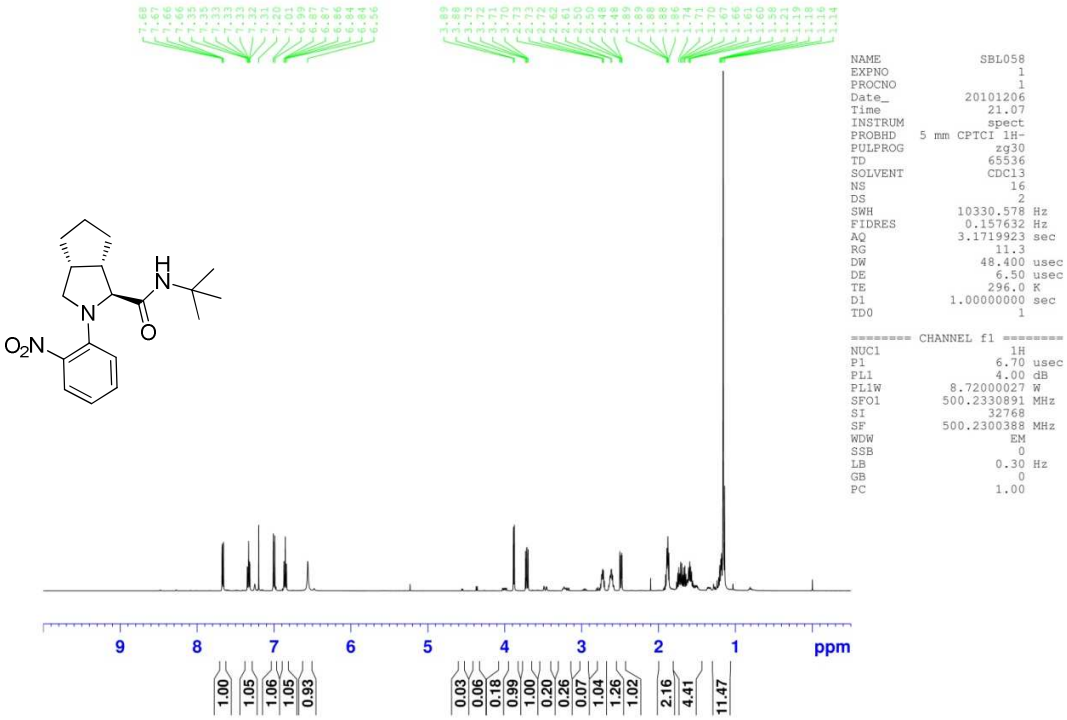
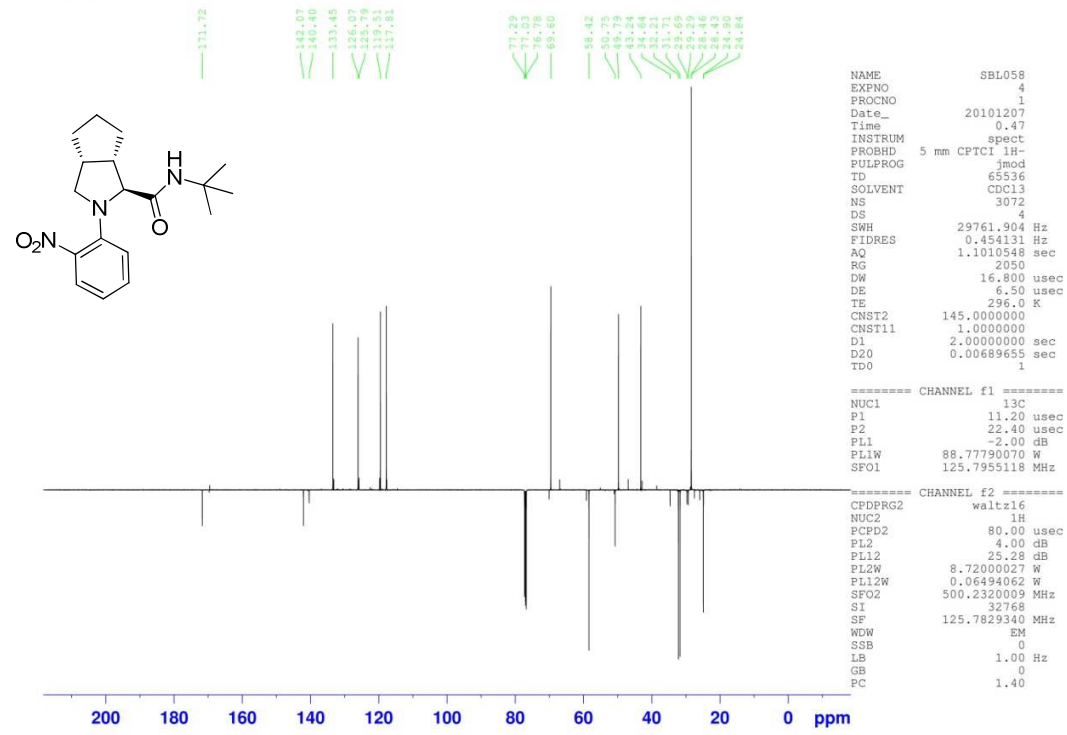
Compound 21





Compound 22


NAME SBL058
EXPNO 1
PROCNO 1
Date_ 20101206
Time 21.07
INSTRUM spect
PROBHD 5 mm CPTCI 1H-
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 11.3
DW 48.400 usec
DE 6.50 usec
TE 296.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 6.70 usec
PL1 4.00 dB
PL1W 8.72000027 W
SFO1 500.2330891 MHz
SI 32768
SF 500.2300388 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9 8 7 6 5 4 3 2 1 ppm
1.00 1.05 1.06 1.05 0.93
0.03 0.06 0.18 0.99 1.00 0.20 0.26 0.07 1.04 1.26 1.02 2.16 4.41 11.47


NAME SBL058
EXPNO 4
PROCNO 1
Date_ 20101207
Time 0.47
INSTRUM spect
PROBHD 5 mm CPTCI 1H-
PULPROG jmod
TD 65536
SOLVENT CDCl3
NS 3072
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 296.0 K
CNST2 145.0000000
CNST11 1.0000000
D1 2.00000000 sec
D20 0.00689655 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 11.20 usec
P2 22.40 usec
PL1 -2.00 dB
PL1W 88.77790070 W
SFO1 125.7955118 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 4.00 dB
PL12 25.28 dB
PL2W 8.72000027 W
PL12W 0.06494062 W
SFO2 500.2320009 MHz
SI 32768
SF 125.7829340 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

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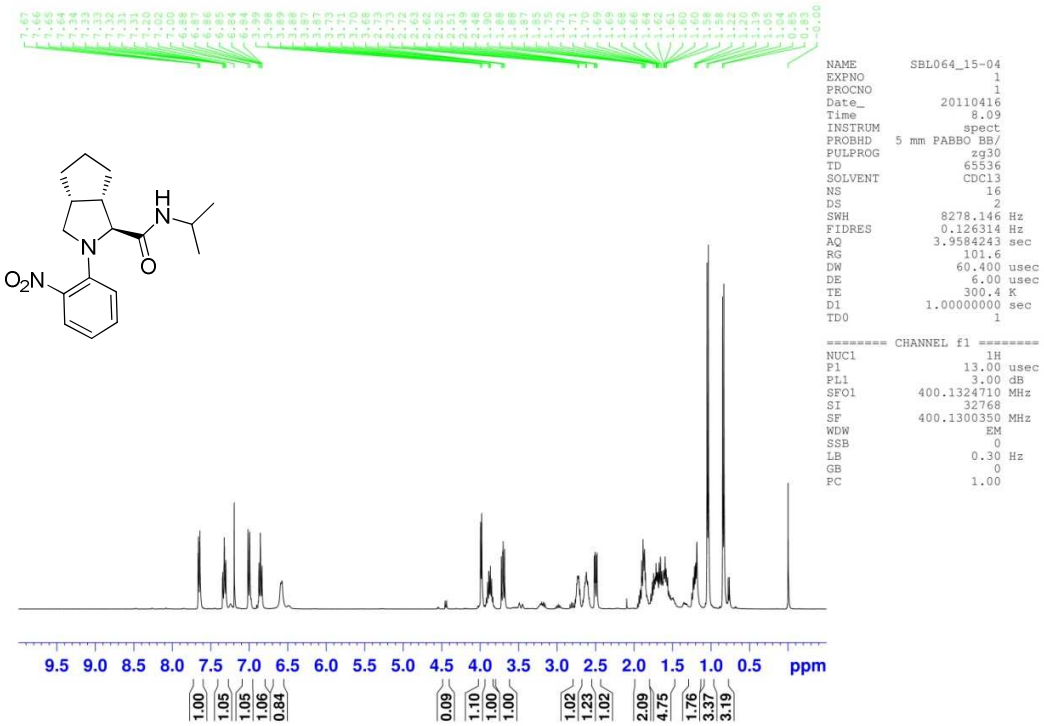
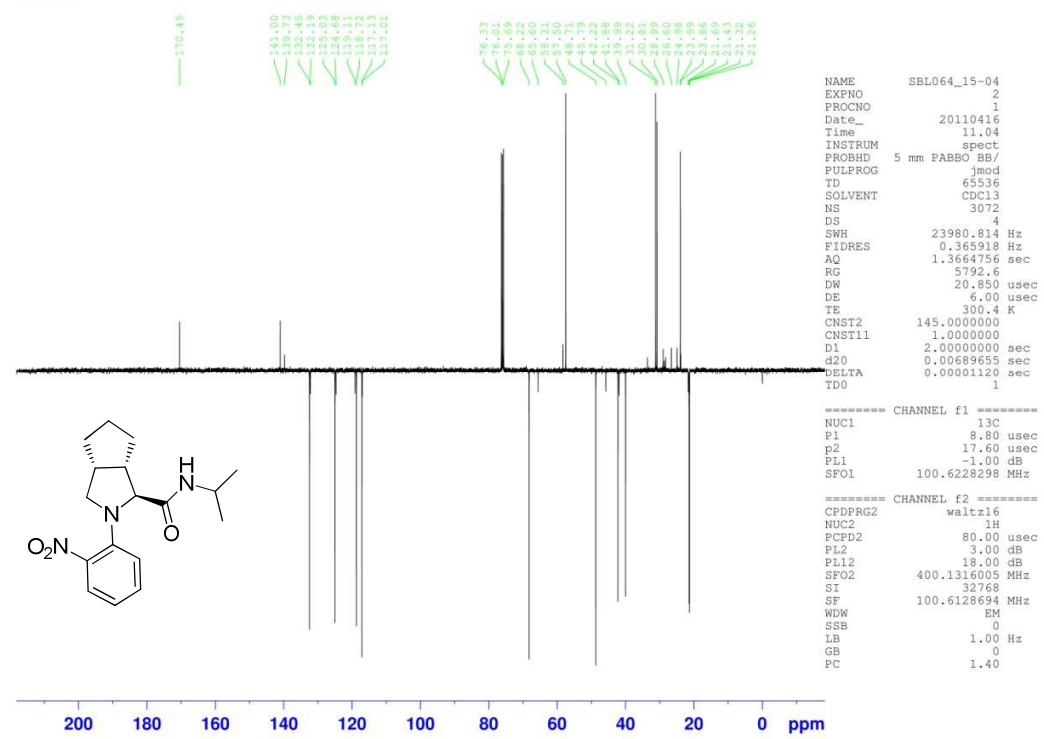
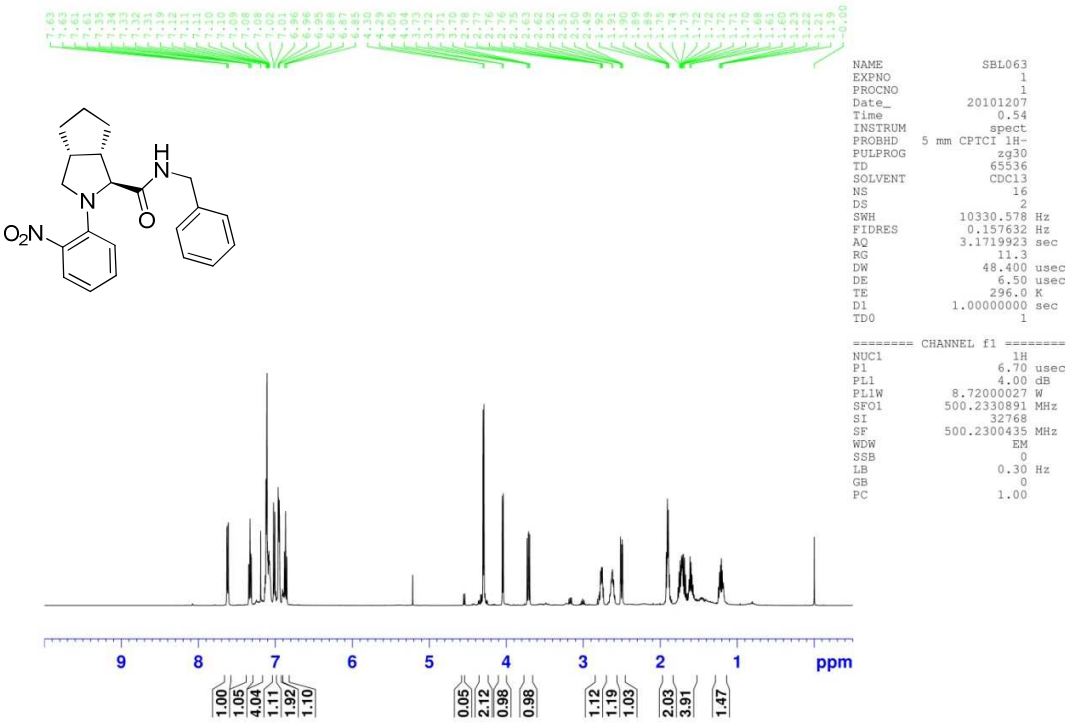
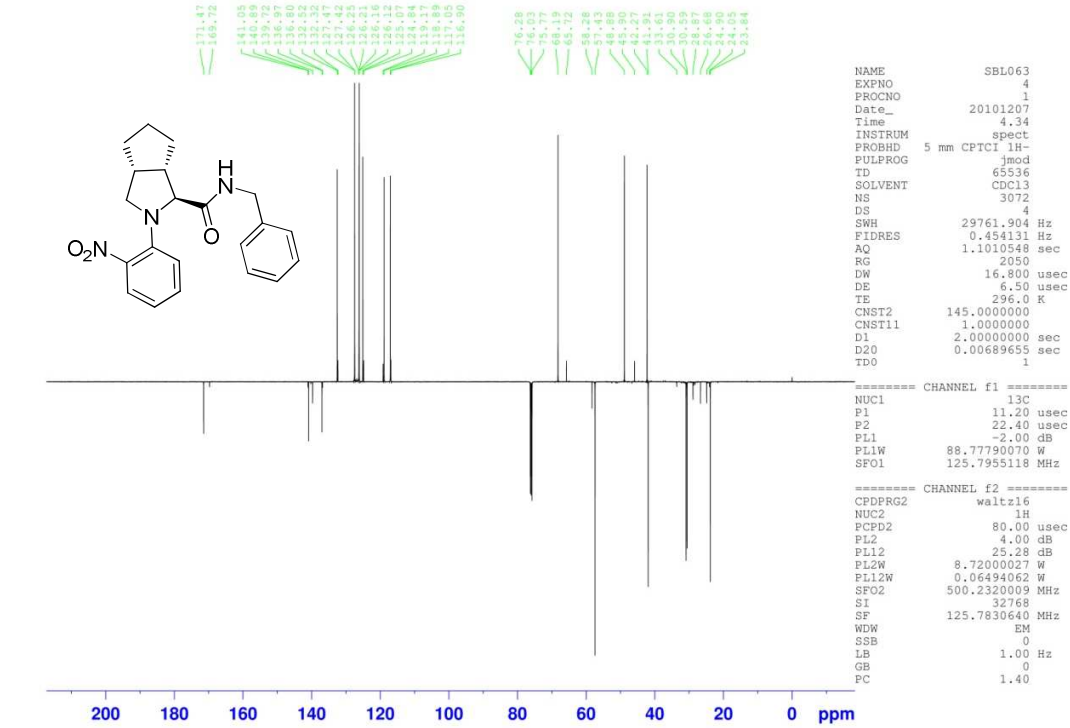
Compound 23



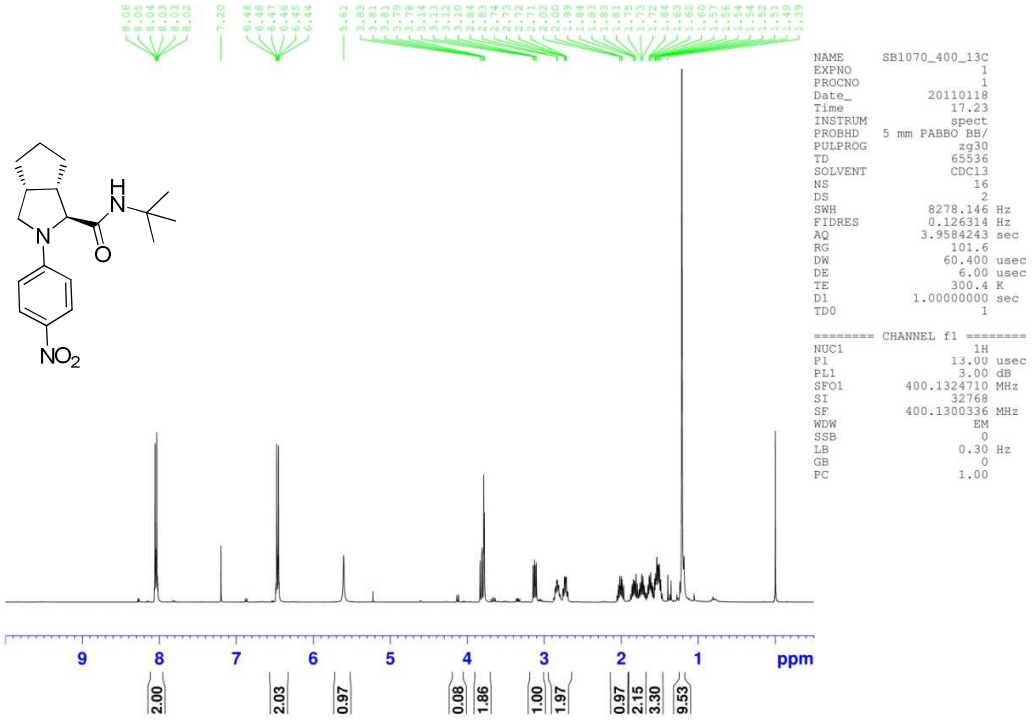


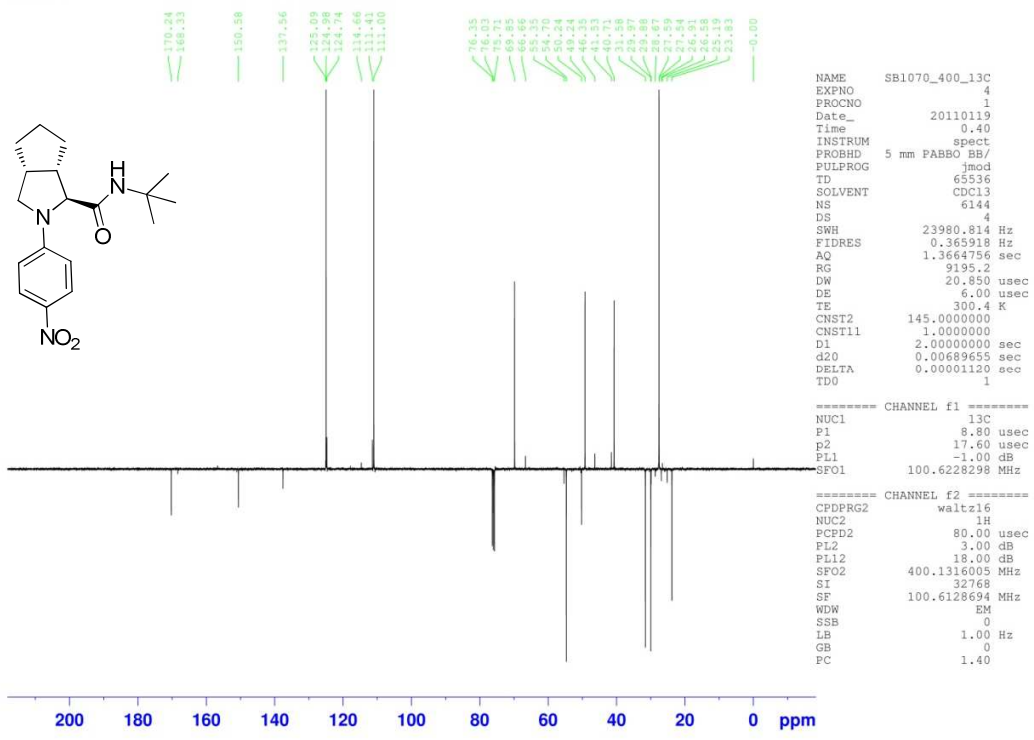
Compound 24


NAME SBL063
EXPNO 1
PROCNO 1
Date_ 20101207
Time 0.54
INSTRUM spect
PROBHD 5 mm CPTCI 1H-
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 10330.578 Hz
FIDRES 0.157632 Hz
AQ 3.1719923 sec
RG 11.3
DW 48.400 usec
DE 6.50 usec
TE 296.0 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 6.70 usec
PL1 4.00 dB
PL1W 8.72000027 W
SFO1 500.2330891 MHz
SI 32768
SF 500.2300435 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9 8 7 6 5 4 3 2 1 ppm
1.00 1.05 4.04 1.11 1.92 1.10 0.05 2.12 0.98 0.98 1.12 1.19 1.03 2.03 3.91 1.47

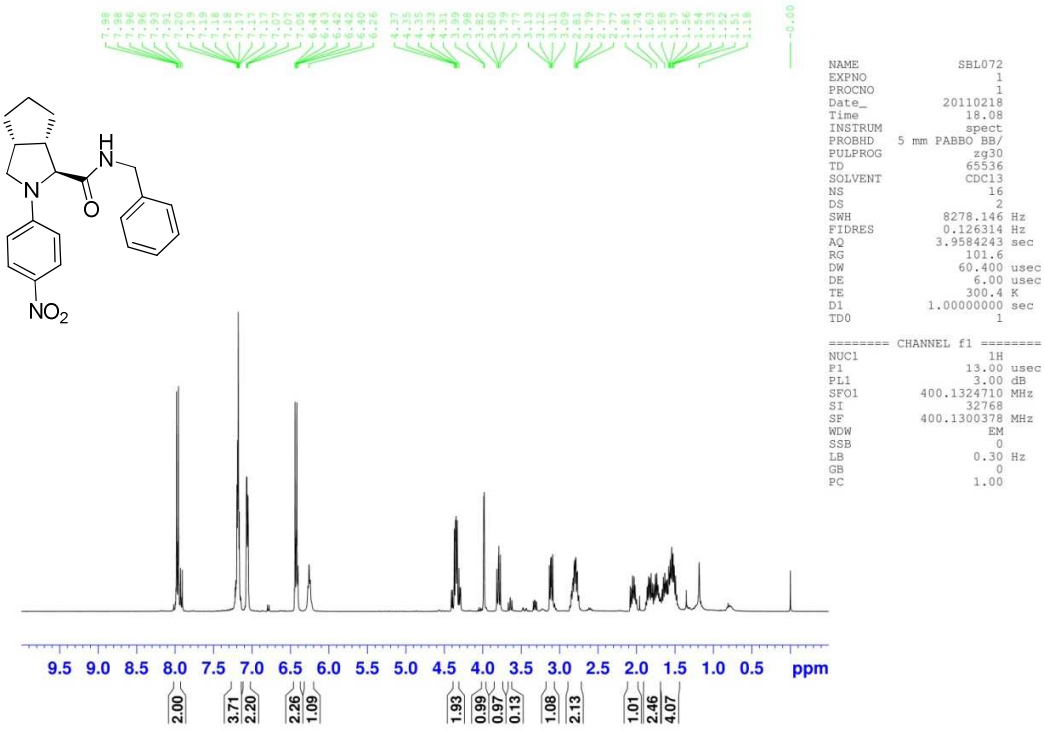

NAME SBL063
EXPNO 4
PROCNO 1
Date_ 20101207
Time 4.34
INSTRUM spect
PROBHD 5 mm CPTCI 1H-
PULPROG jmod
TD 65536
SOLVENT CDC13
NS 3072
DS 4
SWH 29761.904 Hz
FIDRES 0.454131 Hz
AQ 1.1010548 sec
RG 2050
DW 16.800 usec
DE 6.50 usec
TE 296.0 K
CNST2 145.0000000
CNST11 1.0000000
D1 2.00000000 sec
D20 0.00689655 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 11.20 usec
P2 22.40 usec
PL1 -2.00 dB
PL1W 88.77790070 W
SFO1 125.7955118 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 4.00 dB
PL12 25.28 dB
PL2W 8.72000027 W
PL12W 0.06494062 W
SFO2 500.2320009 MHz
SI 32768
SF 125.7830640 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

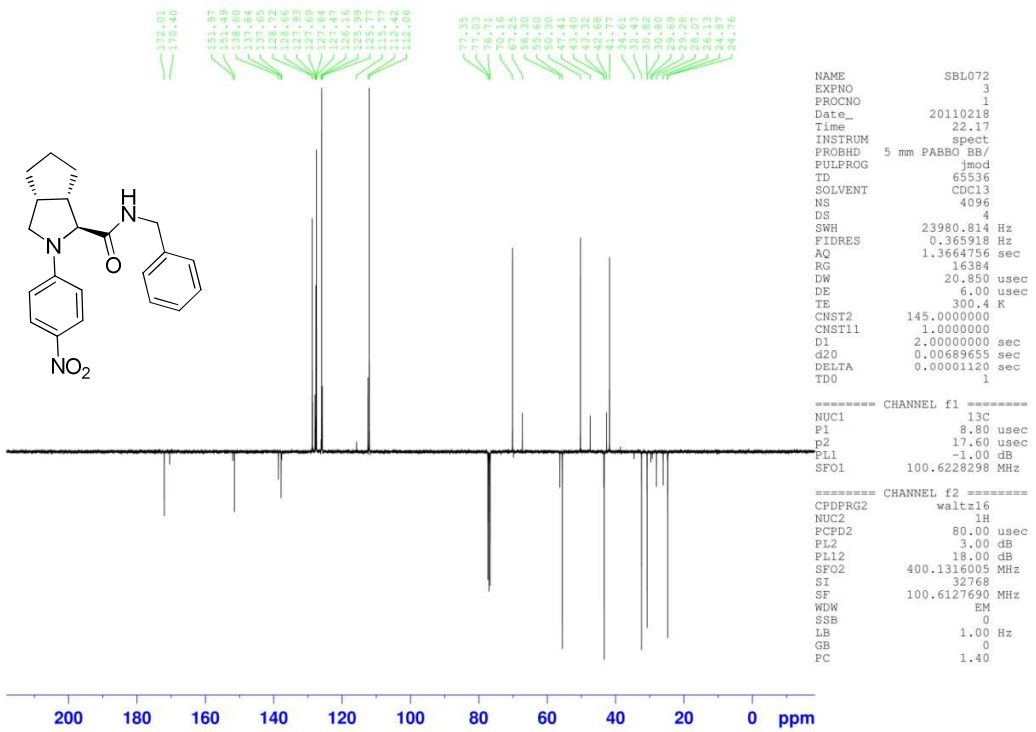
Compound 25


NAME SB1070_400_13C
EXPNO 1
PROCNO 1
Date_ 20110118
Time 17.23
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 101.6
DW 60.400 usec
DE 6.00 usec
TE 300.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 13.00 usec
PL1 3.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300336 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9 8 7 6 5 4 3 2 1 ppm
2.00 2.03 0.97 0.08 1.86 1.00 1.97 0.97 2.15 3.30 9.53

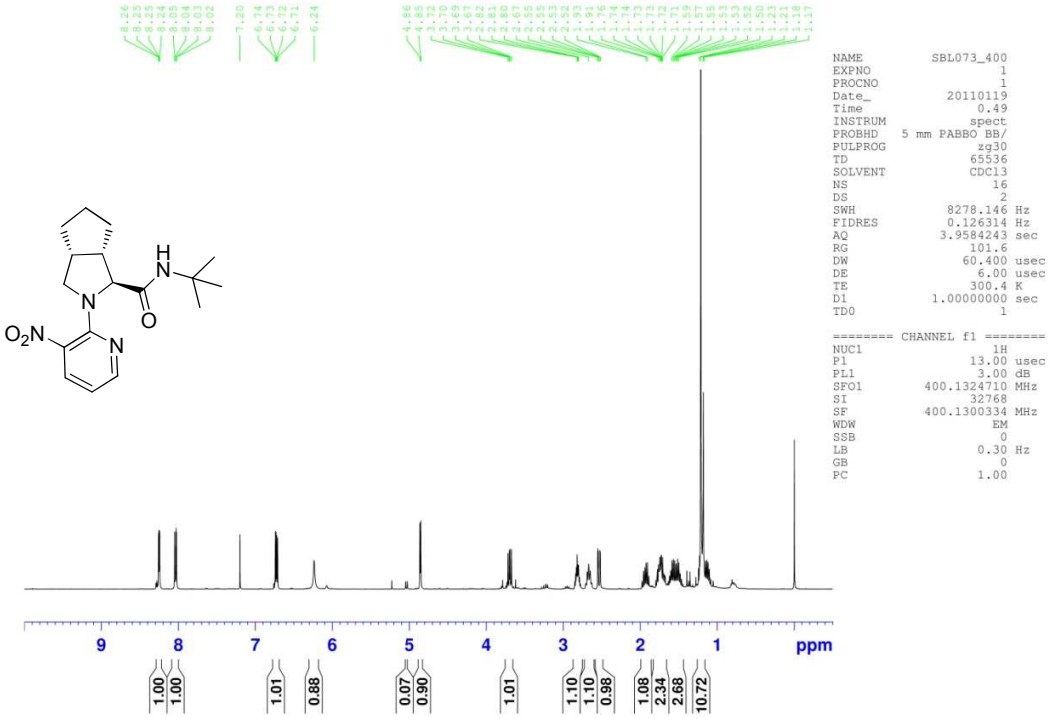

NAME SB1070_400_13C
EXPNO 4
PROCNO 1
Date_ 20110119
Time 0.40
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG jmod
TD 65536
SOLVENT CDCl3
NS 6144
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 9195.2
DW 20.850 usec
DE 6.00 usec
TE 300.4 K
CNST2 145.0000000
CNST11 1.0000000
D1 2.00000000 sec
d20 0.00689655 sec
DELTA 0.00001120 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.80 usec
p2 17.60 usec
PL1 -1.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 3.00 dB
PL12 18.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6128694 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

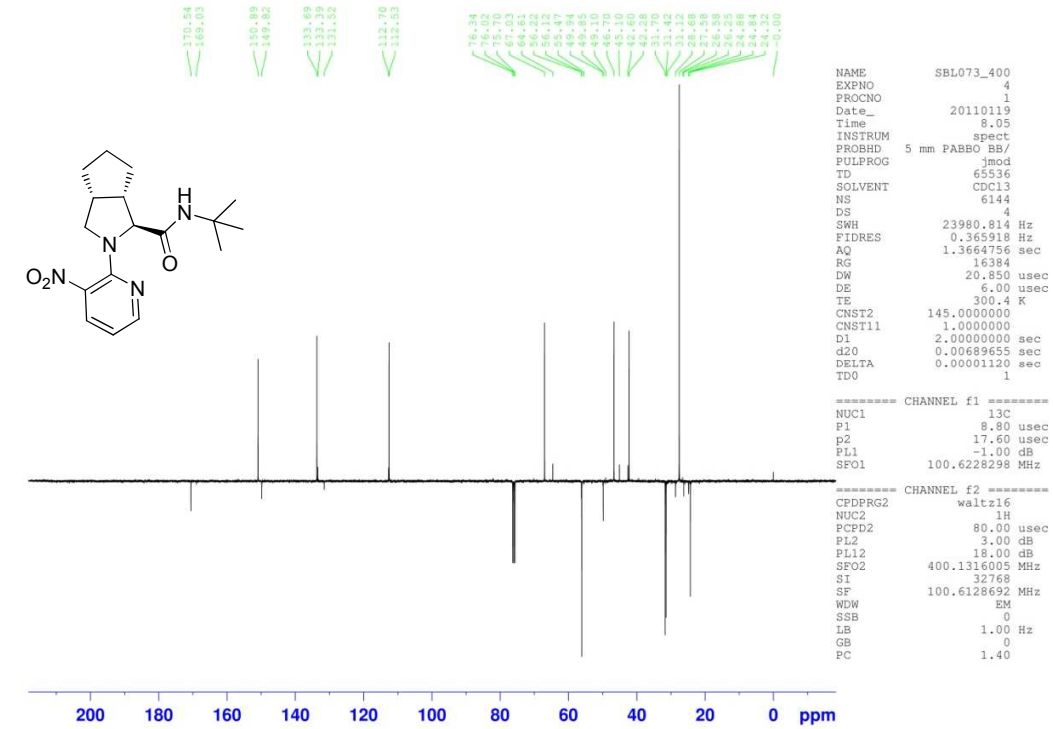
Compound 26


NAME SBL072
EXPNO 1
PROCNO 1
Date_ 20110218
Time 18.08
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 101.6
DW 60.400 usec
DE 6.00 usec
TE 300.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 13.00 usec
PL1 3.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300378 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
NO2
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
2.00 3.71 2.20 2.26 1.09 1.93 0.99 0.97 0.13 1.08 2.13 1.01 2.46 4.07

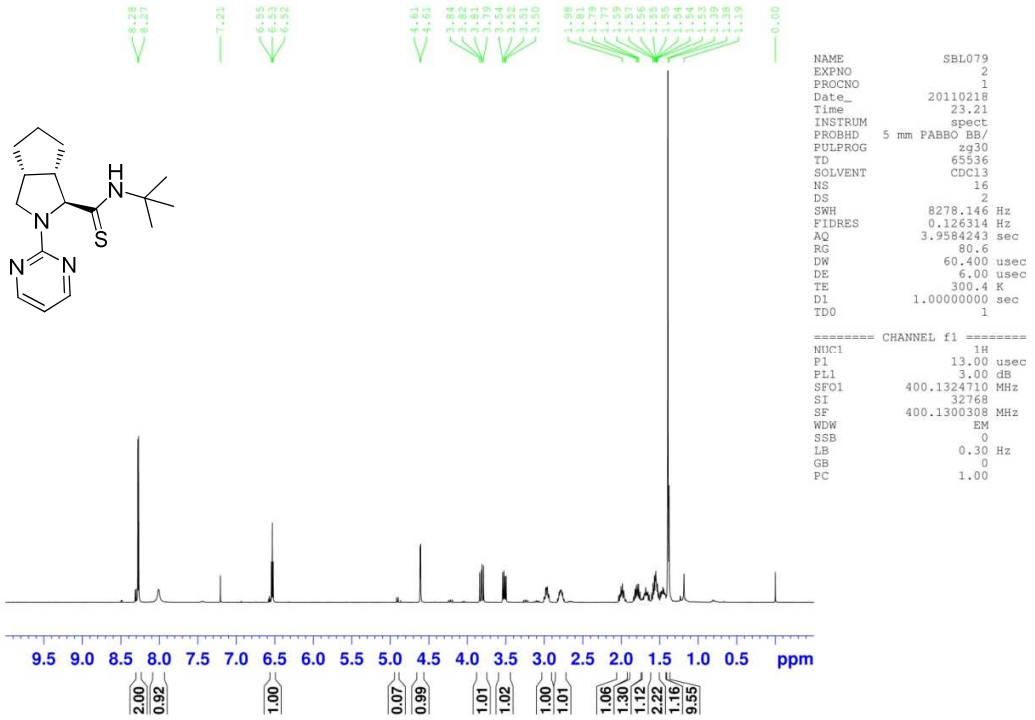

NAME SBL072
EXPNO 3
PROCNO 1
Date_ 20110218
Time 22.17
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG jmod
TD 65536
SOLVENT CDC13
NS 4096
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 16384
DW 20.850 usec
DE 6.00 usec
TE 300.4 K
CNST2 145.0000000
CNST11 1.0000000
D1 2.00000000 sec
d20 0.00689655 sec
DELTA 0.00001120 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.80 usec
p2 17.60 usec
PL1 -1.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 3.00 dB
PL12 18.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
NO2
200 180 160 140 120 100 80 60 40 20 0 ppm

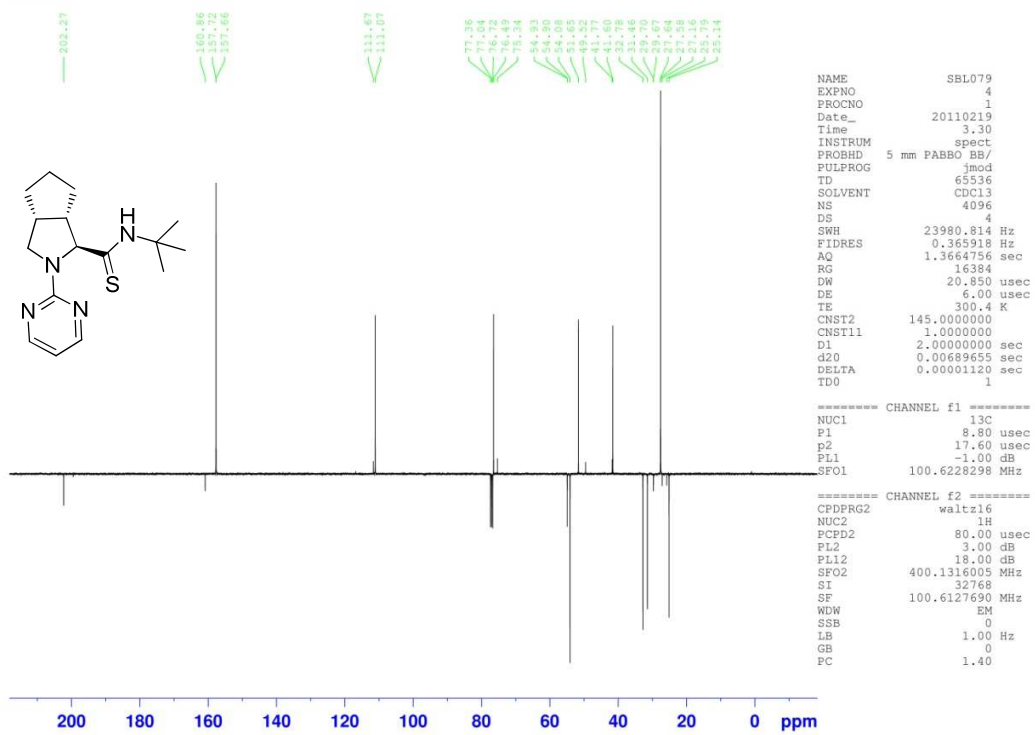
Compound 27


NAME SBL073_400
EXPNO 1
PROCNO 1
Date_ 20110119
Time 0.49
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 101.6
DW 60.400 usec
DE 6.00 usec
TE 300.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 13.00 usec
PL1 3.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300334 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9 8 7 6 5 4 3 2 1 ppm
1.00 1.00 1.01 0.88 0.07 0.90 1.01 1.10 1.10 0.98 1.08 2.34 2.68 10.72

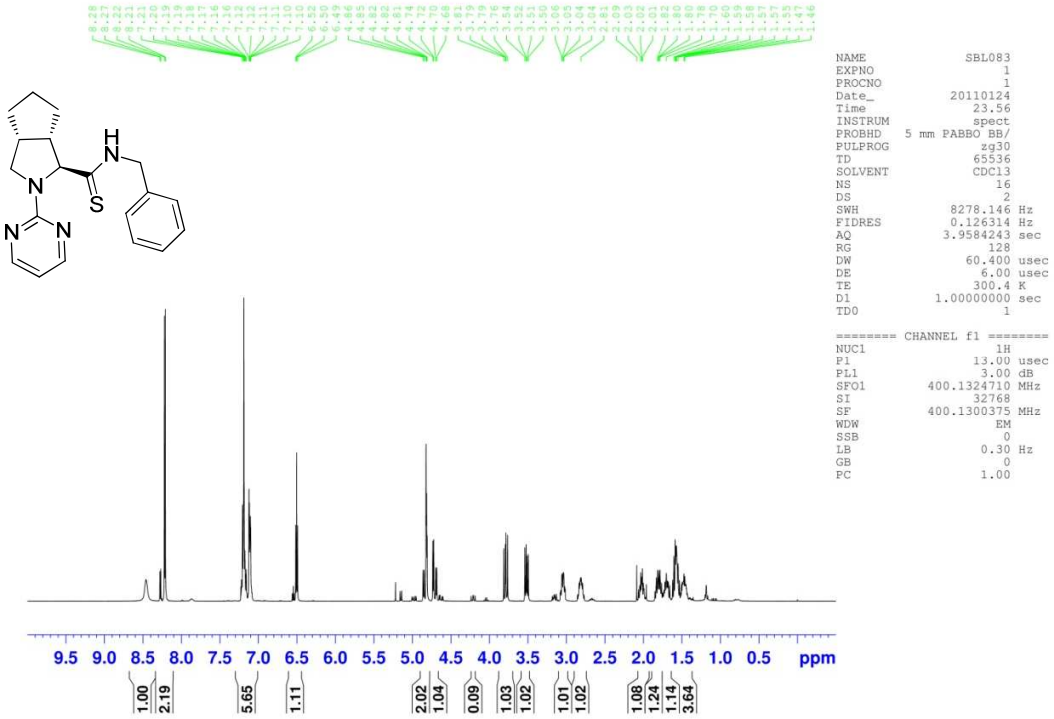

NAME SBL073_400
EXPNO 4
PROCNO 1
Date_ 20110119
Time 8.05
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG jmod
TD 65536
SOLVENT CDCl3
NS 6144
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 16384
DW 20.850 usec
DE 6.00 usec
TE 300.4 K
CNST2 145.0000000
CNST11 1.0000000
D1 2.00000000 sec
d20 0.00689655 sec
DELTA 0.00001120 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.80 usec
p2 17.60 usec
PL1 -1.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 3.00 dB
PL12 18.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6128692 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

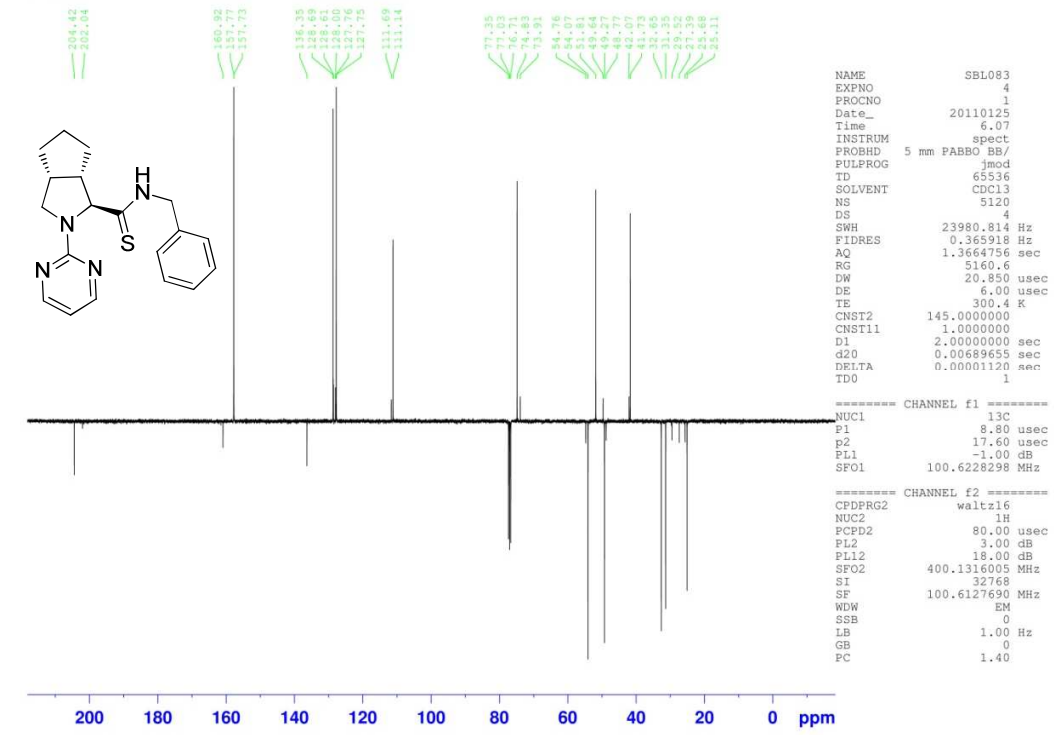
Compound 28


8.28
8.27
7.21
6.55
6.53
6.52
4.61
4.61
3.84
3.82
3.81
3.79
3.54
3.52
3.51
3.50
1.98
1.81
1.79
1.59
1.57
1.56
1.55
1.54
1.54
1.53
1.39
1.38
1.19
0.00
H
N
N
N
S
NAME SBL079
EXPNO 2
PROCNO 1
Date_ 20110218
Time 23.21
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 80.6
DW 60.400 usec
DE 6.00 usec
TE 300.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 13.00 usec
PL1 3.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300308 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
2.00
0.92
1.00
0.07
0.99
1.01
1.02
1.00
1.01
1.06
1.30
1.12
2.22
1.16
9.55

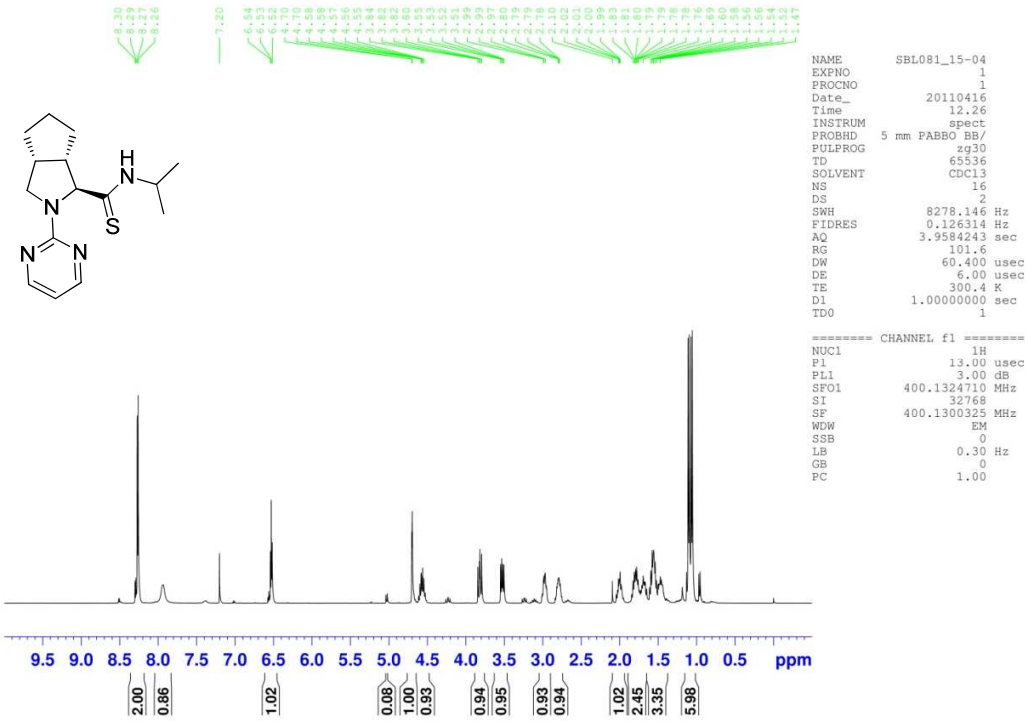

202.27
160.86
157.72
157.46
113.67
111.67
77.36
77.04
76.72
76.43
75.34
54.93
54.90
54.08
51.65
49.52
41.77
41.60
35.46
33.46
29.70
29.67
27.64
27.58
27.16
24.79
23.14
H
N
N
N
S
NAME SBL079
EXPNO 4
PROCNO 1
Date_ 20110219
Time 3.30
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG jmod
TD 65536
SOLVENT CDC13
NS 4096
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 16384
DW 20.850 usec
DE 6.00 usec
TE 300.4 K
CNST2 145.0000000
CNST11 1.0000000
D1 2.00000000 sec
d20 0.00689655 sec
DELTA 0.00001120 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.80 usec
p2 17.60 usec
PL1 -1.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 3.00 dB
PL12 18.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

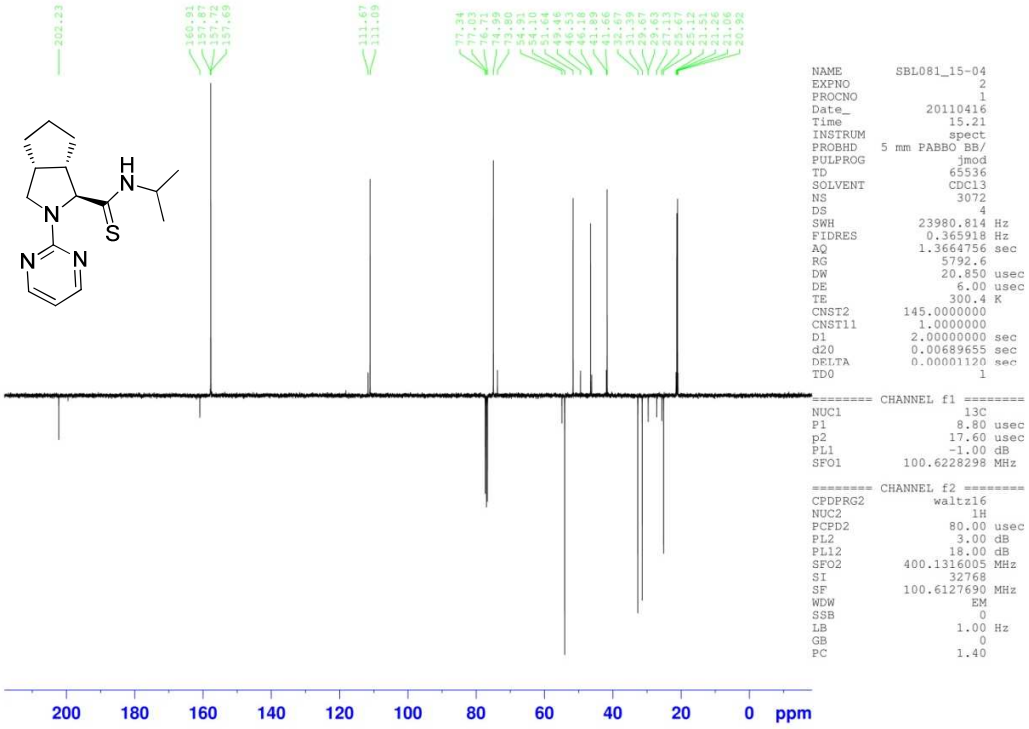
Compound 29


NAME SBL083
EXPNO 1
PROCNO 1
Date_ 20110124
Time 23.56
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 128
DW 60.400 usec
DE 6.00 usec
TE 300.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 13.00 usec
PL1 3.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300375 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.00 2.19 5.65 1.11 2.02 1.04 0.09 1.03 1.02 1.01 1.02 1.08 1.24 1.14 3.64

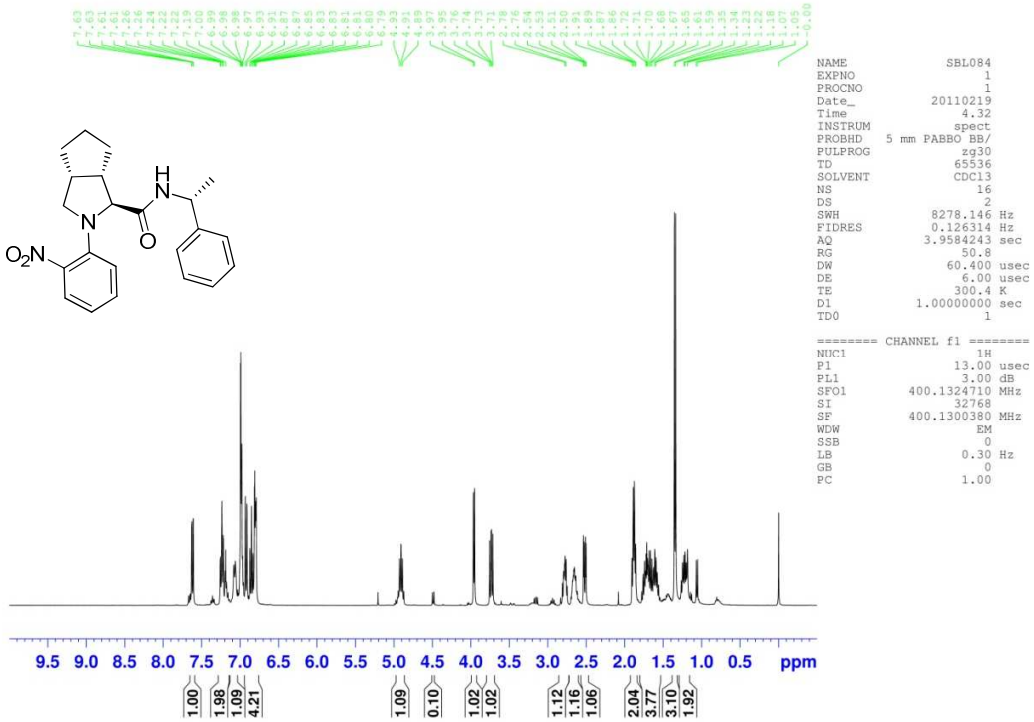

NAME SBL083
EXPNO 4
PROCNO 1
Date_ 20110125
Time 6.07
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG jmod
TD 65536
SOLVENT CDCl3
NS 5120
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 5160.6
DW 20.850 usec
DE 6.00 usec
TE 300.4 K
CNST2 145.0000000
CNST11 1.0000000
D1 2.00000000 sec
d20 0.00689655 sec
DELTA 0.00001120 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.80 usec
p2 17.60 usec
PL1 -1.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 3.00 dB
PL12 18.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

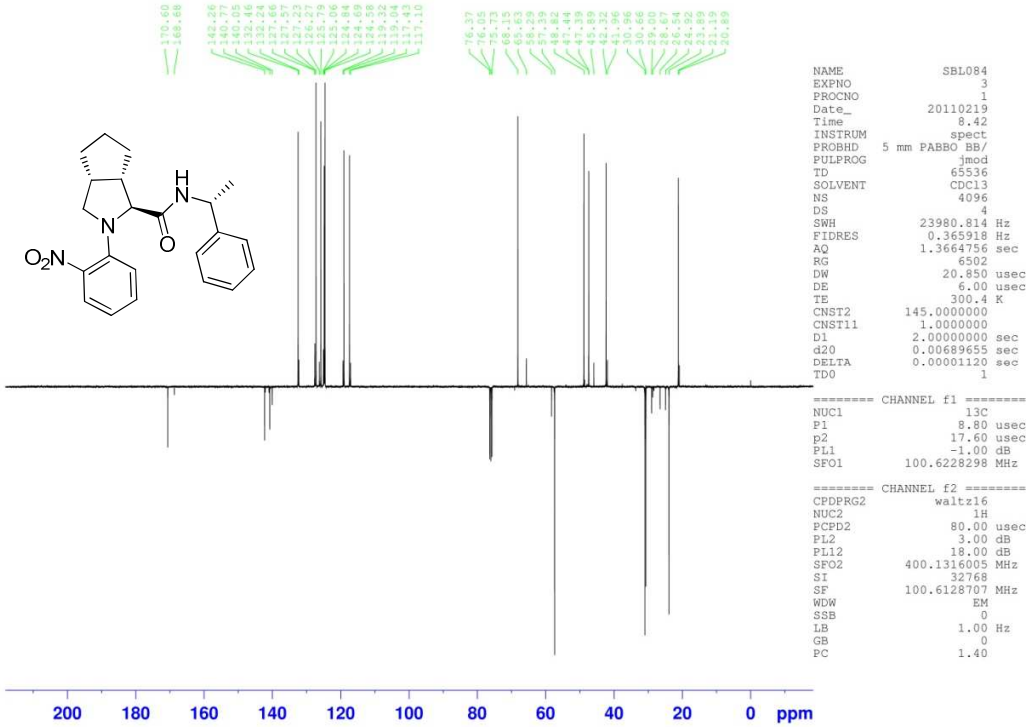
Compound 30


NAME SBL081_15-04
EXPNO 1
PROCNO 1
Date_ 20110416
Time 12.26
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 101.6
DW 60.400 usec
DE 6.00 usec
TE 300.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 13.00 usec
PL1 3.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300325 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
2.00 0.86 1.02 0.08 1.00 0.93 0.94 0.95 0.93 0.94 1.02 2.45 3.35 5.98

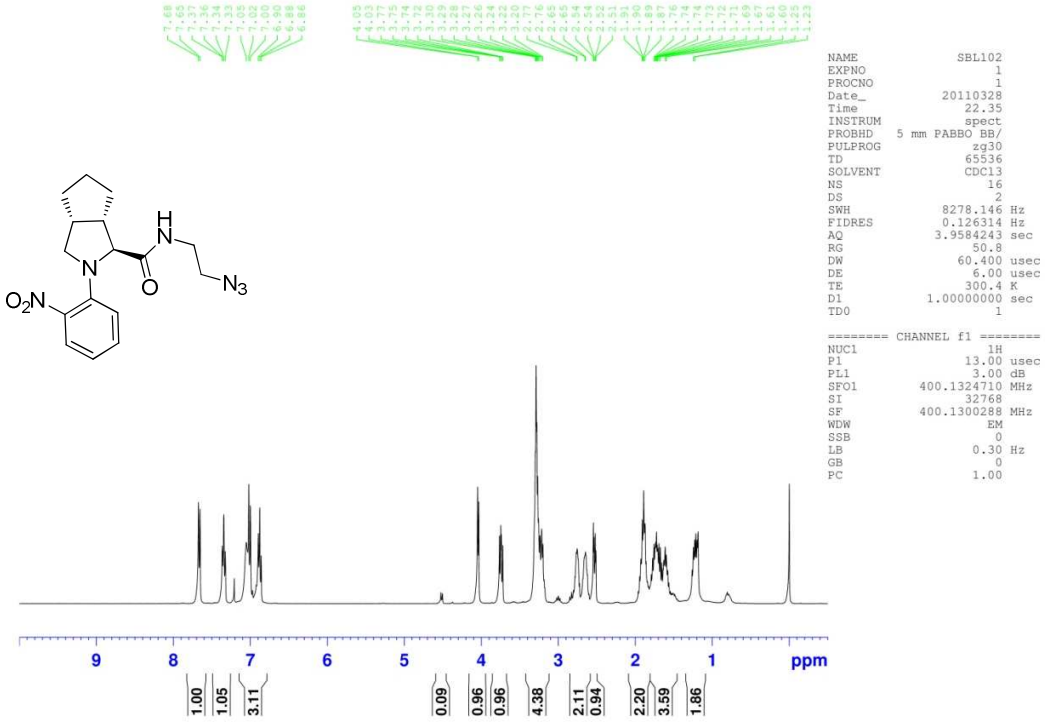

NAME SBL081_15-04
EXPNO 2
PROCNO 1
Date_ 20110416
Time 15.21
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG jmod
TD 65536
SOLVENT CDCl3
NS 3072
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 5792.6
DW 20.850 usec
DE 6.00 usec
TE 300.4 K
CNST2 145.0000000
CNST11 1.0000000
D1 2.00000000 sec
d20 0.00689655 sec
DELTA 0.00001120 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.80 usec
p2 17.60 usec
PL1 -1.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 3.00 dB
PL12 18.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6127690 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

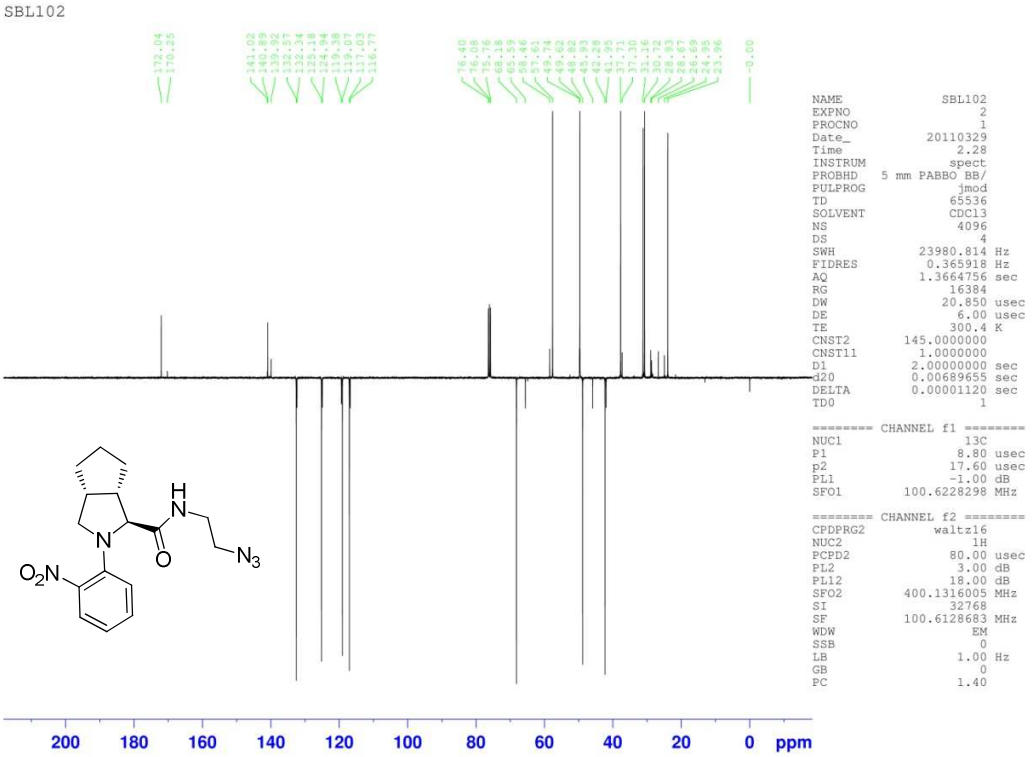
Compound 31


NAME SBL084
EXPNO 1
PROCNO 1
Date_ 20110219
Time 4.32
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDCl3
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 50.8
DW 60.400 usec
DE 6.00 usec
TE 300.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 13.00 usec
PL1 3.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300380 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9.5 9.0 8.5 8.0 7.5 7.0 6.5 6.0 5.5 5.0 4.5 4.0 3.5 3.0 2.5 2.0 1.5 1.0 0.5 ppm
1.00 1.98 1.09 4.21 1.09 0.10 1.02 1.02 1.12 1.16 1.06 2.04 3.77 3.10 1.92


NAME SBL084
EXPNO 3
PROCNO 1
Date_ 20110219
Time 8.42
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG jmod
TD 65536
SOLVENT CDCl3
NS 4096
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 6502
DW 20.850 usec
DE 6.00 usec
TE 300.4 K
CNST2 145.0000000
CNST11 1.0000000
D1 2.00000000 sec
d20 0.00689655 sec
DELTA 0.00001120 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.80 usec
p2 17.60 usec
PL1 -1.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 3.00 dB
PL12 18.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6128707 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

Compound 33


NAME SBL102
EXPNO 1
PROCNO 1
Date_ 20110328
Time 22.35
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG zg30
TD 65536
SOLVENT CDC13
NS 16
DS 2
SWH 8278.146 Hz
FIDRES 0.126314 Hz
AQ 3.9584243 sec
RG 50.8
DW 60.400 usec
DE 6.00 usec
TE 300.4 K
D1 1.00000000 sec
TD0 1
======== CHANNEL f1 ========
NUC1 1H
P1 13.00 usec
PL1 3.00 dB
SFO1 400.1324710 MHz
SI 32768
SF 400.1300288 MHz
WDW EM
SSB 0
LB 0.30 Hz
GB 0
PC 1.00
9 8 7 6 5 4 3 2 1 ppm
1.00 1.05 3.11 0.09 0.96 0.96 4.38 2.11 0.94 2.20 3.59 1.86


SBL102
NAME SBL102
EXPNO 2
PROCNO 1
Date_ 20110329
Time 2.28
INSTRUM spect
PROBHD 5 mm PABBO BB/
PULPROG jmod
TD 65536
SOLVENT CDCl3
NS 4096
DS 4
SWH 23980.814 Hz
FIDRES 0.365918 Hz
AQ 1.3664756 sec
RG 16384
DW 20.850 usec
DE 6.00 usec
TE 300.4 K
CNST2 145.0000000
CNST11 1.0000000
D1 2.00000000 sec
d20 0.00689655 sec
DELTA 0.00001120 sec
TD0 1
======== CHANNEL f1 ========
NUC1 13C
P1 8.80 usec
p2 17.60 usec
PL1 -1.00 dB
SFO1 100.6228298 MHz
======== CHANNEL f2 ========
CPDPRG2 waltz16
NUC2 1H
PCPD2 80.00 usec
PL2 3.00 dB
PL12 18.00 dB
SFO2 400.1316005 MHz
SI 32768
SF 100.6128683 MHz
WDW EM
SSB 0
LB 1.00 Hz
GB 0
PC 1.40
200 180 160 140 120 100 80 60 40 20 0 ppm

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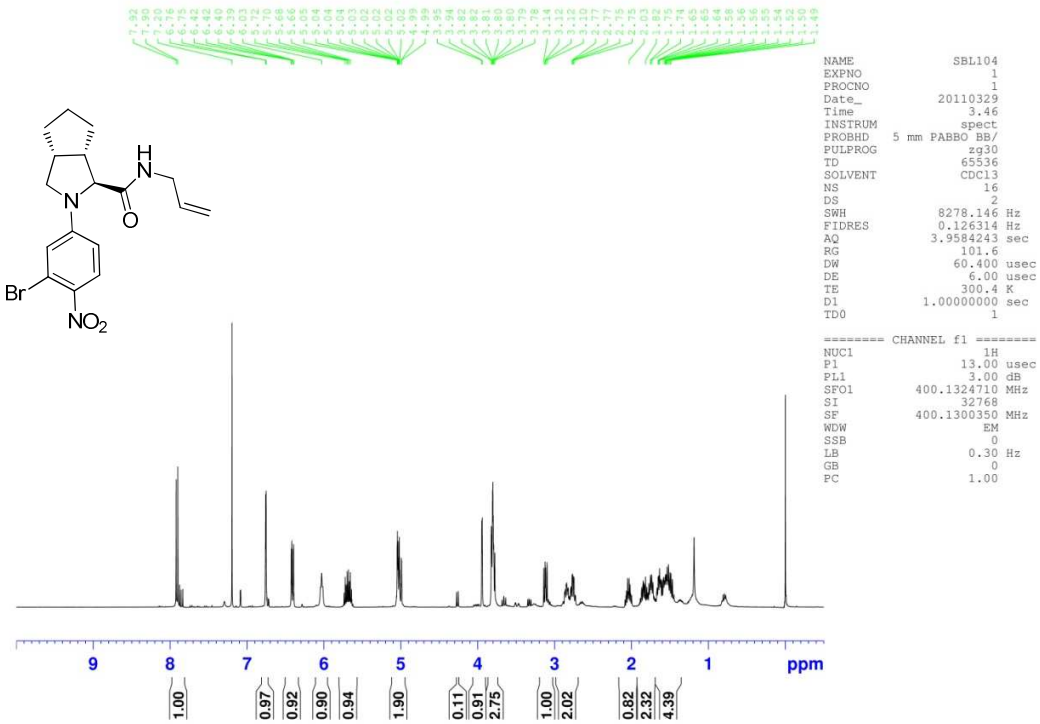
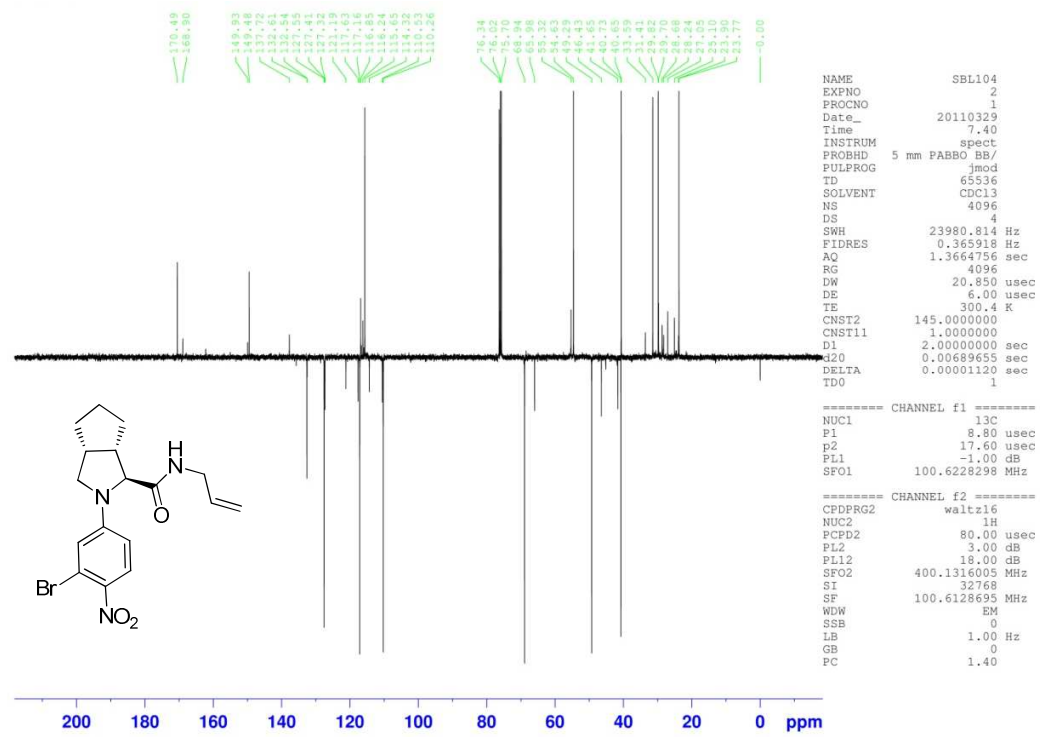
Compound 34





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Compound 35