Electronic Supplementary Material (ESI) for RSC Advances
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"Supporting Information for

Total Synthesis of Batzelline C and Isobatzelline C

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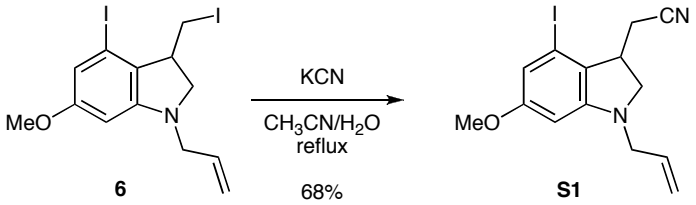
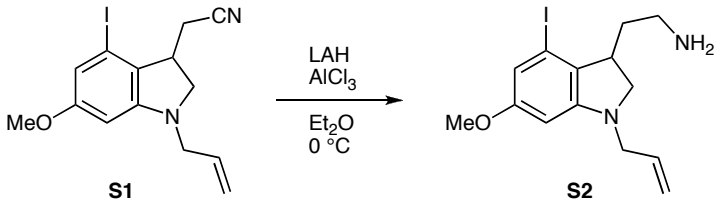
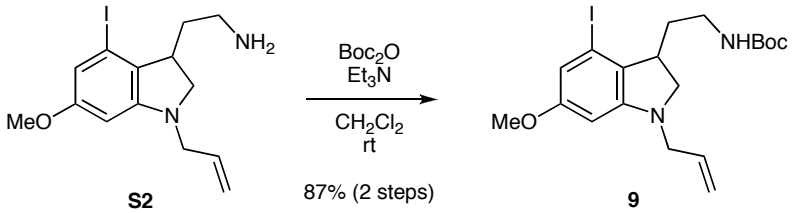
General Remarks.
All reactions were performed in oven-dried glassware, sealed with a rubber septum under a slight positive pressure of argon unless otherwise noted. Anhydrous THF, Et_2O, DMF, and dichloromethane were purchased from Kanto Chemical Co. Inc. 2,2,6,6-Tetramethylpiperidine was distilled from CaH_2. Unless otherwise mentioned, materials were obtained from commercial suppliers and were used without further purification. Chromatography was carried out using Kanto silica gel 60 (230–400 mesh). Preparative TLC was performed with precoated silica gel 60 F_{254} plates (Merck). IR spectra were measured on a JASCO FTIR 4100 spectrometer. NMR spectra were measured on a JEOL AL 400 spectrometer. For ^{1}H NMR spectra, chemical shifts are expressed in ppm downfield from internal tetramethylsilane (δ 0) or relative internal $CHCl_3$ (δ 7.26), or DMSO (δ 2.49). For ^{13}C NMR spectra, chemical shifts are expressed in ppm downfield from relative internal $CHCl_3$ (δ 77.0), or DMSO (δ 39.7). Coupling constants are in hertz. Mass spectra were recorded on a JEOL JMS–DX–303 or a JMS–700 spectrometer.



2-(1-Allyl-4-iodo-6-methoxyindolin-3-yl)acetonitrile (S1). A 300-mL round-bottomed flask equipped with a magnetic stirring bar was charged with **6** (11.2 g, 24.7 mmol), KCN (19.2 g, 296 mmol), CH_3CN (90 mL), and H_2O (30 mL). The resulting mixture was heated at reflux for 4 h, after which time TLC (hexanes-ethyl acetate = 3:1) indicated complete consumption of **6**. The reaction mixture was treated with aqueous NaOH and was extracted with ethyl acetate three times. The organic extracts were washed with aqueous NaOH and brine, dried over anhydrous sodium sulfate, and filtered. The organic solvents were removed under reduced pressure to give a crude material, which was purified by column chromatography on silica gel to provide **S1** (5.97 g, 16.9 mmol, 68%) as a pale yellow oil; IR (neat, cm^{-1}) 3080, 3003, 2935, 2835, 2246, 1609, 1566, 1479, 1339, 1296, 1209, 1173, 1107, 1038, 927, 819; ^{1}H NMR (400 MHz, $CDCl_3$) δ 6.54 (d, 1H, J = 2.0 Hz), 6.02 (d, 1H, J = 2.0 Hz), 5.89–5.77 (m, 1H), 5.31–5.20 (m, 2H), 3.79–3.72 (m, 1H), 3.72 (s, 3H), 3.63–3.55 (m, 1H), 3.51 (d, 2H, J = 4.4 Hz), 3.39–3.32 (m, 1H), 2.77 (dd, 1H, J = 16.8, 3.4 Hz), 2.51 (dd, 1H, J = 16.8, 10.4 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ 161.5, 152.2, 132.4, 125.8, 118.3, 118.1, 111.2, 95.0, 92.1, 56.8, 55.5, 50.8, 40.7, 20.6; HRMS–EI calcd. for $C_{14}H_{15}IN_2O$ (M^+), 354.0229; found 354.0223.



2-(1-Allyl-4-iodo-6-methoxyindolin-3-yl)ethanamine (S2). A 30-mL round-bottomed flask equipped with a magnetic stirring bar was charged with $AlCl_3$ (66.5 mg, 499 µmol), and dry Et_2O (2 mL). The solution was cooled to 0 °C. To the solution was added LAH (24.6 mg, 647 µmol) at 0 °C and stirred for 10 min. To the mixture was added the solution of **S1** (58.9 mg, 166 µmol) in dry Et_2O (1 mL) at 0 °C and the resulting mixture was stirred for 10 min, after which time TLC (dichloromethane-methanol = 4:1) indicated complete consumption of **S1**. The reaction was quenched with H_2O followed by *c*-H_2SO_4. The mixture was basified with aqueous NaOH and extracted with Et_2O three times. The combined organic extracts were dried over anhydrous sodium sulfate, and filtered. The filtrate was concentrated under reduced pressure to give amine **S2** as a pale yellow oil, which was used for the next reaction without further purification; IR (neat, cm^{-1}) 2931, 2834, 1607, 1565, 1476, 1337, 1292, 1207, 1174, 1106, 1038, 924, 817; ^1H NMR (400 MHz, $CDCl_3$) δ 6.51 (d, 1H, J = 2.0 Hz), 5.97 (d, 1H, J = 2.0 Hz), 5.87–5.76 (m, 1H), 5.26–5.15 (m, 2H), 3.75–3.67 (m, 1H), 3.70 (s, 3H), 3.53 (dd, 1H, J = 15.4, 5.8 Hz), 3.38–3.28 (m, 2H), 3.11–3.03 (m, 1H), 2.79–2.73 (m, 2H), 1.85–1.69 (m, 2H), 1.16 (br, 2H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 160.4, 152.2, 133.0, 129.5, 117.3, 110.4, 94.4, 91.8, 57.1, 55.3, 50.9, 40.9, 39.7, 36.4; HRMS–EI calcd. for $C_{14}H_{19}IN_2O$ (M^+), 358.0542; found 358.0533.



***tert*-Butyl 2-(1-allyl-4-iodo-6-methoxyindolin-3-yl)ethylcarbamate (9).** A 30-mL round-bottomed flask equipped with a magnetic stirring bar was charged with the crude amine **S2**, triethylamine (46.3 µL, 332 µmol), and dry dichloroethane (7 mL). To the solution was added Boc_2O (72.5 mg, 332 µmol). The reaction mixture was stirred for 10 h, after which time TLC (hexanes-ethyl acetate = 3:1) indicated complete consumption of **S2**. The reaction mixture was treated with H_2O, and the mixture was extracted with dichloromethane three times. The organic extracts were dried over anhydrous sodium sulfate, and filtered. The organic solvents were removed under reduced pressure to give a crude material, which was purified by column chromatography on silica gel to provide the title compound **9** (66.0 mg, 144 µmol, 87%) as a colorless oil; IR (neat, cm^{-1}) 3362, 2975, 2931, 2834, 1698, 1608, 1567, 1507, 1476, 1364, 1277, 1249, 1207; ^1H NMR (400 MHz, $CDCl_3$) δ 6.53 (d, 1H, J = 2.0 Hz), 6.00 (d, 1H, J = 2.0 Hz), 5.88–5.78 (m, 1H), 5.28–5.16 (m, 2H), 4.68 (br, 1H), 3.77–3.70 (m, 1H), 3.73 (s, 3H), 3.58–3.51 (m, 1H), 3.42–3.32 (m, 2H), 3.22–3.12 (m, 2H), 3.12–3.06 (m, 1H), 1.86–1.77 (m, 2H), 1.44 (s, 9H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 160.7, 155.9, 152.5, 133.0, 129.2, 117.7, 110.8, 94.8, 92.0, 78.9, 57.2, 55.5, 51.2, 40.9, 38.1, 32.7, 28.4; HRMS–EI calcd. for $C_{19}H_{27}IN_2O_3$ (M^+), 458.1066; found 458.1060.

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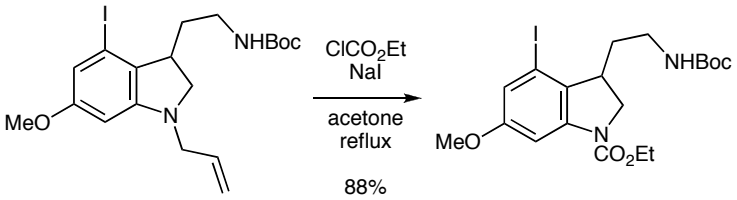
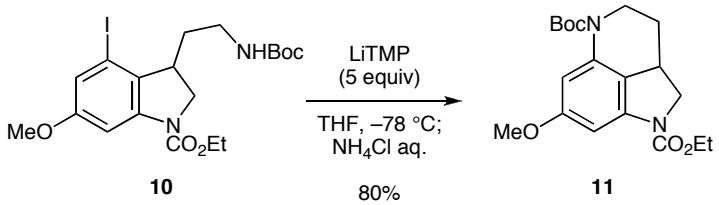


9 **10**

Ethyl 3-(2-(*tert*-butoxycarbonylamino)ethyl)-4-iodo-6-methoxyindoline-1-carboxylate (10). A 300-mL round-bottomed flask equipped with a reflux condenser and a magnetic stirring bar was charged with **9** (6.55 g, 14.3 mmol), ethyl chloroformate (6.84 mL, 71.5 mmol), NaI (10.7 g, 71.5 mmol), and acetone (70 mL). The resulting mixture was heated at reflux for 5 h, after which time TLC (hexanes-ethyl acetate = 3:1) indicated complete consumption of **9**. The reaction mixture was treated with H_2O, and the mixture was extracted with ethyl acetate three times. The organic extracts were dried over anhydrous sodium sulfate, and filtered. The organic solvents were removed under reduced pressure to give a crude material, which was purified by column chromatography on silica gel to provide the ethyl carbamate **10** (6.14 g, 12.5 mmol, 88%) as a colorless amorphous solid; IR (neat, cm^{-1}) 3370, 2977, 2933, 1707, 1601, 1571, 1519, 1474, 1446, 1312, 1220, 1173, 1141, 1053, 914; ^1H NMR (400 MHz, $CDCl_3$) δ 7.52 (br, 1H), 6.90 (d, 1H, J = 2.0 Hz), 4.56 (br, 1H), 4.27 (q, 2H, J = 6.8 Hz), 3.97 (d, 2H, J = 5.6 Hz), 3.77 (s, 3H), 3.27–3.06 (m, 3H), 2.01–1.90 (m, 1H), 1.72–1.59 (m, 1H), 1.45 (s, 9H) 1.36 (t, 3H, J = 6.8 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ 160.1, 155.9, 153.2, 143.2, 129.3, 117.9, 101.0, 91.6, 79.0, 61.6, 55.5, 52.8, 40.0, 37.9, 34.0, 28.3, 14.4; HRMS–EI calcd. for $C_{19}H_{27}IN_2O_5$ (M^+), 490.0965; found 490.0984.



10 **11**

5-*tert*-Butyl 1-ethyl 7-methoxy-2,2a,3,4-tetrahydropyrrolo[4,3,2-*de*]quinoline-1,5-dicarboxylate (11). A flame-dried 100-mL Schlenk tube equipped with a magnetic stirrer bar and an inlet adapter with three-way stopcock was charged with 2,2,6,6-tetramethylpiperidine (1.70 mL, 10.1 mmol) and dry THF (5 mL) under argon atmosphere. To the solution was added *n*-BuLi (1.60 M in *n*-hexane, 5.96 mL, 10.1 mmol) at –78 °C. The resulting solution was warmed to 0 °C over 25 min. The resulting pale yellow solution was added to the solution of **10** (1.01 g, 2.01 mmol) in THF (15 mL) at –78 °C dropwise. The reaction mixture was stirred for 5 min, after which time TLC (hexanes-ethyl acetate = 3:1) indicated complete consumption of **10**. The reaction mixture was treated with aqueous NH_4Cl, and the mixture was extracted with ethyl acetate three times. The organic extracts were washed with brine, dried over anhydrous sodium sulfate, and filtered. The organic solvents were removed under reduced pressure to give a crude material, which was purified by column chromatography on silica gel to provide the title compound **11** (582 mg, 1.61 mmol, 80%) as a pale yellow amorphous solid; IR (neat, cm^{-1}) 2978, 2935, 2879, 1708, 1613, 1496, 1472, 1450, 1410, 1379, 1339, 1300, 1201, 1160, 1132; ^1H NMR (400 MHz, $CDCl_3$) δ 7.42–7.20 (m, 1.5H), 7.20–7.00 (m, 0.3H), 6.82–6.64 (m, 0.2H), 4.40–4.21 (m, 3H), 4.10 (ddd, 1H, J = 13.2, 4.8, 2.0 Hz), 3.79 (s, 3H), 3.51 (dd, 1H, J = 10.8, 10.0 Hz), 3.42 (ddd, 1H, J = 13.2, 13.2, 4.4 Hz), 3.28–3.17 (m, 1H), 2.31–2.23 (m, 1H), 1.70–1.58 (m, 1H), 1.57 (s, 9H), 1.58–1.28 (m, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 160.7, 153.4, 153.0, 141.7, 135.7, 114.1, 101.0, 96.0, 81.1, 61.2, 55.5, 55.0, 45.6, 34.1, 28.2, 27.6, 14.5; HRMS–EI cald. for $C_{19}H_{26}N_2O_5$ (M^+), 362.1842; found 362.1851.

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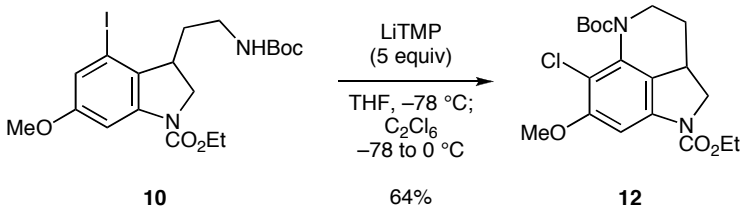
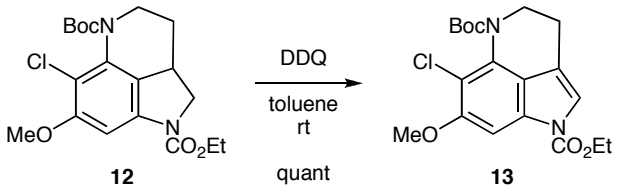


10 64% **12**

5-*tert*-Butyl 1-ethyl 6-chloro-7-methoxy-2,2a,3,4-tetrahydropyrrolo[4,3,2-*de*]quinoline-1,5-dicarboxylate (12). A flame–dried 50-mL Schlenk tube equipped with a magnetic stirrer bar and an inlet adapter with three-way stopcock was charged with 2,2,6,6-tetramethylpiperidine (1.70 mL, 10.0 mmol) and dry THF (20 mL) under argon atmosphere. To the solution was added *n*-BuLi (1.60 M in *n*-hexane, 6.14 mL, 10 mmol) at –78 °C. The resulting solution was warmed to 0 °C over 25 min. The resulting pale yellow solution was added to the solution of **10** (980 mg, 2.00 mmol) in THF (20 mL) at –78 °C dropwise over 5 min. The reaction mixture was stirred for 10 min, after which time TLC (hexanes-ethyl acetate = 3:1) indicated complete consumption of **10**. To the reaction mixture was added 1,1,1,2,2,2–hexachloroethane (2.37 g, 10 mmol) at –78 °C. The resulting suspension was warmed to 0 °C for 30 min. The reaction mixture was treated with saturated aqueous NH_4Cl, and the mixture was extracted with ethyl acetate three times. The organic extracts were dried over anhydrous sodium sulfate, and filtered. The organic solvents were removed under reduced pressure to give a crude material, which was purified by column chromatography on silica gel to provide the title compound **12** (506 mg, 1.27 mmol, 64%) as a pale yellow amorphous solid; IR (neat, cm^{-1}) 2979, 2936, 1704, 1608, 1487, 1450, 1409, 1378, 1330, 1303, 1169, 1138, 760; ^1H NMR (400 MHz, $CDCl_3$) δ 7.40–7.25 (m, 0.8H), 7.06–6.87 (m, 0.2H), 4.38 (dd, 1H, J = 1.0, 1.0 Hz), 4.35–4.18 (m, 2H), 4.07–3.92 (m, 1H), 3.91 (s, 3H), 3.60 (dd, 1H, J = 11.2, 8.4 Hz), 3.45–3.28 (m, 1H), 3.26–3.14 (m, 1H), 2.54–2.40 (m, 1H), 1.56–1.44 (m, 1H), 1.49 (s, 9H), 1.44–1.26 (m, 3H); ^{13}C NMR (100 MHz, $CDCl_3$) δ 156.3, 153.5, 152.9, 139.6, 134.5, 121.2, 111.3, 97.0, 81.2, 61.4, 56.7, 55.4, 44.3, 32.8, 31.2, 27.9, 14.5; HRMS–EI cald. for $C_{19}H_{25}ClN_2O_5$ (M^+), 396.1452; found 396.1436.



12 quant **13**

5-*tert*-Butyl 1-ethyl 6-chloro-7-methoxy-3,4-dihydropyrrolo[4,3,2-*de*]quinoline-1,5-dicarboxylate (13). A 20-mL round-bottomed flask equipped with a magnetic stirring bar was charged with **12** (38.6 mg, 97.3 μmol) and toluene (2 mL). To the solution was added DDQ (66.0 mg, 292 μmol). The reaction mixture was stirred for 1 h, after which time TLC (hexanes–ethyl acetate = 3:1) indicated complete consumption of **12**. The reaction mixture was treated with aqueous NaOH, and the mixture was extracted with ethyl acetate three times. The organic extracts were washed with aqueous $NaHCO_3$ and brine and dried over anhydrous sodium sulfate, and filtered. The organic solvents were removed under reduced pressure to give a crude material, which was purified by column chromatography on silica gel to provide the title compound **13** (39.0 mg, 99.0 μmol, quant) as a white solid; IR (neat, cm^{-1}) 3125, 2980, 2937, 1739, 1713, 1615, 1576, 1473, 1408, 1371, 1343, 1256, 1159, 1126, 887, 822, 761; ^1H NMR (400 MHz, $CDCl_3$) δ 7.46 (br, 1H), 7.16 (br, 1H), 4.45 (q, 2H, J = 6.8 Hz), 3.96 (s, 3H), 4.10–3.85 (m, 2H), 2.86–2.80 (m, 2H), 1.50 (s, 9H), 1.45 (t, 3H, J = 6.8 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ 154.6, 153.4, 151.1, 131.9, 131.8, 118.6, 117.9, 115.3, 112.8, 96.6, 81.6, 63.1, 56.9, 46.6, 28.0, 22.5, 14.3; HRMS–EI calcd. for $C_{19}H_{23}ClN_2O_5$ (M^+), 394.1295; found 394.1292.

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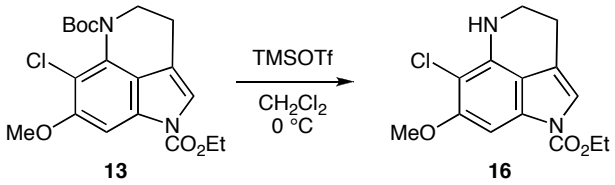
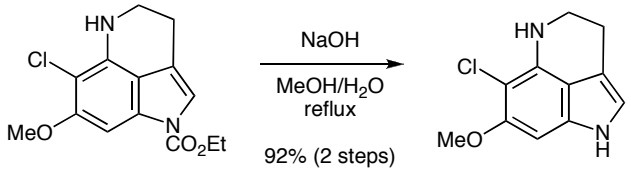


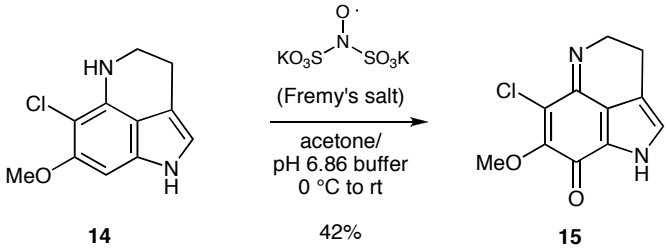
13 **16**

Ethyl 6-chloro-7-methoxy-4,5-dihydropyrrolo[4,3,2-*de*]quinoline–1(3*H*)–carboxylate (16). A 20-mL round-bottomed flask equipped with a magnetic stirring bar was charged with **13** (38.4 mg, 97.3 µmol) and dichloromethane (3 mL) under argon atmosphere. To the solution was added TMSOTf (33.6 µL, 195 µmol) at 0 °C. The reaction mixture was stirred for 10 min, after which time TLC (hexanes-ethyl acetate = 5:1) indicated complete consumption of the **13**. The reaction mixture was treated with aqueous $NaHCO_3$, and the mixture was extracted with dichloromethane three times. The organic extracts were dried over anhydrous sodium sulfate, and filtered. The organic solvents were removed under reduced pressure to give a crude **16**, which was used for the next reaction without further purification; IR (neat, cm^{-1}) 3410, 3388, 3119, 2973, 2938, 2908, 2844, 1735, 1627, 1575, 1475, 1412, 1312, 1252, 1217, 1128, 1085, 1021, 817, 759; ^1H NMR (400 MHz, $CDCl_3$) δ 7.10–7.00 (m, 2H), 4.46 (br, 1H), 4.45 (q, 2H, J = 7.2 Hz), 3.93 (s, 3H), 3.50 (t, 2H, J = 5.0 Hz), 2.93 (t, 2H, J = 5.0 Hz), 1.45 (t, 3H, J = 7.2 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ 154.5, 151.4, 137.6, 132.5, 115.4, 114.8, 113.5, 99.7, 89.6, 62.9, 56.5, 42.6, 22.3, 14.3; HRMS–EI calcd. for $C_{14}H_{15}ClN_2O_3$ (M^+), 294.0771; found 294.0764.



16 **14**

6-Chloro-7-methoxy-1,3,4,5-tetrahydropyrrolo[4,3,2-*de*]quinoline (14). A 20-mL round-bottomed flask equipped with a reflux condenser and a magnetic stirring bar was charged with a crude **16**, 5 M aqueous NaOH (400 µL), and methanol (3 mL). The resulting mixture was heated at reflux for 10 min, after which time TLC (hexanes-ethyl acetate = 3:1) indicated complete consumption of **16**. The reaction mixture was treated with NH_4Cl powder and diluted with ethyl acetate, and filtered. The organic solvents were removed under reduced pressure to give a crude material, which was purified by column chromatography on silica gel to provide **14** (19.8 mg, 88.9 µmol, 92% from **13**) as a white solid; IR (neat, cm^{-1}) 3433, 3375, 3355, 2909, 2842, 1617, 1510, 1090, 763; ^1H NMR (400 MHz, $CDCl_3$) δ 7.71 (br, 1H), 6.65 (s, 1H), 6.33 (s, 1H), 4.47 (br, 1H), 3.88 (s, 3H), 3.53 (t, 2H, J = 5.8 Hz), 2.99 (t, 2H, J = 5.8 Hz); ^{13}C NMR (100 MHz, $CDCl_3$) δ 153.3, 137.7, 132.1, 114.5, 112.5, 110.0, 96.3, 85.0, 56.5, 43.2, 22.6; HRMS–EI calcd. for $C_{11}H_{11}ClN_2O$ (M^+), 222.0555; found 222.0560.



14 **15**

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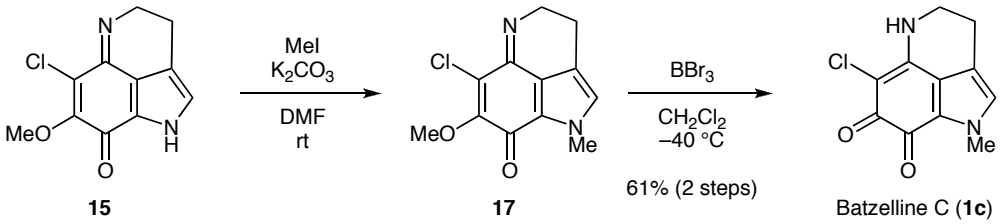
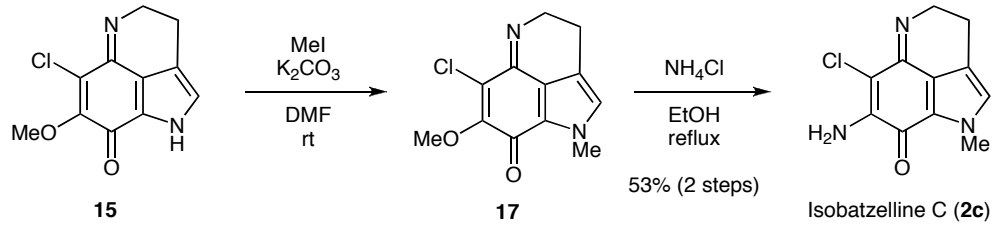
6-Chloro-7-methoxy-3,4-dihydropyrrolo[4,3,2-*de*]quinolin-8(1*H*)-one (15). A 200-mL round-bottomed flask equipped with a magnetic stirring bar was charged with Fremy's salt (805 mg, 3.00 mmol) and pH 6.86 buffer solution (60 mL). To the solution was added **14** (66.8 mg, 300 µmol) in acetone (30 mL) dropwise over 5 min at 0 °C. The resulting solution was warmed to room temperature over 10 min. After which time TLC (hexanes-ethyl acetate = 3:1) indicated complete consumption of **14**. The reaction mixture was treated with brine, and the mixture was extracted with ethyl acetate three times. The organic extracts were dried over anhydrous sodium sulfate, and filtered. The organic solvents were removed under reduced pressure. The residue was purified by preparative TLC to afford **15** (29.7 mg, 126 µmol, 42%) as a yellow solid; IR (neat, cm^{-1}) 3065, 3002, 2926, 2908, 2841, 2767, 1738, 1657, 1615, 1260, 1067, 1006, 890, 801; ^{1}H NMR (400 MHz, DMSO-d_6) δ 12.31 (br, 1H), 7.08 (d, 1H, J = 1.6 Hz), 4.13 (t, 2H, J = 8.0 Hz), 3.89 (s, 3H), 2.69 (t, 2H, J = 8.0 Hz); ^{13}C NMR (100 MHz, DMSO-d_6) δ 169.4, 154.9, 152.6, 127.8, 123.7, 122.9, 119.9, 116.6, 60.8, 50.9, 17.8; HRMS–EI calcd. for $C_{11}H_9ClN_2O_2$ (M^+), 236.0353; found 236.0358.



Batzelline C (1c). A 10-mL round-bottomed flask equipped with a magnetic stirring bar was charged with **15** (23.3 mg, 98.4 µmol), K_2CO_3 (27.2 mg, 197 µmol), and DMF (1 mL) under argon atmosphere. To the solution was added MeI (9.2 µL, 0.15 mmol). The reaction mixture was stirred for 10 min, after which time TLC (hexanes-ethyl acetate = 5:1) indicated complete consumption of **15**. The reaction mixture was treated with H_2O, and the mixture was extracted with ethyl acetate three times. The organic extracts were washed with H_2O three times and brine, dried over anhydrous sodium sulfate, and filtered. The organic solvents were removed under reduced pressure to give a crude **17**, which was used for the next reaction without further purification. A 20-mL round-bottomed flask equipped with a magnetic stirring bar was charged with a crude **17** and dichloromethane (5 mL) under argon atmosphere. To the solution was added BBr_3 (1.0 M in dichloromethane, 246 µL, 0.25 mmol) at –40 °C. The reaction mixture was stirred for 10 min, after which time TLC indicated complete consumption of **17**. The reaction mixture was treated with methanol, and concentrated under reduced pressure to give a crude batzelline C, which was purified by column chromatography on silica gel to afford batzelline C (**1c**) (14.1 mg, 59.6 µmol, 61% from **15**) as a purple solid; IR (neat, cm^{-1}) 3216, 3117, 2923, 2852, 1645, 1574, 1508, 1421, 1329, 833, 725; ^{1}H NMR (400 MHz, DMSO-d_6) δ 8.34 (s, 1H), 7.17 (s, 1H), 3.82 (s, 3H), 3.57 (td, 2H, J = 7.2, 2.4 Hz), 2.74 (t, 2H, J = 7.2 Hz); ^{13}C NMR (100 MHz, DMSO-d_6) δ 171.4, 169.1, 149.0, 129.6, 123.4, 123.0, 116.8, 96.8, 41.7, 35.5, 18.9; HRMS–EI cald. for $C_{11}H_9ClN_2O_2$ (M^+), 236.0353; found 236.0358.



Isobatzelline C (2c). A 10-mL round-bottomed flask equipped with a magnetic stirring bar was charged with **15** (20.4 mg, 86.2 µmol), K_2CO_3 (23.8 mg, 172 µmol), and DMF (1 mL) under argon

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atmosphere. To the solution was added MeI (8.1 μL, 0.13 mmol). The reaction mixture was stirred for 10 min, after which time TLC (hexanes-ethyl acetate = 5:1) indicated complete consumption of **15**. The reaction mixture was treated with H_2O, and the mixture was extracted with ethyl acetate three times. The organic extracts were washed with H_2O three times and brine, dried over anhydrous sodium sulfate, and filtered. The organic solvents were removed under reduced pressure to give a crude **17**, which was used for the next reaction without further purification. A 20-mL round-bottomed flask equipped with a reflux condenser and a magnetic stirring bar was charged with a crude **17**, NH_4Cl (23.0 mg, 431 μmol) and EtOH (1 mL) under argon atmosphere. The resulting mixture was heated at reflux for 20 min, after which time TLC indicated complete consumption of **17**. The reaction mixture was concentrated under reduced pressure to give a crude isobatzelline C, which was purified by preparative TLC to afford isobatzelline C (**2c**) (10.8 mg, 45.8 μmol, 53% from **15**) as a brown solid; IR (neat, cm^{-1}) 3010, 2919, 2851, 1670, 1604, 1520, 1406, 1348, 1324, 1256, 1204, 1144, 975; ^1H NMR (400 MHz, $CDCl_3$:CD_3OD = 1:1) δ 7.10 (s, 1H), 3.98 (s, 3H), 3.94 (t, 2H, J = 7.6 Hz), 2.99 (t, 2H, J = 7.6 Hz); ^{13}C NMR (100 MHz, $CDCl_3$:CD_3OD = 1:1) δ 166.4, 154.6, 152.7, 131.9, 123.7, 122.6, 119.9, 94.0, 43.9, 36.6, 19.1; HRMS–EI cald. for $C_{11}H_{10}ClN_3O$ (M^+), 235.0512; found 235.0518.

Chemical Shift of ^{13}C NMR for Natural and Synthetic Batzelline C (**1c**)

natural **1c**[1)]	synthetic **1c**	Δ (ppm)
171.4	171.4	0.0
169.1	169.1	0.0
148.9	149.0	0.1
129.4	129.6	0.2
123.4	123.4	0.0
122.9	123.0	0.1
116.7	116.8	0.1
96.9	96.8	–0.1
41.7	41.7	0.0
35.5	35.5	0.0
18.9	18.9	0.0

Chemical Shift of ^{13}C NMR for Natural and Synthetic Isobatzelline C (**2c**)

natural **2c**[2)]	synthetic **2c**	Δ (ppm)
166.8	166.4	–0.4
155.1	154.6	–0.5
153.5	152.7	–0.8
132.4	131.9	–0.5
124.1	123.7	–0.4
122.8	122.6	–0.2
120.3	119.9	–0.4
93.9	94.0	0.1
44.3	43.9	–0.4
36.6	36.6	0.0
19.2	19.1	–0.1

References

1) Sakemi, S.; Sun, H. H.; Jefford, C. W.; Bernardinelli, G. *Tetrahedron Lett.* **1989**, *30*, 2517.
2) Sun, H. H.; Sakemi, S. Burres, N.; McCarthy, P. *J. Org. Chem.* **1990**, *55*, 4964.