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## Supporting Procedures.

**7-Bromo-8-chloroquinoline-11-carboxylic Acid (5c).** Reaction of isatin (2.55 g, 17.3 mmol) in 4 M KOH (80 mL) with 5-bromo-6-chloroindoxyl acetate (5.00 g, 17.3 mmol) for 5 days according to General Procedure A gave 3.32 g (51%) of **5c** as a yellow solid, mp > 243 °C: <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 14.2 (broad s, 1H), 11.60 (s, 1H), 9.10 (dd, *J* = 7.6, *J* = 1.2, 1H), 8.63 (s, 1H), 8.26 (dd, *J* = 10.0, *J* = 2.4, 1H), 7.96 (s, 1H), 7.76-7.71 (m, 2H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 167.44, 145.22, 143.78, 143.73, 134.01, 132.64, 129.62, 127.45, 126.57, 125.57, 125.08, 123.93, 122.60, 121.23, 114.04, 112.12; MS (EI, *m/z*) 373.9 (M<sup>+</sup>) 375.9 (M+2<sup>+</sup>). Anal. (C<sub>16</sub>H<sub>8</sub>N<sub>2</sub>O<sub>2</sub>BrCl•0.6 H<sub>2</sub>O) C, H, N.

**7-Bromo-6-chloroquinoline-11-carboxylic Acid (5d).** Reaction of isatin (2.23 g, 15.1 mmol) in 4 M KOH (60 mL) with 5-bromo-4-chloroindoxyl diacetate (5.00 g, 15.1 mmol) for 11 days according to General Procedure A gave 1.82 g (32%) of **5d** as a yellow solid: <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 14.2 (bs, 1H), 11.77 (s, 1H), 9.08 (dd, *J* = 4.8, *J* = 2.4, 1H), 8.28 (dd, *J* = 5.6, *J* = 3.2, 1H), 7.95 (dd, *J* = 8.8, *J* = 1.6, 1H), 7.75-7.69 (m, 3H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 167.56, 145.19, 144.49, 143.71, 134.00, 132.11, 130.14, 127.77, 127.56, 126.43, 124.96, 123.57, 118.76, 113.24, 112.89, 112.01.

**7-Bromo-8-chloroquinoline (6c).** Decarboxylation of **5c** (3.00 g, 7.99 mmol) according to General Procedure B gave 2.49 g (94%) of **6c** as a greenish solid, mp > 246 °C: <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 11.70 (s, 1H), 8.62 (s, 1H), 8.36 (s, 1H), 8.18 (d, *J* = 8.4, 1H), 8.12 (d, *J* = 8.4, 1H), 7.84 (s, 1H), 7.69 (dd, *J* = 6.8, *J* = 6.8, 1H), 7.59 (dd, *J* = 7.2, *J* = 7.2, 1H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 143.65, 143.62, 143.15, 133.39, 132.95, 128.65, 127.66, 126.97, 126.75, 125.51 (two signals), 121.53, 114.34, 113.10, 111.11; MS (EI, *m/z*) 329.9 (M<sup>+</sup>) 331.9 (M+2<sup>+</sup>). Anal. (C<sub>15</sub>H<sub>8</sub>N<sub>2</sub>BrCl) C, H, N.

**7-Bromo-6-chloroquinoline (6d).** Decarboxylation of **5d** (1.75 g, 4.66 mmol) according to General Procedure B gave 1.48 g (96%) of **6d** as a brown solid: <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 11.92 (s, 1H), 8.39 (s, 1H), 8.21 (d, *J* = 8.4, 1H), 8.13 (dd, *J* = 8.4, *J* =

1.2, 1H), 7.90 (d,  $J = 8.4$ , 1H), 7.69 (ddd,  $J = 8.4$ ,  $J = 6.8$ ,  $J = 1.6$ , 1H), 7.60 (ddd,  $J = 8.0$ ,  $J = 7.2$ ,  $J = 1.2$ , 1H), 7.52 (d,  $J = 8.8$ , 1H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  143.88, 143.64, 143.59, 133.31, 132.56, 129.23, 127.82, 127.53, 126.62, 125.62, 119.09, 113.95, 112.14, 111.89.

**7-Bromo-8-chloro-5-methylquindolinium Hydrochloride (11c).** Reaction of **5c** (0.35 g, 1.06 mmol) and methyl iodide (1.97 mL, 31.7 mmol) in a Parr bomb according to General Procedure D gave 0.31 g (77%) of **11c** as a bright orange solid, mp  $> 246$  °C:  $^1\text{H}$  NMR (DMSO- $d_6$ )  $\delta$  13.33 (s, 1H), 9.38 (s, 1H), 9.21 (s, 1H), 8.81 (d,  $J = 8.8$ , 1H), 8.60 (d,  $J = 8.0$ , 1H), 8.21-8.18 (m, 2H), 7.98 (dd,  $J = 7.6$ ,  $J = 7.6$ , 1H), 5.02 (s, 3H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  144.42, 137.91, 136.67, 135.73, 133.85, 133.09, 130.27, 130.00, 127.53, 126.76, 126.08, 118.02, 114.48, 114.36, 113.63, 40.46; MS (LSIMS,  $m/z$ ) 345 ( $M^+$ ) 347 ( $M+2^+$ ). Anal. ( $\text{C}_{16}\text{H}_{11}\text{N}_2\text{BrCl}\cdot 0.75 \text{H}_2\text{O}$ ) C, H, N.

**5-(4-Fluorobenzyl)quindolinium Hydrochloride (11h).** Reaction of a suspension of quindoline (0.7 g, 3.21 mmol) and 4-fluorobenzyl bromide (2 mL, 16.0 mmol) in dry chloroform (4 mL) according to the procedure described for **11g** gave 0.30 g (23%) of **11h** as yellow crystals, mp 246.2-246.5 °C:  $^1\text{H}$  NMR (DMSO- $d_6$ )  $\delta$  13.50 (s, 1H, NH), 9.50 (s, 1H), 8.67 (d,  $J = 7.6$ , 1H), 8.52 (d,  $J = 9.2$ , 1H), 8.32 (d,  $J = 8.4$ , 1H), 8.12 (dd,  $J = 7.6$ ,  $J = 7.6$ , 1H), 7.95 (dd,  $J = 7.6$ ,  $J = 7.6$ , 1H), 7.90 (d,  $J = 3.6$ , 2H), 7.41 (m, 1H), 7.30 (d,  $J = 8.4$ , 1H), 7.29 (d,  $J = 8.0$ , 1H), 7.19 (t,  $J = 8.8$ , 2H), 6.82 (s, 2H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  161.74 (d,  $J = 244.1$ ), 146.15, 138.06, 135.11, 134.14, 133.87, 132.99, 130.24, 129.45 (d,  $J = 2.8$ ), 128.34 (d,  $J = 8.5$ ), 127.18, 126.50, 126.47, 125.14, 121.65, 117.50, 116.00 (d,  $J = 22.1$ ), 113.53, 112.78, 54.30; MS (EI,  $m/z$ ) 326 ( $M^+$ , free base). HRMS (FAB) calcd for  $\text{C}_{22}\text{H}_{16}\text{N}_2\text{F}^+$  327.1298, found 327.1284. Anal. ( $\text{C}_{22}\text{H}_{16}\text{N}_2\text{ClF}\cdot 0.75 \text{H}_2\text{O}$ ) C, H, N.

**4-Methoxy-10-acetylquindoline (15).** A suspension of **14** (460 mg, 1.36 mmol) and 10% Pd/C (70 mg) in MeOH (17 mL) was stirred under  $\text{H}_2$  (balloon) for 3 h. Additional Pd/C (70 mg) was added, a fresh balloon of  $\text{H}_2$  was attached and the mixture

was stirred at rt overnight. The catalyst was then removed over celite and the solvent was evaporated. The crude yellow product (209 mg, > 100%) was purified by LPLC, eluting with CH<sub>2</sub>Cl<sub>2</sub>, then CH<sub>2</sub>Cl<sub>2</sub>/EtOAc (3:97), to obtain 208 mg (53%) of the title compound as a colorless solid, R<sub>f</sub>0.47 (hexane-EtOAc 1:1), mp 125.1-125.8 °C: <sup>1</sup>H NMR (CDCl<sub>3</sub>) δ 9.02 (s, 1H), 8.62 (dd, *J* = 7.6, *J* = 0.8, 1H), 8.13 (d, *J* = 8.4, 1H), 7.65 (dt, *J* = 8.0; *J* = 0.8, 1H), 7.59 (d, *J* = 8.4, 1H), 7.53 (m, 2H), 7.11 (d, *J* = 7.6, 1H), 4.18 (s, 3H), 2.97 (s, 3H); <sup>13</sup>C NMR (CDCl<sub>3</sub>) δ 169.8, 155.2, 146.5, 141.4, 138.1, 131.9, 130.5, 128.6, 126.3, 124.3, 124.2, 122.7, 121.6, 120.5, 115.6, 106.7, 56.2, 27.7; MS (EI, *m/z*) 290 (M<sup>+</sup>).

**2-[(2-Bromoacetyl)amino]benzoic Acid (17k).** Reaction of anthranilic acid (50 g, 364.6 mmol) with bromoacetyl bromide (73.6 g, 365 mmol) according to General Procedure H gave 82.61 g (87.8%) of **17k** as a white powder, mp 164.6-167.6 °C (lit.<sup>51</sup> 165.5-172 °C): <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 13.7 (bs, 1H), 11.60 (s, 1H), 8.44 (d, *J* = 8.0, 1H), 8.00 (dd, *J* = 8.0, *J* = 1.6, 1H), 7.62 (ddd, *J* = 8.0, *J* = 8.0, *J* = 1.6, 1H), 7.21 (dd, *J* = 8.0, *J* = 8.0, 1H), 4.26 (s, 2H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 169.20, 165.05, 139.95, 134.08, 131.13, 123.46, 120.02, 117.09, 30.67; MS (EI, *m/z*) 256.9 (M<sup>+</sup>), 258.9 (M+2<sup>+</sup>). Anal. (C<sub>9</sub>H<sub>8</sub>BrO<sub>3</sub>) C, H, N.

**2-[(2-Bromoacetyl)amino]-5-chlorobenzoic Acid (17n).** Reaction of 2-amino-5-chlorobenzoic acid (10 g, 58 mmol) with bromoacetyl bromide (11.8 g, 5 mL, 58 mmol) according to General Procedure H gave 11.4 g (67%) of **17n**, mp 210–212 °C (dec.): <sup>1</sup>H NMR (CD<sub>3</sub>OD) δ 8.59 (d, *J* = 9.2, 1H), 8.04 (d, *J* = 2.8, 1H), 7.55 (dd, *J* = 9.2, *J* = 2.4, 1H), 4.11 (s, 2H); <sup>13</sup>C NMR (CD<sub>3</sub>OD) δ 167.94, 165.19, 138.69, 133.67, 130.29, 127.14, 121.98, 119.13, 30.51; MS (EI, *m/z*) 293 (M<sup>+</sup>). Anal. (C<sub>9</sub>H<sub>7</sub>NO<sub>3</sub>BrCl) C, H, N.

**2-[(2-Bromoacetyl)amino]-6-chlorobenzoic Acid (17o).** Reaction of 2-amino-6-chlorobenzoic acid (10.0 g, 58 mmol) with bromoacetyl bromide (5 mL, 58 mmol) according to General Procedure H gave 5.0 g (30%) of **17o**, mp 133–135 °C (dec.): <sup>1</sup>H

NMR (CD<sub>3</sub>OD)  $\delta$  7.70 (d,  $J$  = 8.0, 1H), 7.43 (t,  $J$  = 8.4, 1H), 7.35 (d,  $J$  = 8, 1H), 4.05 (s, 2H); <sup>13</sup>C NMR (CD<sub>3</sub>OD)  $\delta$  168.19, 167.84, 137.24, 133.31, 132.85, 132.08, 128.21, 124.20, 29.21; MS (EI,  $m/z$ ) 293 (M<sup>+</sup>). Anal. (C<sub>9</sub>H<sub>7</sub>NO<sub>3</sub>BrCl) C, H, N.

**2-[(2-Bromoacetyl)amino]-3-chlorobenzoic Acid (17q).** Reaction of 2-amino-3-chlorobenzoic acid (7.0 g, 41 mmol) with bromoacetyl bromide (8.2 g, 3.5 mL, 41 mmol) according to General Procedure H gave 7.7 g (65%) of **17q** as a light yellow crystals, mp 173–175 °C: <sup>1</sup>H NMR (CD<sub>3</sub>OD)  $\delta$  7.88 (dd,  $J$  = 6.0,  $J$  = 1.6, 1H), 7.68 (dd,  $J$  = 6.8,  $J$  = 1.2, 1H), 7.39 (t,  $J$  = 8.0, 1H), 6.6 (bs, 1H), 4.06 (s, 2H); <sup>13</sup>C NMR (CD<sub>3</sub>OD)  $\delta$  176.37, 168.38, 134.84, 134.40, 131.95, 130.53, 129.15, 129.05, 28.66; MS (EI,  $m/z$ ) 293 (M<sup>+</sup>).

**2-[[2-(Phenylamino)acetyl]amino]benzoic Acid (19k).** Reaction of **17k** (5.0 g, 19.37 mmol) and aniline (4.51 g, 48.4 mmol) at 85 °C for 4.5 h according to General Procedure I gave 4.74 g (90.6%) of **19k** as a white powder, mp 202-204 °C, mp 192.4–192.8 °C (sealed tube) (lit.<sup>16</sup> 183-186 °C): <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>)  $\delta$  13.41 (bs, 1H), 12.01 (s, 1H), 8.72 (d,  $J$  = 8.4, 1H), 7.93 (dd,  $J$  = 7.6,  $J$  = 1.6, 1H), 7.59 (ddd,  $J$  = 8.8,  $J$  = 8.8,  $J$  = 1.6, 1H), 7.15-7.05 (m, 3H), 6.63-6.45 (m, 4H); 3.83 (s, 2H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>)  $\delta$  170.85, 169.01, 148.11, 140.56, 134.13, 131.10, 128.94, 122.63, 119.38, 117.10, 115.96, 112.40, 48.93; MS (EI,  $m/z$ ) 270.1 (M<sup>+</sup>). Anal. (C<sub>15</sub>H<sub>14</sub>N<sub>2</sub>O<sub>3</sub>) C, H, N.

**2-[2-[(Phenylamino)acetyl]amino]-5-chlorobenzoic Acid (19n).** The reaction of a solution of **17n** (10 g, 32.9 mmol) and aniline (8.0 g, 86.0 mmol) in DMF (60 mL) at 100–110 °C for 4 h followed General Procedure I. After acidification with 5% HBr, the mixture was extracted with EtOAc (3 x 200 mL). The combined EtOAc layer was dried (Na<sub>2</sub>SO<sub>4</sub>), filtered and concentrated to give 7.8 g (75%) of **19n** as a white solid, mp 210–212 °C: <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>)  $\delta$  13.99 (s, 1H), 11.96 (s, 1H), 8.75 (d,  $J$  = 8.0, 1H), 7.87 (d,  $J$  = 2.8, 1H), 7.68 (d,  $J$  = 2.4, 1H), 7.65 (d,  $J$  = 2.8, 1H), 7.10 (t,  $J$  = 7.6, 2H), 6.61 (m, 4H), 3.84 (s, 2H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>)  $\delta$  171.08, 167.81, 148.05, 139.36, 133.81, 130.25, 128.97, 126.20, 121.25, 117.77, 117.14, 112.45, 48.90; MS (EI,  $m/z$ ) 304

(M<sup>+</sup>). HRMS (EI) calcd for C<sub>15</sub>H<sub>13</sub>N<sub>2</sub>O<sub>3</sub>Cl 304.0615, found 304.0617. Anal.

(C<sub>15</sub>H<sub>13</sub>N<sub>2</sub>O<sub>3</sub>Cl•0.95 H<sub>2</sub>O) C, H, N.

**2-[2-[(Phenylamino)acetyl]amino]-6-chlorobenzoic Acid (19o).** The reaction of **17o** (7.0 g, 23.0 mmol) and aniline (5.6 g, 60.0 mmol) in DMF (40 mL) at 100 °C for 5 h followed the procedure described for **19n**. Final recrystallization from EtOAc/hexane gave 6.0 g (82%) of **19o** as white crystals, mp 176–178.2 °C: <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 9.93 (s, 1H), 7.97 (d, *J* = 8.0, 1H), 7.42 (dd, *J* = 8.0, *J* = 8.0, 1H), 7.30 (d, *J* = 7.6, 1H), 7.12 (t, *J* = 7.2, 2H), 6.65 (t, *J* = 7.2, 3H), 3.82 (s, 2H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 170.19, 166.30, 148.15, 136.56, 131.12, 130.53, 128.98, 125.51, 121.39, 119.12, 117.23, 112.71, 48.13; MS (EI, *m/z*) 304 (M<sup>+</sup>). HRMS (EI) calcd for C<sub>15</sub>H<sub>13</sub>N<sub>2</sub>O<sub>3</sub>Cl 304.0615, found 304.0635.

**2-[2-[(Phenylamino)acetyl]amino]-3-chlorobenzoic Acid (19q).** The reaction of **17q** (7.5 g, 0.026 mol) and aniline (5.8 mL, 250 mol%) in DMF (60 mL) at 95–100 °C for 20 h followed the procedure described for **19n**. Recrystallization from ether gave 3.0 g (38%) of **19q** as a white crystals, mp 184–185 °C: <sup>1</sup>H NMR (CD<sub>3</sub>OD) δ 7.85 (dd, *J* = 6.0, *J* = 1.6, 1H), 7.66 (dd, *J* = 6.4, *J* = 1.6), 7.33 (t, *J* = 8.0), 7.16 (t, *J* = 7.2, 2H), 6.72 (dd, *J* = 5.6, *J* = 2.0, 3H), 3.91 (s, 2H); <sup>13</sup>C NMR (CD<sub>3</sub>OD) δ 203.86, 196.95, 173.19, 173.17, 168.69, 149.44, 134.30, 130.41, 130.09, 128.42, 119.31, 114.44; MS (EI, *m/z*) 304 (M<sup>+</sup>). HRMS (EI) calcd for C<sub>15</sub>H<sub>13</sub>N<sub>2</sub>O<sub>3</sub>Cl 304.0615, found 304.0613.

**2-[2-[[[4-(Phenyl)phenyl]amino]acetyl]amino]benzoic Acid (19r).** The reaction of a solution of **17k** (8.00 g, 31.0 mmol) and 4-aminobiphenyl (13.12 g, 77.5 mmol) in DMF (80 mL) at 80 °C for 8 h followed General Procedure I. The product was triturated three times with ethyl acetate (100 mL, 2 x 25 mL), and then dried to give 8.18 g (76%) of **19r** as a tan solid, mp 228 °C: <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 13.4 (bs, 1H), 12.05 (s, 1H), 8.75 (d, *J* = 8.4, 1H), 7.95 (dd, *J* = 7.4, *J* = 1.2, 1H), 7.60 (ddd, *J* = 7.2, *J* = 7.2, *J* = 1.2, 1H), 7.54 (d, *J* = 7.6, 2H), 7.45 (d, *J* = 8.8, 2H), 7.37 (t, *J* = 7.6, 2H), 7.22 (dd, *J* = 7.6, *J* = 7.6, 1H), 7.13 (dd, *J* = 7.6, *J* = 7.6, 1H), 6.69 (d, *J* = 8.4, 2H), 3.90 (s,

2H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  170.74, 169.12, 147.71, 140.60, 140.36, 134.20, 131.14, 128.87, 128.74, 127.28, 125.96, 125.55, 122.69, 119.40, 115.97, 112.85, 48.87; MS (EI,  $m/z$ ) 346 ( $\text{M}^+$ ). HRMS (EI) calcd for  $\text{C}_{21}\text{H}_{18}\text{N}_2\text{O}_3$  346.1317, found 346.1293.

**2-[2-[[4-Fluorophenyl]amino]acetyl]amino]benzoic Acid (19s).** Reaction of **17k** (8.00 g, 31.0 mmol) and 4-fluoroaniline (7.34 mL, 77.5 mmol) in DMF (80 mL) at 75 °C for 8 h according to General Procedure I gave 7.98 g (89%) of **19s** as an off-white solid, mp 209 °C:  $^1\text{H}$  NMR (DMSO- $d_6$ )  $\delta$  13.45 (bs, 1H), 12.00 (s, 1H), 8.72 (d,  $J = 8.0$ , 1H), 7.94 (dd,  $J = 8.0$ ,  $J = 1.2$ , 1H), 7.59 (ddd,  $J = 7.2$ ,  $J = 7.2$ ,  $J = 1.6$ , 1H), 7.13 (ddd,  $J = 7.2$ ,  $J = 7.2$ ,  $J = 0.8$ , 1H), 6.95 (m, 2H), 6.58 (m, 2H), 6.47 (s, 1H), 3.82 (s, 2H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  170.73, 169.04, 154.95 (d,  $J = 230.6$ ), 144.78, 140.54, 134.15, 131.13, 122.69, 119.43, 116.00, 115.38 (d,  $J = 21.9$ ), 113.22 (d,  $J = 7.6$ ), 49.31. HRMS (EI) calcd for  $\text{C}_{15}\text{H}_{13}\text{N}_2\text{O}_3\text{F}$  288.0910, found 288.0906. Anal. ( $\text{C}_{15}\text{H}_{13}\text{N}_2\text{O}_3\text{F}\cdot 0.5 \text{H}_2\text{O}$ ) C, H, N.

**2-[2-[[2-Fluorophenyl]amino]acetyl]amino]benzoic Acid (19t).** Reaction of a solution of **17k** (8.00 g, 31.0 mmol) and 2-fluoroaniline (7.48 mL, 77.5 mmol) in DMF (80 mL) at 75 °C for 8 h according to General Procedure I gave 7.62 g (85%) of **19t** as an off-white solid, mp 196 °C:  $^1\text{H}$  NMR (DMSO- $d_6$ )  $\delta$  13.54 (bs, 1H), 12.01 (s, 1H), 8.72 (d,  $J = 8.4$ , 1H), 7.93 (dd,  $J = 8.0$ ,  $J = 1.4$ , 1H), 7.59 (ddd,  $J = 7.2$ ,  $J = 7.2$ ,  $J = 1.6$ , 1H), 7.13 (dd,  $J = 7.6$ ,  $J = 7.6$ , 1H), 7.05 (dd,  $J = 11.6$ ,  $J = 8.0$ , 1H), 6.94 (dd,  $J = 7.6$ ,  $J = 7.6$ , 1H), 6.58 (m, 2H), 6.37 (bs, 1H), 3.90 (d,  $J = 5.6$ , 2H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  170.30, 169.19, 151.02 (d,  $J = 238.1$ ), 140.56, 136.00 (d,  $J = 11.3$ ), 134.20, 131.12, 124.77 (d,  $J = 3.1$ ), 122.71, 119.35, 116.80 (d,  $J = 6.8$ ), 114.52 (d,  $J = 18.2$ ), 111.81 (d,  $J = 3.1$ ), 48.23; MS (EI,  $m/z$ ) 288.1 ( $\text{M}^+$ ). HRMS (EI) calcd for  $\text{C}_{15}\text{H}_{13}\text{N}_2\text{O}_3\text{F}$  288.0910, found 288.0907. Anal. ( $\text{C}_{15}\text{H}_{13}\text{N}_2\text{O}_3\text{F}\cdot 0.25 \text{H}_2\text{O}$ ) C, H, N.

**5,11-Dihydro-11-oxo-10H-indolo[3,2-b]quinoline (Quindolone) (20k).**

Reaction of a mixture of **19k** (3.0 g, 11.10 mmol) and PPA (100 g) at 130 °C for 5 h according to General Procedure J gave 5.38 g (> 100%) of **20k** as a green powder, mp >

330 °C (lit.<sup>18</sup> >330 °C): <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 12.5 (bs, 1H), 11.70 (s, 1H), 8.34 (dd, *J* = 8.0, *J* = 0.8, 1H), 8.18 (d, *J* = 7.6, 1H), 7.72 (d, *J* = 8.4, 1H), 7.69 (ddd, *J* = 8.4, *J* = 8.4, *J* = 1.2, 1H), 7.51 (d, *J* = 8.4, 1H), 7.46 (dd, *J* = 7.6, *J* = 7.6, 1H), 7.28 (ddd, *J* = 8.0, *J* = 8.0, *J* = 1.2, 1H), 7.19 (ddd, *J* = 7.2, *J* = 7.2, *J* = 0.8, 1H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 167.33, 139.09, 138.59, 130.58, 128.98, 127.35, 125.15, 123.06, 122.85, 120.80, 120.40, 118.83, 117.80, 115.90, 112.96; MS (EI, *m/z*) 234 (M<sup>+</sup>). This compound was used without further purification.

**2-Chloro-11-quindolone (20n).** A mixture of **19n** (2.0 g, 6.6 mmol) and PPA (30 g) was heated to 125–135 °C with mechanical stirring for 35 min. The reaction mixture was cooled to 70 °C and ice-water (20 mL) was carefully added. This mixture was stirred for 10 min, poured in ice-water (~150-200 mL), and solid NaHCO<sub>3</sub> was added very slowly over a 45 min period. Aqueous 15% NaOH was added to adjust the pH to 7, the reaction mixture was allowed to stand for 20 min, and then it was filtered. The product washed with hot water (70 °C, 200 mL) and dried *in vacuo* overnight (45–50 °C) to give crude **20n** (80%). The crude product was dissolved in a small amount of DMSO (~20 mL) and then water was added (~70 mL) to precipitate the product. Trituration with water, filtration, and then drying gave 1.1 g (63%) of **20n**, mp > 300 °C: <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 12.66 (s, 1H), 11.81 (s, 1H), 8.28 (d, *J* = 2.0, 1H), 8.17 (d, *J* = 8.0, 1H), 7.76 (d, *J* = 8.8, 1H), 7.69 (dd, *J* = 8.8, *J* = 2.4, 1H), 7.53-7.48 (m, 2H), 7.22 (dd, *J* = 6.8, *J* = 6.8, 1H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 166.09, 138.81, 137.47, 130.67, 129.18, 127.75, 125.06, 123.96, 123.71, 123.05, 120.84, 120.14, 119.13, 115.72, 112.69; MS (EI, *m/z*) 268 (M<sup>+</sup>).

**1-Chloro-11-quindolone (20o).** The reaction of **19o** (0.94 g, 3.0 mmol) and PPA (10 g) at 115-120 °C for 45 min followed the procedure for **20n**, providing 0.5 g (61%) of **20o**, mp > 300 °C: <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 12.52 (s, 1H), 11.65 (s, 1H), 8.14 (d, *J* = 8.0, 1H), 7.66 (d, *J* = 8.4, 1H), 7.57-7.44 (m, 3H), 7.22 (d, *J* = 6.8, 1H), 7.19 (d, *J* = 7.2, 1H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 167.12, 141.61, 138.60, 132.47, 130.17, 127.42, 127.24, 124.51, 123.30, 120.87, 119.06, 118.65, 117.49, 115.63, 112.68; MS (EI, *m/z*) 268

(M<sup>+</sup>).

**11-Chloroquindolinium Hydrochloride and 11-Chloroquindoline (21k).** A mixture of **20k** (4.5 g, 9.23 mmol based on **19k**) and distilled POCl<sub>3</sub> (50 mL) was heated to reflux for 2 h. The mixture was cooled and the excess POCl<sub>3</sub> distilled off under reduced pressure (in the hood!). The residue was dissolved in ice-water (100 mL) and the pH of the mixture was adjusted to 8 with saturated NaHCO<sub>3</sub> solution. Dichloromethane (250 mL) was added, the mixture was stirred, and then the layers were separated. The aqueous layer was extracted with additional dichloromethane (2 x 250 mL) and the combined dichloromethane layers were sequentially washed with brine (500 mL) and water (500 mL), and then dried (Na<sub>2</sub>SO<sub>4</sub>). Filtration and then concentration gave a yellow solid which was recrystallized (at -20 °C) from isopropanol-chloroform (2:1, 200 mL) to give 1.18 g (50.4%) of 11-chloroquindolinium chloride as a yellow solid, mp 258.4-261.2 °C: <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 12.5 (s, 1H), 8.73 (d, *J* = 8.0, 1H), 8.54 (d, *J* = 8.4, 1H), 8.41 (dd, *J* = 8.4, *J* = 1.2, 1H), 8.33 (s, 1H), 7.98 (ddd, *J* = 7.6, *J* = 7.2, *J* = 0.8, 1H), 7.88 (ddd, *J* = 7.6, *J* = 7.2, *J* = 0.8, 1H), 7.80 (ddd, *J* = 7.6, *J* = 7.2, *J* = 0.8, 1H), 7.71 (d, *J* = 8.0, 1H), 7.43 (ddd, *J* = 7.6, *J* = 7.2, *J* = 0.8, 1H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>; quaternary carbons broadened and indistinguishable) δ 144.99, 136.69, 131.15, 129.70, 127.44, 123.82 (br), 123.25, 122.98, 121.07, 112.68; MS (EI, *m/z*) 252 (M<sup>+</sup>), 254 (M+2<sup>+</sup>). Anal. (C<sub>15</sub>H<sub>10</sub>N<sub>2</sub>Cl<sub>2</sub>•2H<sub>2</sub>O) C, H, N.

The filtrate was concentrated and adsorbed onto neutral alumina. The adsorbate was poured onto a silica gel column and eluted with hexane-ethyl acetate (2:1) to give 0.30 g (12.8%) of **21k** as a yellow solid, mp 220.3-222.3 °C (lit.<sup>15</sup> 220-224 °C): <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 11.84 (s, 1H), 8.36 (d, *J* = 7.6, 1H), 8.33-8.25 (m, 2H), 7.81-7.60 (m, 4H), 7.34 (dt, *J* = 8.0, *J* = 0.8, 1H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 146.07, 144.15, 143.84, 130.39, 130.11, 129.29, 126.85, 126.38, 123.63, 122.13, 121.72, 121.19, 120.24, 117.97, 112.04; MS (EI, *m/z*) 252 (M<sup>+</sup>), 254 (M+2<sup>+</sup>).

The 11-chloroquindolinium salt (1.1 g, 3.80 mmol) was converted to its free base

upon treatment with 5%  $K_2CO_3$  solution and then extraction into chloroform to give 950 mg (98%) of **21k**. Anal. ( $C_{15}H_9N_2 \cdot 0.25 H_2O$ ) C, H, N.

**2,11-Dichloroquindoline (21n)**. A mixture of **20n** (0.7 g, 2.6 mmol) and  $PCl_5$  (0.54 g, 2.6 mmol) in  $POCl_3$  (8 mL) was heated at reflux for 30 min. The solution was cooled to rt, concentrated (hood!), and then ice-water was carefully added. The pH of the mixture was adjusted to 8-9 with a cold solution of 10% NaOH, and the crystalline product which formed was filtered, dried, extracted with hot  $CHCl_3$  (~100 mL, 40–50 °C) with stirring for 30 min, and then filtered while hot. The filtrate was cooled to rt, dried ( $Na_2SO_4$ ), and then concentrated to give 0.40 g (53%) of **21n**, mp 281–281.9 °C:  $^1H$  NMR ( $DMSO-d_6$ )  $\delta$  11.93 (s, 1H), 8.31 (d,  $J = 8.0$ , 1H), 8.24 (d,  $J = 9.2$ , 1H), 8.20 (d,  $J = 2.0$ , 1H), 7.70 (dd,  $J = 8.8$ ,  $J = 2.4$ , 1H), 7.66 (d,  $J = 7.6$ , 1H), 7.61 (d,  $J = 8.0$ , 1H), 7.33 (dd,  $J = 8.0$ ,  $J = 8.0$ , 1H);  $^{13}C$  NMR ( $DMSO-d_6$ )  $\delta$  146.42, 144.23, 141.98, 131.30, 130.93, 130.58, 130.41, 127.12, 124.29, 121.70, 120.95, 120.64, 120.40, 116.76, 112.07; MS (EI,  $m/z$ ) 286 ( $M^+$ ). HRMS (EI) calcd for  $C_{15}H_8N_2Cl_2$  286.0064, found 286.0057.

**1,11-Dichloroquindoline (21o)**. The reaction of **20o** (0.6 g, 2.2 mmol) and  $PCl_5$  (0.50 g, 2.4 mmol) in  $POCl_3$  (10 mL) at reflux for 45 min followed the procedure for **21n**, affording 0.28 g (44%) of **21o**, mp 275–277 °C:  $^1H$  NMR ( $DMSO-d_6$ )  $\delta$  11.85 (s, 1H), 8.32 (d,  $J = 8.0$ , 1H), 8.25 (dd,  $J = 8.4$ ,  $J = 1.2$ , 1H), 7.77 (dd,  $J = 7.6$ ,  $J = 1.2$ , 1H), 7.72–7.61 (m, 3H), 7.34 (dd,  $J = 8.0$ ,  $J = 8.0$ , 1H);  $^{13}C$  NMR ( $DMSO-d_6$ )  $\delta$  145.56, 144.39, 144.23, 132.27, 130.77, 129.88, 129.41, 127.05, 126.05, 121.84, 120.73, 120.46, 120.30, 116.88, 112.15; MS (EI,  $m/z$ ) 286 ( $M^+$ ). HRMS (EI) calcd for  $C_{15}H_8N_2Cl_2$  286.0064, found 286.0070.

**4,11-Dichloroquindoline (21q)**. The reaction of a suspension of **19q** (3.10 g, 10.2 mmol) and PPA (180 g) at 140 °C for 5 h with mechanical stirring followed the procedure given in General Procedure J, affording 2.72 g (99%) of **20q** as a brown solid:  $^1H$  NMR ( $DMSO-d_6$ )  $\delta$  11.88 (s, 1H), 11.72 (s, 1H), 8.69 (d,  $J = 8.4$ , 1H), 8.37 (dd,  $J = 8.0$ , 1.6,

1H), 7.87 (dd,  $J = 7.4$ ,  $J = 1.4$ , 1H), 7.52 (d,  $J = 8.0$ , 1H), 7.47 (ddd,  $J = 8.0$ ,  $J = 6.8$ ,  $J = 1.2$ , 1H) 7.31 (t,  $J = 7.8$ , 1H), 7.20 (ddd,  $J = 8.4$ ,  $J = 6.8$ ,  $J = 1.2$ , 1H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  166.97, 138.75, 135.60, 131.10, 128.84, 127.62, 124.60, 124.52, 123.26, 122.69, 121.12, 120.78, 118.89, 116.14, 112.41; MS (LSIMS,  $m/z$ ) 268 ( $\text{MH}^+$ ).

The crude **20q** (2.7 g) was refluxed in  $\text{POCl}_3$  (35 mL) for 3 h. Workup and chromatography on neutral alumina, eluting with EtOAc-hexane (1:5 gradiated to 1:4), according to General Procedure J afforded 0.19 g (6% overall) of **21q** as a yellow solid:  $^1\text{H}$  NMR (DMSO- $d_6$ )  $\delta$  12.01 (s, 1H), 8.38 (d,  $J = 8.4$ , 1H), 8.27 (dd,  $J = 8.4$ ,  $J = 1.2$ , 1H), 7.95 (dd,  $J = 7.6$ ,  $J = 1.2$ , 1H), 7.73-7.64 (m, 3H), 7.38 (t,  $J = 7.2$ , 1H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  146.16, 144.45, 139.52, 132.59, 130.87, 130.46, 127.02, 126.15, 124.96, 121.94, 121.75, 121.06, 120.56, 118.50, 112.22; MS (EI,  $m/z$ ) 286.

**7-Phenyl-11-chloroquinoline (21r)**. The reaction of **19r** (8.00 g, 23.1 mmol) and PPA (480 g) at 140 °C for 5 h with mechanical stirring followed General Procedure J, affording 10.54 g of crude **20r** as a green solid: MS (FAB,  $m/z$ ) 311 ( $\text{M}+\text{H}^+$ ).

The crude **20r** (8.43 g) was refluxed in  $\text{POCl}_3$  (80 mL) for 3 h. Workup and chromatography on neutral alumina, eluting with EtOAc-hexane (1:5 then gradiated to 1:3), followed General Procedure J to give 1.61 g (25% overall) of **21r** as a reddish solid, mp 217-218 °C:  $^1\text{H}$  NMR (DMSO- $d_6$ )  $\delta$  11.92 (s, 1H), 8.58 (d,  $J = 1.2$ , 1H), 8.30-8.27 (m, 2H), 8.00 (dd,  $J = 8.4$ ,  $J = 1.6$ , 1H), 7.83-7.69 (m, 5H), 7.51 (t,  $J = 7.6$ , 2H), 7.37 (dd,  $J = 7.2$ ,  $J = 7.2$ , 1H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  146.50, 144.31, 144.02, 140.81, 133.07, 131.00, 129.87, 129.73, 129.45, 127.38, 127.31, 127.19, 126.89, 124.15, 122.60, 122.29, 119.74, 118.64, 112.93; MS (EI,  $m/z$ ) 328 ( $\text{M}^+$ ). HRMS (EI) calcd for  $\text{C}_{21}\text{H}_{13}\text{N}_2\text{Cl}$  328.0767, found 328.0777. Anal. ( $\text{C}_{21}\text{H}_{13}\text{N}_2\text{Cl}\cdot\text{H}_2\text{O}$ ) C, H, N.

**7-Fluoro-11-chloroquinoline (21s)**. Reaction of **19s** (7.50 g, 26.0 mmol) and PPA (330 g) at 130 °C for 5.5 h with mechanical stirring according to General Procedure J gave 7.14 g of **20s** as a green solid:  $^1\text{H}$  NMR (DMSO- $d_6$ )  $\delta$  12.42 (s, 1H), 11.81 (s, 1H), 8.35 (d,  $J = 8.0$ , 1H), 7.93 (dd,  $J = 9.2$ ,  $J = 2.4$ , 1H), 7.69 (m, 2H), 7.52 (dd,  $J = 8.8$ ,  $J = 1.2$ , 1H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  146.50, 144.31, 144.02, 140.81, 133.07, 131.00, 129.87, 129.73, 129.45, 127.38, 127.31, 127.19, 126.89, 124.15, 122.60, 122.29, 119.74, 118.64, 112.93; MS (EI,  $m/z$ ) 328 ( $\text{M}^+$ ). HRMS (EI) calcd for  $\text{C}_{21}\text{H}_{13}\text{N}_2\text{Cl}$  328.0767, found 328.0777. Anal. ( $\text{C}_{21}\text{H}_{13}\text{N}_2\text{Cl}\cdot\text{H}_2\text{O}$ ) C, H, N.

= 4.4, 1H), 7.35 (ddd,  $J = 11.6, J = 9.2, J = 2.4$ , 1H), 7.31-7.28 (m, 1H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  167.69, 156.03 (d,  $J = 232.1$ ), 139.09, 135.28, 130.97, 128.60 (d,  $J = 4.5$ ), 125.24, 124.43, 122.69, 120.56, 117.78, 116.03 (d,  $J = 25.8$ ), 115.53 (d,  $J = 10.7$ ), 114.04 (d,  $J = 9.1$ ), 105.39 (d,  $J = 24.3$ ).

The crude **20s** (7.00 g) was refluxed in  $\text{POCl}_3$  (100 mL) for 2.5 h. Workup and chromatography on neutral alumina, according to General Procedure J, eluting with EtOAc-hexane (1:5), gave 2.71 g (39% overall) of **21s** as a yellow solid, mp 216-217.4 °C:  $^1\text{H}$  NMR (DMSO- $d_6$ )  $\delta$  11.87 (s, 1H), 8.27-8.24 (m, 2H), 8.08 (dd,  $J = 8.4, J = 2.8$ , 1H), 7.78-7.71 (m, 2H), 7.61 (dd,  $J = 8.8, J = 4.4$ , 1H), 7.53 (ddd,  $J = 9.6, J = 9.6, J = 2.8$ , 1H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  156.94 (d,  $J = 235.1$ ), 145.38 (d,  $J = 4.6$ ), 143.75, 140.50, 130.98, 129.33, 127.01, 126.65, 123.75, 122.16, 121.68 (d,  $J = 9.1$ ), 118.41, 118.14 (d,  $J = 25.8$ ), 113.21 (d,  $J = 9.1$ ), 107.09 (d,  $J = 23.5$ ). Anal ( $\text{C}_{15}\text{H}_8\text{N}_2\text{ClF}\cdot 1.0 \text{H}_2\text{O}$ ).

**9-Fluoro-11-chloroquinoline (21t)**. Reaction of **19t** (7.50 g, 26.0 mmol) and PPA (330 g) at 130 °C for 5.5 h with mechanical stirring according to General Procedure J gave 10.82 g of **20t** as a brown solid, mp 194.7-195.9 °C:  $^1\text{H}$  NMR (DMSO- $d_6$ )  $\delta$  12.57 (s, 1H), 12.20 (s, 1H), 8.38 (dd,  $J = 8.0, J = 1.2$ , 1H), 8.02 (dd,  $J = 7.6, J = 0.8$ , 1H), 7.74 (dd,  $J = 8.4, J = 0.8$ , 1H), 7.70 (ddd,  $J = 10.0, J = 8.4, J = 1.6$ , 1H), 7.35-7.28 (m, 2H), 7.20-7.15 (m, 1H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  167.70, 149.42 (d,  $J = 244.2$ ), 139.21, 131.02, 129.18 (d,  $J = 3.8$ ), 126.98 (d,  $J = 14.4$ ), 125.27, 123.72, 123.02, 120.71, 119.73 (d,  $J = 6.0$ ), 119.22 (d,  $J = 5.3$ ), 117.85, 116.94 (d,  $J = 3.8$ ), 112.96 (d,  $J = 16.0$ ).

The crude **20t** obtained above (10.50 g) was refluxed in  $\text{POCl}_3$  (100 mL) for 2.5 h. Workup and chromatography on neutral alumina according to General Procedure J, eluting with EtOAc-hexane (1:5), gave 3.70 g (45% overall) of **21t** as a yellow solid:  $^1\text{H}$  NMR (DMSO- $d_6$ )  $\delta$  12.26 (s, 1H), 8.28 (m, 2H), 8.18 (d,  $J = 7.6$ , 1H), 7.80-7.72 (m, 2H), 7.55 (dd,  $J = 11.2, J = 8.4$ , 1H), 7.34-7.29 (m, 1H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  148.76 (d,  $J = 244.9$ ), 145.59, 144.13, 131.72 (d,  $J = 13.7$ ), 130.51, 130.30, 127.23, 126.66,

125.03 (d,  $J = 5.3$ ), 123.90, 122.28, 120.77 (d,  $J = 5.3$ ), 119.27, 117.58 (d,  $J = 3.1$ ), 115.59 (d,  $J = 16.6$ ); MS (LSIMS,  $m/z$ ) 270 ( $M^+$ ). HRMS (EI,  $m/z$ ) calcd for  $C_{15}H_8N_2ClF$  271.0438, found 271.0442. Anal. ( $C_{15}H_8N_2ClF \cdot 0.75 H_2O$ ) C, H, N.

**11-Chloro-5-methylquindolinium Hydrotrifluoromethanesulfonate (24k).**

Reaction of **21k** (0.54 g, 2.13 mmol) and methyl triflate (699 mg, 4.26 mmol) according to General Procedure F gave 0.86 g (97.7%) of **24k** as an orange solid:  $^1H$  NMR (DMSO- $d_6$ )  $\delta$  13.28 (s, 1H), 8.86 (t,  $J = 9.2$ , 2H), 8.68 ( $J = 8.40$ , 1H), 8.27 (dd,  $J = 8.4$ ,  $J = 8.4$ , 1H), 8.11 (dd,  $J = 8.4$ ,  $J = 8.4$ , 1H), 8.00 (dd,  $J = 8.4$ ,  $J = 8.4$ , 1H), 7.87 (d,  $J = 8.0$ , 1H), 7.57 (dd,  $J = 8.0$ ,  $J = 8.0$ , 1H), 5.04 (s, 3H);  $^{13}C$  NMR (DMSO- $d_6$ )  $\delta$  145.86, 138.87, 135.82, 134.62, 132.79, 131.85, 128.89, 128.42, 126.67, 124.58, 123.40, 122.09, 118.78, 114.56, 113.46, 40.47; MS (FAB,  $m/z$ ) 267 ( $M^+$ ), 269 ( $M+2^+$ ). HRMS (FAB) calcd for  $C_{16}H_{12}ClN_2^+$  267.0689, found 267.0682. Anal. ( $C_{17}H_{12}N_2ClF_3O_3S$ ) C, H, N.

**11-Chloro-5-methylquindolinium Hydrochloride (25k).** Hydrotriflate salt **24k**

(6.18 g, 0.44 mmol) was adsorbed onto  $Na_2CO_3$  (~10 g) and purified on basic alumina according to General Procedure K, providing 0.12 g of 11-chloro-5-methylquindoline as a purple solid:  $^1H$  NMR (DMSO- $d_6$ )  $\delta$  8.82 (d,  $J = 8.9$ , 1H), 8.77 (d,  $J = 8.5$ , 1H), 8.63 (dd,  $J = 8.4$ ,  $J = 1.3$ , 1H), 8.23 (ddd,  $J = 8.4$ ,  $J = 6.9$ ,  $J = 1.3$ , 1H), 8.06 (dd,  $J = 8.3$ ,  $J = 8.3$ , 1H), 7.92 (dd,  $J = 8.2$ ,  $J = 8.2$ , 1H), 7.80 (d,  $J = 8.5$ , 1H), 7.50 (dd,  $J = 8.2$ ,  $J = 8.2$ , 1H), 5.0 (s, 3H);  $^{13}C$  NMR (DMSO- $d_6$ )  $\delta$  146.4, 138.8, 135.6, 134.4, 132.6, 132.1, 128.9, 128.2, 126.5, 124.5, 123.2, 121.8, 118.6, 114.4, 113.6, 40.3.

The intermediate free-base was converted to its hydrochloride salt according to General Procedure K, affording 0.12 g (92%) of **25k** as a yellow solid, mp 253-254.1 °C (dec.):  $^1H$  NMR (DMSO- $d_6$ )  $\delta$  13.51 (s, 1H), 8.87 (d,  $J = 9.2$ , 1H), 8.83 (d,  $J = 8.8$ , 1H), 8.66 (dd,  $J = 8.8$ ,  $J = 1.2$ , 1H), 8.29-8.23 (m, 1H), 8.10 (dd,  $J = 8.4$ ,  $J = 8.4$ , 1H), 7.97 (dd,  $J = 8.0$ ,  $J = 8.0$ , 1H), 7.89 (d,  $J = 8.4$ , 1H), 7.56 (ddd,  $J = 8.0$ ,  $J = 8.0$ ,  $J = 1.2$ , 1H), 5.03 (s, 3H);  $^{13}C$  NMR (DMSO- $d_6$ )  $\delta$  145.94, 138.79, 135.80, 134.54, 132.78,

131.81, 128.91, 128.40, 126.64, 124.60, 123.38, 122.06, 118.81, 114.48, 113.53, 40.49; MS (FAB,  $m/z$ ) 267 ( $M^+$ ), 269 ( $M+2^+$ ). HRMS (FAB) calcd for  $C_{16}H_{12}N_2Cl^+$  267.0689, found 267.0689. Anal. ( $C_{16}H_{12}N_2Cl_2 \cdot 2.5 H_2O$ ) C, H, N.

**2,11-Dichloro-5-methylquindolinium Hydrochloride (25n).** Hydrotriflate salt **24n** was prepared from **21n** (0.30 g, 1.0 mmol) and methyl triflate (0.25 mL, 200 mol%) according to General Procedure F: MS (-FAB,  $m/z$ ) 149 (OTf). Hydrotriflate salt **24n** was converted to its free base according to General Procedure G. The free base was dissolved in chloroform, anhydrous  $K_2CO_3$  was added (100 g), the mixture was sonicated, the solvent was evaporated, and then the adsorbate was purified over basic alumina (chloroform, 0.5% methanol in chloroform, then 1% methanol in chloroform).

Conversion of the free base to the hydrochloride salt according to General Procedure K gave 0.18 g (51%) of **25n**, mp 239–241 °C (dec.):  $^1H$  NMR (DMSO- $d_6$ )  $\delta$  13.47 (s, 1H), 8.92 (d,  $J = 9.6$ , 1H), 8.84 (d,  $J = 8.4$ , 1H), 8.62 (d,  $J = 2.0$ , 1H), 8.30 (d,  $J = 9.2$ ,  $J = 2.0$ , 1H), 8.00 (t,  $J = 7.2$ , 1H), 7.89 (d,  $J = 8.4$ , 1H), 7.59 (t,  $J = 7.2$ , 1H), 5.04 (s, 3H);  $^{13}C$  NMR (DMSO- $d_6$ )  $\delta$  146.19, 139.04, 134.81, 134.26, 133.23, 132.48, 132.38, 127.42, 126.61, 124.23, 122.88, 122.19, 121.27, 114.27, 113.54, 40.80. HRMS (FAB) calcd for  $C_{16}H_{11}N_2Cl_2^+$  301.0299, found 301.0893.

**1,11-Dichloro-5-methylquindolinium Hydrochloride (25o).** A suspension of **21o** (0.30 g, 1.0 mmol) in anhydrous toluene (12 mL) was treated with methyl triflate (0.25 mL, 2.2 mmol). After 20 h at rt, additional methyl triflate (0.11 mL, 1.0 mmol) and toluene (5 mL) were added. The reaction mixture was stirred overnight, filtered, washed with ether, and then dried to give hydrotriflate salt **24o**: MS (-FAB,  $m/z$ ) 149 (OTf).

Hydrotriflate salt **24o** was converted to its hydrochloride salt according to the procedure described for **25n**, providing 0.28 g (81%) of **25o**, mp 229–230.8 °C:  $^1H$  NMR (DMSO- $d_6$ )  $\delta$  13.39 (s, 1H), 8.81 (dd, 1H,  $J = 8$ ,  $J = 5.2$ ), 8.33 (s, 1H), 8.16 (d, 1H,  $J = 7.2$ ), 8.12 (d, 1H,  $J = 8.4$ ), 7.97 (d, 1H,  $J = 7.2$ ), 7.88 (d, 1H,  $J = 8.8$ ), 7.55 (d, 1H,  $J = 7.6$ );  $^{13}C$  NMR (DMSO- $d_6$ )  $\delta$  146.26, 138.35, 137.88, 135.01, 134.09,

131.64, 131.54, 129.94, 128.27, 126.80, 122.29, 120.25, 118.92, 114.17, 113.63, 41.89. HRMS (FAB) calcd for  $C_{16}H_{11}N_2Cl_2^+$  301.0299, found 301.0287.

**8-Fluoro-5-methyl-11-chloroquindolinium Hydrochloride (25p).**

Hydrotriflate salt **24p** was prepared from **21p** (1.00 g, 3.69 mmol) and methyl triflate (1.05 mL, 9.24 mmol) according to General Procedure F. Hydrotriflate **24p** was suspended in chloroform, adsorbed onto neutral alumina, and then chromatographed over basic alumina (eluting with chloroform-EtOAc gradient from 1:0 to 1:1, then eluting with 3% methanol in chloroform). The violet fractions were collected and concentrated to a small volume (50 mL). The violet solution was acidified with ethereal 1 M HCl according to General Procedure K, providing 0.95 g (90%) of **25p** as a bright orange solid, mp > 270 °C:  $^1H$  NMR (DMSO- $d_6$ )  $\delta$  13.55 (s, 1H), 8.93 (dd,  $J = 9.0$ ,  $J = 5.2$ , 1H), 8.87 (d,  $J = 8.8$ , 1H), 8.68 (d,  $J = 8.0$ , 1H), 8.27 (dd,  $J = 8.0$ ,  $J = 8.0$ , 1H), 8.11 (dd,  $J = 7.6$ ,  $J = 7.6$ , 1H), 7.64 (dd,  $J = 9.0$ ,  $J = 2.2$ , 1H), 7.47 (ddd,  $J = 11.6$ ,  $J = 9.2$ ,  $J = 2.4$ , 1H), 5.00 (s, 3H); MS (EI  $m/z$ ) 285 ( $M^+$ ). HRMS (EI) calcd for  $C_{16}H_{10}N_2ClF$  284.0516, found 284.0534.

**7-Phenyl-5-methyl-11-chloroquindolinium Hydrochloride (25r).** Hydrotriflate salt **24r** was prepared from **21r** (0.25 g, 0.76 mmol) and methyl triflate (0.13 mL, 0.11 mmol) according to General Procedure F. Conversion to its chloride salt according to the procedure described for **25p** gave 0.12 g (42%) of **25r** as a red solid, mp > 234 °C:  $^1H$  NMR (DMSO- $d_6$ )  $\delta$  13.62 (s, 1H), 8.90-8.86 (m, 2H), 8.60 (d,  $J = 8.4$ , 1H), 8.27-8.20 (m, 2H), 8.06 (dd,  $J = 7.6$ ,  $J = 7.6$ , 1H), 7.92-7.88 (m, 3H), 7.55 (t,  $J = 7.6$ , 2H), 7.44 (dd,  $J = 7.6$ ,  $J = 7.6$ , 1H), 5.11 (s, 3H);  $^{13}C$  NMR (DMSO- $d_6$ )  $\delta$  145.21, 139.37, 138.58, 135.80, 134.31, 133.73, 132.84, 132.04, 129.10, 129.00, 128.39, 127.55, 127.28, 126.96, 126.62, 124.55, 123.80, 123.37, 118.82, 114.93, 113.91, 40.65; MS (EI,  $m/z$ ) 343 ( $M^+$ ). Anal. ( $C_{22}H_{16}N_2Cl_2 \cdot 3.5 H_2O$ ) C, H, N.

**7-Fluoro-5-methyl-11-iodoquindolinium Hydrochloride (25s).** A suspension of **21s** (1.00 g, 3.69 mmol) and methyl iodide (8.00 mL, 129 mmol) was heated at 150 °C

for 24 h in a Parr bomb according to General Procedure D. The intermediate hydroiodide salt was adsorbed onto Na<sub>2</sub>CO<sub>3</sub>, chromatographed over basic alumina (chloroform, then 2% methanol in chloroform), and then converted to its chloride salt according to General Procedure K to yield 1.27 g (83%) of **25s**, which contained some 7-fluoro-5-methyl-11-chloroquindolinium hydrochloride, as a bright orange solid, mp 221 °C: <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 13.41 (s, 1H), 8.89 (d, *J* = 8.8, 1H), 8.72 (dd, *J* = 10.0, *J* = 2.0, 1H), 8.65 (dd, *J* = 8.4, *J* = 1.2, 1H), 8.28 (ddd, *J* = 8.8, *J* = 7.2, *J* = 1.2, 1H), 8.10 (dd, *J* = 8.0, *J* = 8.0, 1H), 7.93-7.85 (m, 2H), 5.01 (s, 3H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 157.21 (d, *J* = 235.9), 142.33, 138.09 (d, *J* = 4.6), 135.90, 133.15, 132.38, 129.76, 128.57, 124.60, 123.51, 123.18 (d, *J* = 26.7), 118.84, 114.93 (d, *J* = 8.5), 114.30 (d, *J* = 10.8), 111.46 (d, *J* = 26.7), 40.46; MS (LSIMS, *m/z*) 377 (M<sup>+</sup><sub>iodo</sub>, 100), 285 (M<sup>+</sup><sub>chloro</sub>, 17). HRMS (FAB) calcd for C<sub>16</sub>H<sub>11</sub>N<sub>2</sub>FI<sup>+</sup> 376.9910, found 376.9891.

**9-Fluoro-5-methyl-11-iodoquindolinium Hydrochloride (25t).** Quindoline **21t** (1.00 g, 3.69 mmol) was converted to **25t** according to the procedure described for **25s**, providing 0.84 g (55%) of **25t**, which contained some 9-fluoro-5-methyl-11-chloroquindolinium hydrochloride, as a bright orange solid, mp 229 °C: <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 13.74 (bs, 1H), 8.88 (d, *J* = 8.8, 1H), 8.67 (apparent t, *J* = 8.8, 2H), 8.28 (ddd, *J* = 8.4, *J* = 6.8, *J* = 1.6, 1H), 8.10 (ddd, *J* = 7.6, *J* = 6.8, *J* = 0.4, 1H), 7.87 (dd, *J* = 10.8, *J* = 8.0, 1H), 7.55-7.49 (m, 1H), 5.03 (s, 3H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 148.68 (d, *J* = 246.5), 138.61 (d, *J* = 3.8), 136.09, 134.1 (d, *J* = 15), 133.35, 132.28, 130.50, 128.74, 124.72, 123.76, 122.66 (d, *J* = 3.8), 122.39 (d, *J* = 5.3), 118.89 (d, *J* = 15.3), 118.94, 117.87 (d, *J* = 5.3), 40.67; MS (LSIMS, *m/z*) 377 (M<sup>+</sup><sub>iodo</sub>, 100), 285 (M<sup>+</sup><sub>chloro</sub>, 20). HRMS (FAB) calcd for C<sub>16</sub>H<sub>11</sub>N<sub>2</sub>FI<sup>+</sup> 376.9910, found 376.9932.

**Phenylmercaptoacetyl Chloride.** A mixture of thiophenoxyacetic acid (8.0 g, 0.05 mol) and SOCl<sub>2</sub> (8 mL) was refluxed for 1 h. The excess SOCl<sub>2</sub> was removed *in vacuo* (hood!) and the product was distilled to give 8.6 g (98%) of phenylmercaptoacetyl chloride, bp 85–86 °C, 4–5 Torr (lit.<sup>S2</sup> 117–119 °C, 6 Torr): <sup>1</sup>H NMR (CDCl<sub>3</sub>) δ 7.48–

7.34 (m, 5H), 4.06 (m, 2H);  $^{13}\text{C}$  NMR ( $\text{CDCl}_3$ )  $\delta$  169.75, 132.83, 131.44, 129.35, 128.22, 48.48; MS (EI,  $m/z$ ) 186 ( $\text{M}^+$ ).

**2-[2-(Phenoxyacetyl)amino]benzoic Acid (27).** A solution of anthranilic acid (5.0 g, 36 mmol) in aqueous NaOH (3.0 g, 30 mL) was treated dropwise with phenoxyacetyl chloride (6.2 g, 36 mmol) at 0 °C. The reaction mixture was stirred at 0 °C for 30 min, acidified with dilute HCl, and then the resulting mixture was filtered. The filtered solid was taken up into EtOAc, the mixture was filtered, and then the filtrate was dried over  $\text{Na}_2\text{SO}_4$ . Filtration, concentration, and then drying under vacuum gave 8.0 g (81%) of **27**, mp 201–203 °C. A small amount (100 mg) of the product was recrystallized from ethanol, giving 75 mg of **27**, mp 202–203 °C:  $^1\text{H}$  NMR ( $\text{DMSO}-d_6$ )  $\delta$  13.70 (s, 1H), 12.20 (s, 1H), 8.71 (d,  $J = 8.4$ , 1H), 8.02 (dd,  $J = 7.6$ , 1H), 7.65–7.60 (m, 1H), 7.35–6.89 (m, 6H), 4.73 (s, 2H);  $^{13}\text{C}$  NMR ( $\text{DMSO}-d_6$ )  $\delta$  169.44, 167.23, 157.11, 140.22, 134.34, 131.32, 129.65, 123.06, 121.65, 120.96, 119.45, 116.14, 114.81, 114.38, 67.22; MS (EI,  $m/z$ ) 271 ( $\text{M}^+$ ). HRMS (EI) calcd for  $\text{C}_{15}\text{H}_{13}\text{NO}_4$  271.0845, found 271.0840. Anal. ( $\text{C}_{15}\text{H}_{13}\text{NO}_4$ ) C, H, N.

**2-[2-(Phenylthio)acetyl]amino]benzoic Acid (28).** A solution of anthranilic acid (6.3 g, 46 mmol) in aqueous NaOH (4 g of NaOH in 40 mL of water) was treated with phenylmercaptoacetyl chloride (8.68 g, 46 mmol) at 0 °C. The reaction mixture was stirred for 1 h and neutralized with 5% HCl. Water (50 mL) was added and the mixture was extracted with EtOAc (3 x 100 mL). The combined EtOAc layer was dried, filtered, and then concentrated to give 7.0 g (53%) of **28**, mp 166–167 °C [lit.<sup>21</sup> 164–166 °C]:  $^1\text{H}$  NMR ( $\text{DMSO}-d_6$ )  $\delta$  11.82 (s, 1H), 8.51 (d,  $J = 8.4$ , 1H), 7.96 (dd,  $J = 8.0$ ,  $J = 1.2$ , 1H), 7.58 (dd,  $J = 8.0$ ,  $J = 8.0$ , 1H), 7.38 (d,  $J = 7.2$ , 1H), 7.13 (m, 5H), 4.01 (s, 2H);  $^{13}\text{C}$  NMR ( $\text{DMSO}-d_6$ )  $\delta$  169.17, 167.42, 140.31, 135.00, 134.07, 133.72, 131.12, 129.18, 128.07, 126.33, 123.01, 119.77, 116.58, 116.31, 114.54; MS (EI,  $m/z$ ) 287 ( $\text{M}^+$ ). HRMS (EI) calcd for  $\text{C}_{15}\text{H}_{13}\text{N}_2\text{O}_3\text{S}$  287.0616, found 287.0617.

**Benzofuro[3,2-b]quinolin-6(11H)one (29).** A mixture of **27** (2.0 g, 7.8 mmol) and PPA (10 g) was heated at 120–125 °C for 1 h. The solution was treated with crushed ice and neutralized with solid Na<sub>2</sub>CO<sub>3</sub>. The resulting precipitate was filtered, washed with hot water (70–80 °C, 200 mL), and then dried to give 1.3 g (76%) of **29** as a pale yellow solid, mp > 300 °C: <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 8.33 (d, *J* = 8.0, 1H), 8.20 (d, *J* = 7.6, 1H), 7.78 (d, *J* = 8.4, 1H), 7.76–7.65 (m, 4H), 7.48 (dd, *J* = 8.0, *J* = 8.0, 1H), 7.36 (ddd, *J* = 8.0, *J* = 5.6, *J* = 2.4, 1H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 165.54, 155.64, 139.96, 138.11, 133.79, 131.91, 130.52, 126.06, 125.71, 123.94, 122.38, 122.26, 119.14, 118.89, 113.29; MS (EI, *m/z*) 235 (M<sup>+</sup>).

**Benzothieno[3,2-b]quinoline-6(11H)one (30).** A mixture of **28** (3.0 g, 10.0 mmol) and PPA (20 g) was heated with mechanical stirring for 90 min at 125–130 °C. The reaction mixture was poured into ice-water (~ 100 mL) and neutralized with solid Na<sub>2</sub>CO<sub>3</sub>. The resulting precipitate was filtered, washed with hot water (~70 °C), and then dried to give 2.0 g (77%) of **30**, mp > 300 °C: <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 12.78 (s, 1H), 8.53 (d, *J* = 7.6, 1H), 8.24 (d, *J* = 8.0, 1H), 8.10 (d, *J* = 7.6, 1H), 7.80–7.64 (m, 4H), 7.40 (dd, *J* = 7.2, *J* = 6.8, 1H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 172.37, 140.67, 140.09, 140.08, 132.22, 130.12, 129.08, 124.96, 124.77, 124.14, 123.17, 122.68, 122.13, 118.90, 118.23; IR (KBr) 3098 (NH), 1623 (C=O), 1522 (C=C), 753, 694 (C–S) cm<sup>-1</sup>; MS (EI, *m/z*) 251 (M<sup>+</sup>).

**11-Chlorobenzofuro[3,2-b]quinoline (31).** A mixture of **29** (1.3 g, 5.5 mmol) and PCl<sub>5</sub> (1.15 g, 5.5 mmol) in POCl<sub>3</sub> (6 mL) was heated at reflux for 1 h. The solution was cooled and concentrated, the residue was partitioned between methylene chloride and 10% sodium hydroxide, and then the separated organic layer was dried and concentrated to give 0.9 g (64%) of **31**, mp 158–159 °C (lit.<sup>20</sup> 159–160 °C): <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 8.32–8.25 (m, 3H), 7.91–7.77 (m, 4H), 7.57 (ddd, *J* = 8.0, *J* = 7.6, *J* = 0.8, 1H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 158.75, 146.63, 146.02, 143.63, 132.02, 129.37, 129.00, 127.55, 124.63, 124.40, 123.10, 122.29, 122.20, 119.80, 112.75; MS (EI, *m/z*) 253 (M<sup>+</sup>).

**11-Chlorobenzothieno[3,2-b]quinoline (32).** A solution of **30** (1.0 g, 4.0 mmol) in 5 mL of POCl<sub>3</sub> was treated with PCl<sub>5</sub> (0.83 g, 100 mol%). The reaction mixture was refluxed for 20 min, concentrated, poured into ice-water, and then the pH of the mixture was adjusted to 8-9 with 10% NaOH. The solid product which formed was filtered, suspended in chloroform (100 mL), and heated to 30-40 °C for 30 min. The mixture was filtered while hot, and then the filtrate was dried (Na<sub>2</sub>SO<sub>4</sub>) and concentrated to give 0.51 g of **32**, mp 158–159 °C (lit.<sup>21</sup> 157-158 °C): <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 8.51 (dd, *J* = 7.6, *J* = 0.8, 1H), 8.29 (dd, *J* = 8.0, *J* = 1.2, 2H), 8.17 (dd, *J* = 8.8, *J* = 0.8, 1H), 7.93 (ddd, *J* = 8.4, *J* = 6.8, *J* = 1.6, 1H), 7.84 (ddd, *J* = 8.4, *J* = 6.8, *J* = 1.6, 1H), 7.77 (ddd, *J* = 8.0, *J* = 6.8, *J* = 1.2, 1H), 7.67 (ddd, *J* = 8.0, *J* = 6.8, *J* = 1.2, 1H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 153.12, 146.68, 139.82, 133.99, 133.74, 132.19, 130.96, 130.14, 129.51, 127.90, 126.04, 123.94, 123.79, 123.62, 122.43; MS (EI, *m/z*) 269 (M<sup>+</sup>).

**2-(*p*-Toluenesulfonamido)acetophenone (36).** A solution of 2-aminoacetophenone (7.0 g, 50 mmol) in 30 mL of pyridine was treated with *p*-toluenesulfonylchloride (11.8 g, 120 mol%). The reaction mixture was refluxed with stirring for 2 h, cooled to 40-50 °C, and poured into cold water (150 mL). The mixture was stirred at rt for 1 h, filtered using a warm (~40 °C) water wash, and then dried. Recrystallization from ethanol gave 7.6 g (51%) of **36**, mp 148.2–149.3 °C (lit.<sup>23</sup> 147-148 °C): <sup>1</sup>H NMR (CDCl<sub>3</sub>) δ 11.48 (s, 1H), 7.79 (dd, *J* = 7.6, *J* = 1.2, 1H), 7.74 (d, *J* = 8.4, 1H), 7.69 (dd, *J* = 8.4, *J* = 0.8, 1H), 7.46 (ddd, *J* = 8.0, *J* = 8.0, *J* = 1.2, 1H), 7.23 (d, *J* = 8.0, 1H), 7.06 (ddd, *J* = 6.0, *J* = 6.0, *J* = 0.8, 1H), 2.57 (s, 3H), 2.37 (s, 3H); <sup>13</sup>C NMR (CDCl<sub>3</sub>) δ 202.37, 143.83, 139.94, 136.47, 134.82, 131.87, 129.57, 127.16, 122.55, 122.18, 118.92, 28.04, 21.42; MS (EI, *m/z*) 289 (M<sup>+</sup>).

**2-(2-Toluenesulfonamidobenzoyl)-1-indanone (37).** A solution of *o*-phthalaldehyde (1.8 g, 13.4 mmol) and **36** (3.91 g, 13.4 mmol) in methanol (54 mL) was treated with a freshly prepared solution of sodium methoxide (prepared from 0.62 g of sodium and 27 mL of methanol) over a 20 min period. The reaction mixture was refluxed

for 7 h and then stirred overnight at rt. The pH of the reaction mixture was adjusted with concentrated HCl to pH 5 and the crystalline compound which formed was filtered.

Recrystallization from ethanol-chloroform gave 2.5 g (46%) of **37** as a light pink solid, mp 176-177 °C (lit.<sup>22</sup> 176-177 °C): <sup>1</sup>H NMR (CDCl<sub>3</sub>) δ 8.68 (s, 1H), 7.75 (dd, *J* = 8.0, *J* = 1.2, 1H), 7.59 (ddd, *J* = 7.6, *J* = 7.6, *J* = 1.2, 1H), 7.55-7.40 (m, 7H), 7.27 (ddd, *J* = 7.6, *J* = 7.6, *J* = 1.2, 1H), 6.81 (d, *J* = 8.4, 2H), 3.21 (s, 2H), 1.55 (s, 3H); <sup>13</sup>C NMR (CDCl<sub>3</sub>) δ 189.45, 176.75, 147.25, 143.33, 136.53, 135.55, 135.47, 135.45, 132.84, 131.56, 128.78, 128.26, 128.22, 127.40, 126.99, 126.89, 126.59, 125.38, 125.03, 122.91, 111.25, 32.04, 20.02; MS (EI, *m/z*) 405.1 (M<sup>+</sup>). HRMS (EI) calcd for C<sub>23</sub>H<sub>19</sub>NO<sub>4</sub>S 405.1035, found 405.1051.

**11-Oxo-5,11-dihydro-indeno[1,2-b]quinoline (38).** A mixture of **37** (2.2 g, 5.5 mmol) and PPA (20 g) was heated to 120–122 °C for 1 h. The reaction mixture was poured into ice–water and the crystalline product which formed was filtered, washed with hot water, and then dried for several days in a vacuum oven at rt. The product, 1.15 g (88%), was refluxed with benzene (80 mL) for 30 min, filtered, and then dried to give 0.95 g (73%) of **38**, mp > 300 °C (lit.<sup>53</sup> > 360 °C, lit.<sup>54</sup> 363-364 °C): <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 12.80 (s, 1H), 8.24 (d, *J* = 8.0, 1H), 8.22-8.16 (m, 1H), 7.82-7.69 (m, 3H), 7.56 (d, *J* = 5.6, 1H), 7.55 (d, *J* = 5.6, 1H), 7.43 (dd, *J* = 7.6, *J* = 7.6, 1H), 3.84 (s, 2H); <sup>13</sup>C NMR (DMSO-*d*<sub>6</sub>) δ 144.91, 139.96, 135.57, 131.69, 130.10, 129.93, 128.30, 127.23, 125.75, 124.78, 124.55, 123.48, 121.51, 119.25, 118.52, 32.84; MS (LSIMS, *m/z*) 234 (M+H<sup>+</sup>); MS (EI, *m/z*) 233 (M<sup>+</sup>).

**11-Chloro-indeno[1,2-b]quinoline (39).** A solution of **38** (0.30 g, 1.3 mmol) in POCl<sub>3</sub> (10 mL) was refluxed for 3 h. The POCl<sub>3</sub> was evaporated off and the oily product was poured into ice-water. The mixture was adjusted to pH 8 with 10% aqueous KOH and extracted with dichloromethane. The combined organic fractions were dried (Na<sub>2</sub>SO<sub>4</sub>), filtered, and then concentrated to give 0.21 g (66%) of **39**, mp 148-149 °C (lit.<sup>54</sup> 162-163 °C): <sup>1</sup>H NMR (DMSO-*d*<sub>6</sub>) δ 8.24 (dd, *J* = 8.8, *J* = 1.2, 1H), 8.18 (d, *J* = 8.0, 1H), 8.14

(dd,  $J = 7.2$ ,  $J = 1.6$ , 1H), 7.86 (ddd,  $J = 8.4$ ,  $J = 7.2$ ,  $J = 1.6$ , 1H), 7.76-7.72 (m, 2H), 7.59 (ddd,  $J = 7.2$ ,  $J = 7.2$ ,  $J = 1.2$ , 1H), 7.55 (ddd,  $J = 7.6$ ,  $J = 7.6$ ,  $J = 1.2$ , 1H), 4.08 (s, 2H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  160.83, 148.45, 144.61, 139.33, 136.58, 133.24, 130.72, 130.02, 129.21, 127.76, 127.15, 126.01, 124.45, 123.28, 121.74, 33.78; MS (FAB,  $m/z$ ) 252 ( $\text{M}+\text{H}^+$ ). HRMS (EI) calcd for  $\text{C}_{16}\text{H}_{10}\text{NCl}$  251.0501, found 251.0493. Anal. ( $\text{C}_{16}\text{H}_{10}\text{NCl}$ ) C, H, N.

**5-Methyl-11-(phenylamino)quindolinium Hydrochloride (41a).** Reaction of **24k** (1.0 g, 3.3 mmol) and aniline (1.5 g, 16.5 mmol) in 2-ethoxyethanol (30 mL) at 110 °C for 1 h according to General Procedure L gave, after recrystallization from acetone, 720 mg (60%) of **41a** as a yellow solid, mp 315-316 °C:  $^1\text{H}$  NMR (DMSO- $d_6$ )  $\delta$  11.6 (s, 1H), 10.81 (s, 1H), 8.66 (d,  $J = 8.4$ , 1H), 8.59-8.56 (m, 2H), 8.09 (dd,  $J = 8.2$ ,  $J = 7.6$ , 1H), 7.78-7.70 (m, 3H), 7.46-7.40 (m, 3H), 7.28-7.24 (m, 3H), 4.82 (s, 3H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  142.6, 139.9, 138.2, 137.4, 136.4, 132.3, 131.6, 129.3, 125.1, 125.0, 124.8, 124.4, 121.4, 121.2, 120.9, 118.0, 117.2, 114.6, 113.4, 38.7; MS (FAB,  $m/z$ ) 324 ( $\text{M}^+$ ). HRMS (FAB) calcd for  $\text{C}_{22}\text{H}_{18}\text{N}_3^+$  324.1501, found 324.1523. Anal. ( $\text{C}_{22}\text{H}_{18}\text{N}_3\text{Cl}\cdot 0.5 \text{H}_2\text{O}$ ) C, H, N.

**5-Methyl-11-(phenoxy)quindolinium Hydrochloride (42a).** Phenol (420 mg, 4.5 mmol) was added to a purple solution of 5-methyl-11-chloroquindoline (free base of **25k**) (600 mg, 2.2 mmol) in dimethoxyethane (10 mL). The mixture was heated at 92 °C for 20 min, during which time a yellow solid formed. The mixture was cooled to rt, ether was added, and the precipitate was filtered and then washed with ether. The yellow solid was recrystallized from acetone to give 500 mg (70%) of **42a** as a yellow solid, mp 242-243 °C:  $^1\text{H}$  NMR (DMSO- $d_6$ )  $\delta$  8.86-8.83 (m, 2H), 8.30 (dd,  $J = 8.4$ ,  $J = 1.2$ , 1H), 8.20 (ddd,  $J = 8.4$ ,  $J = 6.8$ ,  $J = 1.2$ , 1H), 7.95-7.88 (m, 2H), 7.78 (d,  $J = 8.0$ , 1H), 7.54 (dd,  $J = 7.2$ ,  $J = 7.2$ , 1H), 7.41 (dd,  $J = 8.8$ ,  $J = 7.6$ , 2H), 7.21 (dd,  $J = 7.6$ ,  $J = 7.6$ , 1H), 7.12 (dd,  $J = 8.8$ , 1H), 5.04 (s, 3H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  157.3, 145.4 (2C), 141.4, 137.4, 133.9, 132.6, 130.2, 127.2, 126.5, 126.0, 124.0, 122.8, 121.6, 120.6, 118.6,

116.0, 114.5, 113.4, 40.0; MS (FAB,  $m/z$ ) 325 ( $M^+$ ). HRMS (FAB) calcd for  $C_{22}H_{17}N_2O^+$  325.1341, found 325.1364. Anal. ( $C_{22}H_{17}N_2OCl \cdot 1.5 H_2O$ ) C, H, N.

**5-Methyl-11-(phenylthio)quindolinium Hydrochloride (43c). Method A.**

The reaction of thiophenol (60 mg, 0.6 mmol) and 5-methyl-11-chloroquindoline (100 mg, 0.4 mmol) in 2-ethoxyethanol (3 mL) proceeded according to General Procedure L.

Recrystallization from acetone gave 80 mg (63%) of **43c** as a yellow solid, mp 239-241

°C. **Method B.** **43c** was also prepared in similar yield from **24k** (600 mg, 2.0 mmol), and thiophenol (0.54 g, 4.9 mmol) in 2-ethoxyethanol (10 mL) as described in Method A.

**43c:**  $^1H$  NMR (DMSO- $d_6$ )  $\delta$  8.87 (d,  $J = 9.1$ , 1H), 8.86 (d,  $J = 8.1$ , 1H), ) 8.71 (d,  $J = 8.3$ , 1H), 8.17 (dd,  $J = 7.8$ ,  $J = 7.1$ , 1H) 7.96 (ddd,  $J = 7.7$ ,  $J = 7.7$ ,  $J = 7.7$ , 1H), 7.88 (d,  $J = 8.3$ , 1H) 7.56 (dd,  $J = 7.7$ ,  $J = 7.7$ , 1H), 7.29-7.24 (m, 5H), 5.08 (s, 3H);  $^{13}C$  NMR (DMSO- $d_6$ , rt)  $\delta$  146.1 (145.9), 138.45 (138.42), 137.3, 137.2, 135.6, 134.6, 133.45 (133.43), 132.0, 129.7, 128.5, 128.1, 127.4, 126.8, 126.4, 121.9, 119.0, 114.59 (114.55), 113.6, 113.5, 40.7);  $^{13}C$  NMR (DMSO- $d_6$ , 80°C)  $\delta$  146.0, 138.1, 137.0, 135.4, 134.2, 133.0, 131.7, 129.4, 128.6, 127.7, 127.2, 126.6, 126.3, 126.1, 121.6, 118.5, 114.3, 113.4, 113.3, 40.4; MS (FAB,  $m/z$ ) 341 ( $M^+$ ). HRMS (FAB) calcd for  $C_{22}H_{17}N_2S^+$  341.1112, found 341.1098. Anal. ( $C_{22}H_{17}N_2ClS \cdot 1.0 H_2O$ ) C, H, N.

**5-Methyl-11-phenylquindolinium Hydrochloride (44a).** Phenylmagnesium bromide (3.3 mL, 11.3 mmol, 3.0 M in ether) was added to a purple solution of 5-methyl-11-chloroquindoline (1.3 g, 4.9 mmol) in dry THF (40 mL) at rt. The mixture was stirred for 1 h at rt and quenched by adding saturated  $NH_4Cl$ . The green precipitate was filtered, washed with water, and dried over  $P_2O_5$  under vacuum. The solid was dissolved in  $CHCl_3$  and a solution of HCl in ether (1 M) was added until a yellow endpoint was reached. The bright yellow solid was filtered and then recrystallized from water to afford 1.10 g (73%) of **44a** as a bright yellow solid, mp 249.1-249.9 °C:  $^1H$  NMR (DMSO- $d_6$ )  $\delta$  12.41 (s, 1H), 8.87 (d,  $J = 8.8$ , 1H), 8.86 (d,  $J = 8.0$ , 1H), 8.20 (ddd,  $J = 8.4$ ,  $J = 6.8$ ,  $J = 1.2$ , 1H), 8.02 (dd,  $J = 8.8$ ,  $J = 1.2$ , 1H), 7.95-7.89 (m, 2H), 7.82-7.78 (m, 4H), 7.74-7.70

(m, 2H), 7.54 (d,  $J = 8.0$ , 1H), 5.11 (s, 3H);  $^{13}\text{C}$  NMR (DMSO- $d_6$ )  $\delta$  146.2 (146.0), 137.9, 136.63 (136.58), 135.7, 133.8 (2C), 132.0 (2C), 131.4, 130.1, 130.0, 129.4, 127.3, 126.8, 126.2, 124.8, 121.4, 118.2, 114.0, 113.4, 113.36, 40.3; MS (FAB,  $m/z$ ) 309 ( $M^+$ ). HRMS (FAB) calcd for  $\text{C}_{22}\text{H}_{17}\text{N}_2^+$  309.1392, found 309.1389. Anal. ( $\text{C}_{22}\text{H}_{17}\text{N}_2\text{Cl}\cdot 2.5 \text{H}_2\text{O}$ ) C, H, N.

**11-(4-Chlorophenylthio)-5-methylbenzofuro[3,2-b]quinolinium Hydrotrifluoromethanesulfonate (45a).** 4-Chlorothiophenol (23 mg, 0.16 mmol) was added to a solution of **33** (65 mg, 0.16 mmol) in 2-ethoxyethanol (5 mL), causing the reaction mixture to become bright yellow. After 5-7 min, TLC showed the disappearance of the starting material. The reaction mixture was cooled to rt and diluted with hexane (100 mL). The precipitate was filtered and dried to afford 50 mg (63%) of **45a**, mp 150-151 °C:  $^1\text{H}$  NMR ( $\text{CDCl}_3$ )  $\delta$  8.71 (d,  $J = 7.6$ , 1H), 8.60 (bt, 2H), 8.23 (bt, 1H), 7.96 (bt,  $J = 6.8$ , 1H), 7.86 (t,  $J = 6.8$ , 1H), 7.69-7.58 (d,  $J = 6.8$ , 3H), 7.42 (d,  $J = 6.8$ , 2H), 7.38 (d,  $J = 8.0$ , 1H), 5.06 (s, 3H);  $^{13}\text{C}$  NMR ( $\text{CDCl}_3$ )  $\delta$  159.65, 146.54, 140.91, 139.53, 137.16, 136.95, 136.13, 135.33, 135.10, 130.24, 129.26, 127.46, 126.74, 126.65, 126.48, 126.08, 119.23, 116.29, 113.54, 41.25; MS (FAB,  $m/z$ ) 376 ( $M^+$ ); MS (FAB,  $m/z$ ) 149 (OTf).

**11-[(4-Chlorophenyl)thio]-5-methylindeno[1,2-b]quinolinium Hydrotrifluoromethanesulfonate (46a).** 4-Chlorothiophenol (17.5 mg, 0.12 mmol) was added to a solution of **40** (50 mg, 0.12 mmol) in 2-ethoxyethanol (4 mL) causing the reaction mixture to become yellow. The mixture was refluxed for 15 min, then cooled to rt. The reaction mixture was diluted with hexane (25 mL), cooled to 0 °C, and then the product was filtered and dried *in vacuo*, affording 30 mg (51%) of **46a**, mp 174-175 °C (dec.):  $^1\text{H}$  NMR ( $\text{CD}_3\text{OD}$ )  $\delta$  8.74 (dd,  $J = 7.2$ ,  $J = 1.2$ , 1H), 8.64 (t,  $J = 9.6$ , 2H), 8.22 (ddd,  $J = 8.8$ ,  $J = 7.2$ ,  $J = 0.8$ , 1H), 7.95 (ddd,  $J = 8.4$ ,  $J = 7.6$ ,  $J = 0.8$ , 1H), 7.85 (d,  $J = 4.4$ , 2H), 7.79-7.77 (m, 1H), 7.48 (d,  $J = 8.8$ , 2H), 7.42 (d,  $J = 8.8$ , 2H), 5.05 (s,

3H); MS (EI,  $m/z$ ) 374 ( $M^+$ ); MS (FAB,  $m/z$ ) 149 ( $OTf$ ). HRMS (FAB) calcd for  $C_{23}H_{17}NCIS^+$  374.0770, found 374.0774.

**Methyl Quindoline-11-carboxylate (47). Method A.** A suspension of quindoline-11-carboxylic acid<sup>8</sup> (1.01 g, 3.9 mmol) in THF (75.0 mL) was stirred at rt as an ethereal solution of  $CH_2N_2$  was added dropwise until most of the solid had dissolved. The reaction mixture was filtered and 0.065 g (6%) of unreacted quindoline-11-carboxylic acid was recovered. The solvent was removed from the filtrate by rotary evaporation. Purification of the material on a silica gel column using EtOAc-hexanes (1:1) as eluant afforded 0.90 g (90%) of **47** which was recrystallized from EtOAc-hexanes to afford yellow, needle-like crystals, mp 150-151 °C. **Method B.** A suspension of quindoline-11-carboxylic acid<sup>8</sup> (2.3 g, 8.77 mmol) in methanol (50 mL) was treated with concentrated  $H_2SO_4$  (1.5 mL, 28 mmol). The resulting solution was refluxed for 8 h, cooled, and then partitioned between benzene (100 mL) and water (50 mL). After adjusting the pH to 9 with a saturated solution of  $K_2CO_3$ , the benzene layer was separated, washed with water, dried ( $Na_2SO_4$ ), and then concentrated. Purification by LPLC (EtOAc-hexane 1:3) gave 0.28 g (11%) of **47** as greenish-yellow crystals (from hexane), mp 152-153.5 °C (lit.<sup>55</sup> 152.5-154 °C):  $^1H$  NMR ( $CDCl_3$ )  $\delta$  9.75 (s, 1H), 9.09 (d,  $J = 7.0$ , 1H), 8.51 (d,  $J = 8.0$ , 1H), 8.38 (d,  $J = 7.2$ , 1H), 7.72-7.62 (m, 3H), 7.49 (d,  $J = 8.0$ , 1H), 7.38 (dd,  $J = 8.0$ ,  $J = 8.0$ , 1H), 4.11 (s, 3H);  $^{13}C$  NMR ( $CDCl_3$ )  $\delta$  168.19, 147.81, 144.43, 143.56, 133.91, 130.50, 130.27, 127.40, 126.18, 125.05, 123.66, 122.23, 121.65, 121.06, 111.19, 109.21, 52.54; MS (EI,  $m/z$ ) 276 ( $M^+$ ). Acidification of the water layer with HCl gave 1.8 g (78.3%) of recovered starting material. HRMS (EI) calcd for  $C_{17}H_{12}N_2O_2$  276.0899, found 276.0896. Anal. ( $C_{17}H_{12}N_2O_2 \cdot 0.5 H_2O$ ) C, H, N.

**Methyl 10-methylquindoline-11-carboxylate (48). Method A.** A solution of **47** (0.04 g, 0.16 mmol) in dry THF (2.0 mL) was stirred at 0 °C as a 15 wt% solution of KHMDS in toluene (0.30 mL, 0.20 mmol) was added. A red solution was obtained. After 15 min, methyl iodide (0.01 mL, 0.19 mmol) was added. The reaction mixture was

warmed to rt and stirred for 3 h. The reaction was quenched with saturated  $\text{NH}_4\text{Cl}$  and extracted with EtOAc. The organic layer was dried over  $\text{MgSO}_4$  and the solvent was removed by rotary evaporation. Purification by LPLC using EtOAc-hexanes (3:7) as eluant afforded 0.05 g (99%) of **48** as a yellow solid, mp 122-123 °C. **Method B.** A mixture of quindoline-11-carboxylic acid<sup>8</sup> (2.6 g, 10 mmol), DMF (25 mL), KOH (2.24 g, 40 mmol), BaO (6.27 g, 40 mmol), and methyl iodide (9.7 mL, 130 mmol) was stirred at rt for 48 h and then partitioned between benzene (60 mL) and water (100 mL). The benzene layer was washed with water (2 x 60 mL), dried and then concentrated. The residue was recrystallized from hexane to give 1.14 g (39.3%) of **48** as light yellow crystals, mp 127 °C:  $^1\text{H}$  NMR ( $\text{CDCl}_3$ )  $\delta$  8.49 (dd,  $J = 8.0, J = 0.8$ , 1H), 8.31 (dd,  $J = 8.4, J = 1.2$ , 1H), 7.95 (dd,  $J = 8.4, J = 0.8$ , 1H), 7.68-7.55 (m, 3H), 7.38 (d,  $J = 8.0$ , 1H), 7.33 (dd,  $J = 8.0, J = 8.0$ , 1H), 4.14 (s, 3H), 3.79 (s, 3H);  $^{13}\text{C}$  NMR ( $\text{CDCl}_3$ )  $\delta$  167.98, 146.93, 145.64, 143.25, 130.27, 129.66, 129.65, 126.52, 126.44, 123.55, 122.92, 122.02, 121.28, 120.42, 115.77, 108.70, 52.71, 30.75; MS (EI,  $m/z$ ) 290.1 ( $\text{M}^+$ ). HRMS (EI) calcd for  $\text{C}_{18}\text{H}_{14}\text{N}_2\text{O}_2$  290.1055, found 290.1074. Anal. ( $\text{C}_{18}\text{H}_{14}\text{N}_2\text{O}_2 \cdot 0.2 \text{H}_2\text{O}$ ) C, H, N.

**5-Methyl-11-methoxycarbonylquindolinium Hydroiodide (49).** A solution of **47** (0.16 g, 0.58 mmol) and methyl iodide (3 mL, 30.2 mmol) was stirred at rt for 48 h. The excess of methyl iodide was removed and the residue was washed thoroughly with ether to give the 0.06 g (25%) of **49** as a red solid, mp 246.5-247.0 °C:  $^1\text{H}$  NMR ( $\text{DMSO}-d_6$ )  $\delta$  12.68 (s, 1H), 8.92-8.80 (m, 3H), 8.22 (dd,  $J = 8.0, J = 8.0$ , 1H), 8.05 (d,  $J = 8.4$ , 1H), 8.01 (d,  $J = 7.6$ , 1H), 7.93 (d,  $J = 8.1$ , 1H), 7.58 (dd,  $J = 7.6, J = 7.6$ , 1H), 5.09 (s, 3H), 4.24 (s, 3H);  $^{13}\text{C}$  NMR ( $\text{DMSO}-d_6$ )  $\delta$  164.01, 146.47, 141.01, 135.35, 135.14, 132.10, 131.94, 128.40, 126.89, 126.37, 122.88, 122.10, 121.80, 118.60, 113.86, 113.54, 54.20, 41.29; MS (LSIMS,  $m/z$ ) 291 ( $\text{M}^+$ ). HRMS (FAB) calcd for  $\text{C}_{18}\text{H}_{15}\text{N}_2\text{O}_2^+$  291.1133, found 291.1110.

**5,10-Dimethyl-11-methoxycarbonylquindolinium Iodide (50).** A solution of **48** (0.5 g, 1.72 mmol) and methyl iodide (5 mL, 50.3 mmol) was stirred at rt for 48 h. The excess of methyl iodide was removed and the residue was dissolved in MeOH (10 mL). Ether (30 mL) was added and the precipitate was filtered, washed thoroughly with ether, and then dried ( $\text{Na}_2\text{SO}_4$ ) to give 0.33 g (44.6%) of **50** as an orange solid, mp 257.0-257.5 °C (dec):  $^1\text{H}$  NMR ( $\text{DMSO}-d_6$ )  $\delta$  8.90 (d,  $J = 9.2$ , 1H), 8.89 (d,  $J = 8.4$ , 1H), 8.33 (dd,  $J = 8.4$ ,  $J = 0.4$ , 1H), 8.24 (ddd,  $J = 8.0$ ,  $J = 6.8$ ,  $J = 0.8$ , 1H), 8.10-8.00 (m, 3H), 7.62 (ddd,  $J = 8.0$ ,  $J = 5.6$ ,  $J = 2.0$ , 1H), 5.08 (s, 3H), 4.31 (s, 3H), 4.00 (s, 3H);  $^{13}\text{C}$  NMR ( $\text{DMSO}-d_6$ )  $\delta$  164.95, 148.00, 140.48, 135.11, 134.96, 132.61, 129.99, 128.74, 126.96, 125.76, 124.86, 122.31, 122.27, 118.73, 113.60, 111.71, 54.67, 41.20, 30.98; MS (LSIMS,  $m/z$ ) 305 ( $\text{M}^+$ ). HRMS (FAB) calcd for  $\text{C}_{19}\text{H}_{17}\text{N}_2\text{O}_2^+$  305.1290, found 305.1296. Anal. ( $\text{C}_{19}\text{H}_{17}\text{N}_2\text{O}_2\text{I}$ ) C, H, N.

**4-Methoxy-5-methyl-10-acetylquindolinium Iodide.** A suspension of **15** (194 mg, 0.67 mmol) in methyl iodide (1.25 mL, 200 mmol) was heated in a Parr bomb at 150 °C with stirring for 24 h. After cooling, the precipitate was filtered off and dried to obtain 77 mg (27%) of the title compound as brown crystals, mp > 250 °C (sublimes):  $^1\text{H}$  NMR ( $\text{DMSO}-d_6$ )  $\delta$  9.84 (s, 1H), 8.83 (d,  $J = 8.0$ , 1H), 8.56 (d,  $J = 8.8$ , 1H), 8.22 (m, 1H), 8.09 (m, 1H), 7.94 (t,  $J = 8.0$ , 1H), 7.79 (m, 2H), 5.07 (s, 3H), 4.17 (s, 3H), 3.06 (s, 3H);  $^{13}\text{C}$  NMR ( $\text{DMSO}-d_6$ )  $\delta$  170.5, 150.8, 143.7, 143.1, 135.5, 132.5, 130.1, 129.3, 129.12, 129.09, 127.5, 125.1, 122.3, 117.5, 116.8, 115.2, 57.3, 47.7, 27.7; MS (LSIMS,  $m/z$ ) 305 ( $\text{M}^+$ ).

**4-Methoxy-5-methylquindoline.** A solution of 4-methoxy-5-methyl-10-acetylquindolinium iodide (90 mg, 0.31 mmol) was adsorbed onto anhydrous  $\text{Na}_2\text{CO}_3$  (1 g) and applied to a column filled with basic alumina. The mixture was eluted with  $\text{CHCl}_3$  and then eluted with  $\text{CHCl}_3$ -MeOH (97:3) to provide 21 mg (26%) of the title compound as a purple solid:  $^1\text{H}$  NMR ( $\text{CDCl}_3$ )  $\delta$  8.74 (s, 1H), 8.22 (d,  $J = 8.4$ , 1H), 7.85 (d,  $J = 8.4$ , 1H), 7.73 (d,  $J = 8.4$ , 1H), 7.57 (m, 1H), 7.48 (m, 1H), 7.18 (d,  $J = 7.6$ , 1H), 7.08 (m, 1H),

5.07 (s, 3H), 4.12 (s, 3H);  $^{13}\text{C}$  NMR ( $\text{CDCl}_3$ )  $\delta$  159.8, 150.5 (2 carbons), 144.1, 141.5, 131.2, 127.2, 126.3, 124.4, 124.1, 122.2, 119.5, 117.6, 114.1, 109.4, 56.5, 45.3; MS (LSIMS,  $m/z$ ) 263 ( $\text{M}+\text{H}^+$ ).

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