Supplementary data

Radical Reactions with 3*H*-Quinazolin-4-ones: Synthesis of Deoxyvasicinone, Mackinazolinone, Luotonin A, Rutaecarpine and Tryptanthrin

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2-(2-Bromophenyl)ethyl methanesulfonate 15[32]

Mesyl chloride (2.38 cm^3, 30.7 mmol) was slowly added to 2-(2-bromophenyl)ethanol (4.74 g, 25.6 mmol) in dry DCM (50 cm^3) followed by addition of triethylamine (5.34 cm^3, 38.4 mmol) at 0 °C and the mixture stirred for 48 h. The crude reaction mixture was washed with H_2O and brine. The organic layer was dried and evaporated to dryness under reduced pressure yielding 2-(2-bromophenyl)ethyl methanesulfonate **15** as an orange oil (4.91 g, 18.7 mmol, 75%); ν_{max}(neat)/cm^{-1} 3057, 3024, 2939, 1594, 1568, 1473, 1442, 1038 and 858; δ_H 2.87 (3 H, s, CH_3), 3.20 (2 H, t, *J* 6.9, CH_2), 4.43 (2 H, t, J 6.9, OCH_2), 7.17-7.09 (1 H, m, ArH), 7.29-7.26 (2 H, m, ArH) and 7.57 (1 H, d, *J* 7.7, 6-H). The data were identical with literature values.[32]

3-(2-Phenylethyl)-2-thioxo-2,3-dihydro-1*H*-quinazolin-4-one

The procedure was adapted from a literature protocol.[35] 2-(Methoxycarbonyl)phenyl isothiocyanate (0.31 cm^3, 2.0 mmol) and 2-phenylethylamine (0.25 cm^3, 2.0 mmol) were refluxed in 2-propanol (10 cm^3) for 2 h. The mixture was cooled and the precipitate collected by filtration and recrystallised from hot propanol yielding 3-(2-phenylethyl)-2-thioxo-2,3-dihydro-1*H*-quinazolin-4-one as colourless crystals (0.52 g, 1.8 mmol, 92%), mp 237-238 °C (lit.[35] 238-239 °C); Found: $(M+H)^+$, 283.0897. $C_{16}H_{15}N_2OS$ requires 283.0900; δ_H 3.11-3.09 (2 H, m, CH_2), 4.76-4.72 (2 H, m, NCH_2), 7.17 (1 H, d, *J* 8.2, 8-H), 7.28-7.23 (2 H, m), 7.37-7.32 (2 H, m), 7.43-7.40 (2 H, m), 7.68 (1 H, ddd, *J* 8.2, 6.4, 1.2, 7-H), 8.17 (1 H, dd, *J* 9.6, 1.2, 5-H) and 10.33 (1 H, b, NH); δ_C 32.8 (CH_2), 48.4 (NCH_2), 114.5 (8-C), 116.1 (C), 125.1 (CH), 126.6 (CH), 128.6 (CH), 128.7 (CH), 129.5 (CH), 135.5 (7-C), 138.3 (C), 138.3 (C), 159.5 (2-C) and 175.7 (4-C); *m/z* (EI) 282 (M^+, 21%), 178 (38), 162 (18), 104 (100), 91 (38), 77 (35), 65 (34), 63 (21) and 51 (26).

Di-[3-(2-phenylethyl)quinazolin-4-on-2-yl] disulfide

3-(2-Phenylethyl)-2-thioxo-2,3-dihydro-1*H*-quinazolin-4-one (0.56 g, 2.0 mmol) and bromine (0.20 cm^3, 4.0 mmol) were stirred in anhydrous MeOH (20 cm^3) for 4 h under an atmosphere of nitrogen. The white precipitate was collected by filtration and washed with MeOH yielding di-[3-(2-phenylethyl)quinazolin-4-on-2-yl] disulfide as colourless crystals (0.33 g, 0.59 mmol, 59%), mp 223-225 ˚C; Found: $(M+H)^+$, 563.1566. $C_{32}H_{27}N_4O_2S_2$ requires 563.1570; ν_{max}(thin film)/cm^{-1} 3607, 2354, 1672, 1555, 1469, 1336, 1130, 768 and 690; δ_H 3.13 (4 H, t, *J* 8.2, CH_2), 4.59 (4 H, t, *J* 8.2, NCH_2), 7.28-7.48 (14 H, m, ArH), 7.66-7.61 (2 H, m, 7-H) and 8.23-8.20 (2 H, m, 5-H); δ_C 34.9 (CH_2), 46.8 (NCH_2), 119.8 (C), 126.7 (CH), 126.8 (CH), 127.0 (CH), 127.1 (CH), 128.9 (CH), 129.1 (CH), 134.6 (CH), 137.5 (C), 147.1 (C), 152.7 (4-C) and 161.5 (2-C); *m/z* (EI) 562 (M^+,7%), 529 (100), 497 (27), 401 (17) and 321 (20).

3-(3-Chloropropyl)-3*H*-quinazolin-4-one

Sodium hydride (60% dispersion in mineral oil) (1.78 g, 44.6 mmol) was added at 0 °C to 3-*H*-quinazolin-4-one (6.5 g, 44 mmol) in dry DMF (50 cm^3) and the mixture warmed to 60 °C and stirred for 1 h. 1-Chloro-3-iodopropane (4.0 cm^3, 37 mmol) was added and stirring continued for a further 12 h. The reaction mixture was diluted with DCM and washed with H_2O and brine. The organic layer was dried and evaporated to dryness under reduced pressure. The crude product was purified by column chromatography using silica gel as absorbent and light petroleum/EtOAc (2:1) as eluent yielding 3-(3-chloropropyl)-3*H*-quinazolin-4-one as colourless crystals (5.06 g, 22.8 mmol, 51%);, mp 97-99 °C (lit.[64] 98-100 °C); ν_{max}(thin film)/cm^{-1} 3439, 1659, 1613, 1469, 1366, 774 and 696; Found: MH^+, 223.0635. $C_{11}H_{11}{}^{35}ClN_2O$. requires 223.0633; δ_H 2.34-2.28 (2 H, m, CH_2), 3.60 (2 H, t, *J* 9.9, $ClCH_2$), 4.19 (2 H, t, *J* 10.4, NCH_2), 7.51 (1 H, ddd, *J* 12.9, 9.4, 2.4, ArH), 7.81-7.69 (2 H, m, ArH), 8.11 (1 H, s, ArH) and 8.30 (1 H, dd, 9.4, 4.7, ArH); δ_C 31.0 (CH_2), 41.6 ($ClCH_2$), 44.5 (NCH_2), 122.0 (C), 126.6 (CH), 127.4 (CH), 127.5 (CH), 134.4 (CH), 146.6 (CH), 148.0 (C) and 161.1 (C); *m/z* (EI) 222 (M^+, 9%), 187 (46), 160 (48), 129 (36), 77 (41), 63 (29), 49 (39) and 41 (100).

3-(4-Chlorobutyl)-3*H*-quinazolin-4-one

The above alkylation procedure using 1-chloro-4-iodobutane yielded 3-(4-chlorobutyl)-3*H*-quinazolin-4-one as colourless crystals (65%), mp 74-76 °C; ν_{max}(thin film)/cm^{-1} 3446, 2953, 1662, 1609, 1471, 1367, 908, 875, 769 and 696; Found: C, 60.76; H, 5.44; N, 12.00. $C_{12}H_{13}ClN_2O$ requires C, 60.89; H, 5.54; N, 11.84; Found: $(M+H)^+$, 237.0792. $C_{12}H_{13}ClN_2O$. requires 237.0789; δ_H 1.86-189 (2 H, m, 3-H), 2.05-1.97 (2 H, m, 2-H), 3.61 (2 H, t, *J* 6.5, CH_2Cl), 4.06 (2 H, t, *J* 7.6, NCH_2), 7.52 (1 H, m, ArH), 7.77-712 (2 H, m, ArH), 8.05 (1 H, s, ArH) and 8.32-8.30 (1 H, m, ArH); δ_C 26.9 (2-C), 29.5 (3-C), 44.2 (NCH_2), 46.1 (CH_2Cl), 122.1 (C), 126.7 (CH), 127.3 (CH), 127.5 (CH), 134.3 (CH), 146.3 (CH), 148.1 (C) and 161.1 (C); *m/z* (EI) 236 (M^+, 6%), 201 (29), 146 (39), 77 (28), 63 (25), 55 (42) and 49 (74).

3-Propyl-3*H*-quinazolin-4-one 33 (n = 1)

The above alkylation procedure using 1-iodopropane yielded 3-propyl-3*H*-quinazolin-4-one **33** (n = 1) as colourless crystals (64%), mp 93-95 ºC (lit.[65] 96-98 ºC); ν_{max}(thin film)/cm^{-1} 3416, 2963, 2875, 2462, 1674, 1611, 1473, 1376, 1324, 1091, 899, 767, 695, 610 and 552; δ_H 0.99 (3 H, t, *J* 7.4, CH_3), 1.88-1.79 (2 H, m, CH_2), 3.97 (2 H, t, *J* 7.2, NCH_2), 7.48 (1 H, ddd, *J* 8.1, 6.8, 1.5, ArH), 7.75-7.67 (2 H, m, ArH), 8.06 (1 H, s, ArH) and 8.30 (1 H, dd, *J* 8.1 1.5, ArH); δ_C 11.0 (CH_3), 22.2 (CH_2), 48.4 (NCH_2), 122.0 (C), 126.5 (CH), 126.6 (CH), 126.8 (CH), 133.6 (CH), 146.6 (CH), 148.0 (C) and 160.8 (C).

Finkelstein reactions

3-(3-Iodopropyl)-3*H*-quinazolin-4-one 31a. 3-(3-Chloropropyl)-3*H*-quinazolin-4-one (4.43 g, 20.0 mmol) and sodium iodide (14.9 g, 100 mmol) were added to dry acetone (50 cm^3) and the mixture stirred and heated under reflux for 12 h in the dark. The precipitated sodium chloride was removed by filtration on a celite bed and the solution evaporated to dryness. The sold residue was triturated with diethyl ether and the solution filtered a second time. The ether solution was evaporated to dryness to afford 3-(3-iodopropyl)-3*H*-quinazolin-4-one **31a** as colourless crystals (3.35 g, 10.6 mmol, 53%), mp 119-121 °C; (lit.[65] 120-122 °C); Found: M$^+$, 314.9990. $C_{11}H_{11}IN_2O$. requires 314.9989; ν_{max}(thin film)/cm^{-1} 3421, 1667, 1614, 1470, 1364, 1118, 775 and 698; δ_H 2.37-2.30 (2 H, m CH_2), 3.20 (2 H, t, *J* 6.4, ICH_2), 4.13 (2 H, t, *J* 6.8, NCH_2), 7.52-7.48 (1 H, m, ArH), 7.74-7.68 (2 H, m, ArH), 8.13 (1 H, s, ArH) and 8.27 (1 H, dd, *J* 8.0, 1.6, ArH); δ_C 2.3 (ICH_2), 31.9 (CH_2), 47.4 (NCH_2), 121.9 (C), 126.2 (CH), 126.5 (CH), 126.7 (CH), 134.3 (CH), 146.5 (CH), 148.0 (C) and 161.0 (C); *m/z* (EI) 314 (M$^+$, 4%), 187 (37), 127 (35), 76 (28) and 41 (100).

3-(4-Iodobutyl)-3*H*-quinazolin-4-one 31b. Colourless crystals (67%), mp 79-80 °C; (Found: M$^+$, 329.0253. $C_{12}H_{13}IN_2O$. requires 329.0254); ν_{max}(thin film)/cm^{-1} 3424, 2949, 1656, 1614, 1471, 1372, 1172, 1111, 888, 769 and 697; δ_H 1.89-1.91 (4 H, m, CH_2CH_2), 3.24 (2 H, t, *J* 6.4, CH_2I), 4.04 (2 H, t, *J* 6.8, NCH_2), 7.51 (1 H, ddd, *J* 8.2 6.8 1.2, ArH), 7.78-7.70 (2 H, m, ArH), 8.06 (1 H, s, ArH) and 8.32-8.29 (1 H, dd, *J* 8.2, 1.0, ArH); δ_C 5.2 (4-C), 30.2 (2-C), 30.4 (3-C), 45.7 (1-C), 122.0 (C), 126.7 (CH), 127.3 (CH), 127.6 (CH), 134.3 (CH), 146.3 (CH), 148.0 (C) and 161.0 (C); *m/z* (EI) 329 (M$^+$, 13%), 201 (43), 141 (27), 90 (100), 76 (53), 62 (41) and 50 (30).

2-Chloro-3-(hydroxymethyl)quinoline

Sodium borohydride (0.18 g, 4.8 mmol) was added to a stirred solution of 2-chloroquinoline-3-carbaldehyde (0.76 g, 4.0 mmol) in EtOH (50 cm^3) and the mixture stirred for 2 h. The crude reaction was diluted with EtOAc and washed with H_2O and brine. The organic layer was dried and evaporated to dryness under reduced pressure yielding 2-chloro-3-(hydroxymethyl)quinoline as colourless crystals (0.58, 3.0 mmol, 75%), mp 151-152 °C (lit.[46a] 149 °C); Found: C, 61.92; H, 4.16; N, 7.23. $C_{10}H_7NClO$ requires C, 62.03; H, 4.16; N, 7.23; Found: (M+H)$^+$, 194.0368. $C_{10}H_8{}^{35}ClNO$ requires 194.0372; ν_{max}(thin film)/cm^{-1} 3410, 1256, 1201, 1187, 1016, 942, 896, 778, 756 and 670; δ_H 4.94 (2 H, d, *J* 3.0, CH_2), 7.57 (1 H, ddd, *J* 8.2, 6.8, 0.9, 6-ArH), 7.73 (1 H, ddd, *J* 8.2, 6.8, 1.5, 7-ArH), 7.85 (1 H, dd, *J* 8.2, 1.5, 5-ArH), 8.03 (1 H, dd, *J* 8.2, 1.5, 8-ArH) and 8.30 (1 H, s, 4-ArH); δ_C 62.0 (CH_2), 127.2 (6-C), 127.4 (4a-C), 127.6 (5-C), 128.2 (8-C), 130.3 (7-C), 132.2 (3-C), 136.2 (4-C), 146.9 (8a-C) and 149.1 (2-C); *m/z* (EI) 194 (M$^+$, 15%), 192 (38), 163 (42), 156 (38), 140 (30), 130 (42), 129 (45), 128 (100), 75 (36), 63 (44), 62 (88), 50 (53) and 39 (59). The data were identical to those in the literature.

2-Bromo-3-(bromomethyl)quinoline[46]

Phosphorus tribromide (1.5 cm^3, 16 mmol) was added to a stirred solution of 2-chloro-3-(hydroxymethyl)quinoline (0.77 g, 4 mmol) in THF (20 cm^3) at 0 °C and stirred for a further 24 h. The crude reaction mixture was diluted with DCM and washed with H_2O (3 × 50 cm^3) and brine (50 cm^3). The organic layer was dried and evaporated to dryness under reduced pressure. The crude product was purified by column chromatography using silica gel as absorbent and light petroleum/EtOAc (10:1) as eluent to yield 2-bromo-3-(bromomethyl)quinoline as colourless crystals (0.66 g, 2.2 mmol, 55%), mp 137-138 °C (lit.[46] 139-140 ºC); ν_{max}(thin film)/cm^{-1} 1559, 1490, 1430, 1399, 1249, 1210, 1131, 1022, 968, 920, 858, 776, 757, 695, 594 and 474; δ_H 4.74 (2 H, s, CH_2), 7.60 (1 H, ddd, *J* 8.0, 6.8, 2.0, 6-H), 7.76 (1 H, ddd, *J* 8.6, 6.8 ,2.0, 7-H), 7.82 (1 H, dd, *J* 8.0, 1.4,, 5-H), 8.05 (1 H, dd, *J* 8.6, 2.0, 8-H) and 8.23 (1 H, s, 4-H); δ_C 29.0 (CH_2), 127.2 (4a-C), 127.5 (5-C), 127.6 (6-C), 128.5 (8-C), 131.1 (7-C), 131.4 (3-C), 138.7 (4-C), 143.1 (2-C) and 147.9 (8a-C). The yield was optimised at 75%.

3-[(2-Bromoquinolin-3-yl)methyl]-4(3*H*)-quinazolinone 34

Potassium *tert*-butoxide (0.14 g, 1.28 mmol) was added to a solution of 3*H*-quinazolin-4-one (0.17 g, 1.2 mmol) in DMF (20 cm^3) and the mixture stirred for 1 h. 2-Bromo-3-(bromomethyl)quinoline (0.42 g, 1.4 mmol) was added and stirred for a further 12 h. The crude reaction was diluted with Et_2O and washed with H_2O and brine. The organic layer was dried and evaporated to dryness under reduced pressure. The crude product was purified by column chromatography using silica gel as absorbent and light petroleum/EtOAc (1:1) as eluent to yield 3-[(2-bromoquinolin-3-yl)methyl]-4(3*H*)-quinazolinone **34** as colourless crystals (0.279 g, 0.76 mmol, 65%), mp 200-202 °C (lit.[46b] 201-203 °C); ν_{max} (thin film)/cm^{-1} 3424, 1664, 1470, 1359, 1318, 1220, 1164, 960, 858, 774, 693 and 494; δ_H 5.42 (CH_2), 7.59-7.53 (2 H, m, ArH), 7.83-7.16 (4 H, m, ArH), 8.04-7.99 (1 H, m, ArH), 8.05 (1 H, s, ArH), 8.34-8.30 (1 H, m, ArH) and 8.35 (1 H, s, ArH); δ_C 49.5 (CH_2), 122.1 (4a-C), 126.8 (CH), 127.0 (4a'-C), 127.7 (CH), 127.7 (CH), 127.8 (CH), 127.8 (CH), 128.3 (CH), 128.7 (3'-C), 131.0 (CH), 134.7 (CH), 138.3 (CH), 142.0 (2'-C), 146.5 (CH), 147.9 (8a'-C), 148.0 (8a-C) and 161.2 (4-C). The data were identical to those in the literature.[46b]

3-(2-Bromoethyl)-1*H*-indole[66]

Phosphorus tribromide (1.2 cm^3, 11 mmol) was added slowly at 0 °C to 3-(2-hydroxyethyl)-1*H*-indole (tryptophol) (1.78 g, 11 mmol) in anhydrous DCM (10 cm^3) and the mixture stirred for 2 h. The crude reaction mixture was diluted with EtOAc and washed with H_2O and brine. The organic layer was dried and evaporated to dryness under reduced pressure. The crude product was purified by column chromatography using silica gel as absorbent and light petroleum/EtOAc (9:1) as eluent to yield 3-(2-bromoethyl)-1*H*-indole as yellow crystals (1.40 g, 6.2 mmol, 56%); mp 96-97 ºC (lit.,[66] 97-98 ºC) ν_{max}(thin film)/cm^{-1} 3412, 3053, 2919, 2480, 1620, 1455, 1264, 1008, 744 and 564; δ_H 3.33 (2 H, t, *J* 7.4, CH_2), 3.63 (2 H, t, *J* 7.4, $BrCH_2$), 7.06-7.05 (1 H, m, ArH), 7.13 (1 H, ddd, *J* 7.0, 6.6, 1.3, ArH), 7.20 (1 H, ddd, *J* 7.9, 7.0, 1.5, ArH), 7.35 (1 H, dd, *J* 6.6, 1.5, ArH) and 7.58 (1 H, dd, *J* 7.9, 1.3, ArH); δ_C 29.3 (CH_2), 32.9 (CH_2), 111.3 (CH), 113.5 (C), 118.5 (CH), 119.6 (CH), 122.2 (CH), 122.25 (CH), 126.9 (C) and 136.1 (C). The tryptophol needs to be of good purity or yields are poor.

Tryptanthrin 4

Isatin (0.88 g, 6.0 mmol), isatoic anhydride (0.97 g, 6.0 mmol) and triethylamine (0.97 cm^3, 7.0 mmol) were refluxed in toluene for 12 h under Dean Stark conditions. The reaction mixture was diluted with DCM and washed with H_2O and brine. The organic layer was dried and evaporated to dryness under reduced pressure. The crude product was purified by column chromatography using silica gel as absorbent and light petroleum/EtOAc (2:1) as eluent yielding tryptanthrin 4 as a yellow solid (1.32 g, 5.3 mmol, 88%); mp 213-214 ˚C (lit.[53] 215-217 ˚C); [Found: $(M+H)^+$, 249.0659. $C_{15}H_8N_2O_2$ requires 249.0660]; δ_H 7.43 (1 H, t, *J* 8.0, ArH), 7.68 (1 H, t, *J* 8.0, ArH), 7.79 (1 H, t, *J* 8.0, ArH), 7.86 (1 H, t, *J* 8.0, ArH), 7.92 (1 H, d, *J* 8.0, ArH), 8.04 (1 H, d, *J* 8.0, ArH), 8.44 (1 H, d, *J* 8.0, ArH) and 8.64 (1 H, d, *J* 8.0, ArH); δ_C 118.0 (ArH), 121.9 (ArC), 123.7 (C), 125.4 (CH), 127.2 (CH), 127.6 (CH), 130.2 (CH), 130.7 (CH), 135.1 (CH), 138.3 (CH), 146.4 (C), 146.7 (C), 158.1 (C) and 171.1 (2 × C); *m/z* (EI) 248 (M^+, 51%), 220 (22), 130 (28), 102 (54), 90 (100), 76 (81), 63 (55) and 50 (74).

2-(4-Oxo-4*H*-quinazolin-3-yl)benzoic acid 42[56]

Isatoic anhydride (7.5 g, 46 mmol) and anthranilic acid (6.9 g, 50 mmol) were refluxed in water for 12 h. The reaction was cooled over ice water. The precipitate was collected by filtration and washed with EtOAc and dried. The yellow precipitate was heated under reflux with triethyl orthoformate (17 cm^3, 108 mmol) in MeOH (50 cm^3) for 4 h. The reaction was cooled and the precipitate collected by filtration and dried yielding 2-(4-oxo-4*H*-quinazolin-3-yl)benzoic acid **42** as colourless crystals (4.85 g, 18.2 mmol, 40%) mp 281-283 ˚C (lit.,[56] 282-284 ˚C); Found: $(M+H)^+$, 267.0764. $C_{15}H_{11}N_2O_3$ requires 267.0764; ν_{max}(thin film)/cm^{-1} 3405, 1873, 1785, 1762, 1690, 1657, 1639, 1629, 789 and 669; δ_H (DMSO) 7.62-7.57 (2 H, m, ArH), 7.69-7.66 (1 H, m, ArH), 7.83-7.74 (2 H, m, ArH), 7.91-7,87 (1 H, m, ArH), 8.09 (1 H, d, *J* 9.2, ArH), 8.17 (1 H, d, *J* 9.2, ArH) and 8.33 (1 H, s, 2-H); δ_C 121.8 (4a-C), 126.3 (CH), 127.2 (CH), 127.3 (CH), 129.1 (C), 129.6 (CH), 129.8 (CH), 131.1 (CH), 133.4 (CH), 134.6 (CH), 137.1 (C), 147.1 (2-C), 147.93 (8a-C), 160.29 (4-C) and 165.86 (CO_2H); *m/z* (EI) 266 (M^+, 30%), 221 (100), 145 (22), 119 (24), 102 (29), 90 (37), 76 (35) and 65 (30).

2-Bromo-3*H*-quinazolin-4-one 26

Bromine (0.76 cm^3, 15 mmol) was slowly added to a solution of 2-mercapto-3*H*-quinazolin-4-one **24** (0.89 g, 5 mmol) in EtOH (20 cm^3) and the mixture stirred for 2 h. The crude reaction mixture was filtered and triturated with EtOH and DCM. The solid was dried under reduced pressure yielding 2-bromo-3*H*-quinazolin-4-one as colourless crystals (0.55 g, 2.5 mmol, 50%) mp 134-136 ˚C; Found: M^+, 223.9585. $C_8H_5{}^{79}BrN_2O$ requires 223.9585; ν_{max}(thin film)/cm^{-1} 2959, 2722, 2579, 1714, 1628, 1565, 1536, 1465, 1376, 1288, 1255, 1181, 1068, 755, 721 and 511; δ_H (DMSO-d_6) 7.20-7.16 (2 H, m, 6,8-H), 7.64 (1 H, ddd, *J* 8.6, 7.0 ,1.5, 7-H) and 7.89 (1 H, dd, *J* 9.6, 1.5, 5-H); δ_C (DMSO-d_6) 114.3 (4a-C), 115.3 (6/8-C), 122.3 (6/8-C), 126.9 (5-C), 134.9 (7-C), 140.8 (8a-C), 150.2 (2-C) and 162.8 (4-C); *m/z* (EI) 226 (M^+, 51%), 224 (52), 145 (100), 90 (46), 82 (26) and 80 (27). The data are identical to that reported in the literature.[67]

3-[2-(2-Bromoindol-3-yl)ethyl]-4(3*H*)-quinazolinone 40

NBS (0.12 g, 0.65 mmol) was added to 3-[2-(1*H*-indol-3-yl)ethyl]-4(3*H*)-quinazolinone **39** (0.19 g, 0.65 mmol) in DCM at 0 ˚C and the mixture stirred for 30 min. The solution was diluted with EtOAc and washed with H_2O and brine. The organic layer was dried and evaporated under reduced pressure. The crude product was purified by column chromatography using silica gel as absorbent and light petroleum/EtOAc (2:1) as eluent to yield 3-[2-(2-bromoindol-3-yl)ethyl]-4(3*H*)-quinazolinone as yellow crystals **40** (0.09 g, 0.24 mmol, 38%), mp 172-173 °C; (Found: MH^+, 368.0395. $C_{18}H_{15}{}^{79}BrN_3O$ requires 368.0393); ν_{max}(thin film)/cm^{-1} 3407, 2358, 1651, 1611, 1471, 1446, 1376, 1157 and 742; δ_H 3.23 (2 H, t, *J* 6.4, CH_2), 4.27 (2 H, t, *J* 6.4, NCH_2), 7.06 (1 H, ddd, *J* 8.0, 6.8, 0.8, ArH), 7.15-7.10 (1 H, m, ArH), 7.19 (1 H, d, *J* 8.0, ArH), 7.39 (1 H, s, 2-H), 7.51-7.53 (2 H, m, ArH), 7.64 (1 H, dd, *J* 8.0, 0.8, ArH), 7.73 (1 H, ddd, *J* 8.0, 6.8, 1.2, ArH), 8.37 (1 H, dd, *J* 8.0, 1.6, 5-H) and 8.98 (1 H, brs, NH); δ_C 24.1 (CH_2), 46.8 (NCH_2), 109.7 (C), 110.8 (C), 110.8 (CH), 117.6 (CH), 120.4 (CH), 122.1 (C), 122.7 (CH), 126.6 (CH), 127.1 (C), 127.2 (CH), 127.2 (CH), 134.2 (CH), 136.2 (C), 146.6 (CH), 147.9 (C) and 161.4 (C); *m/z* (EI) 288 (M^+, 21%), 221 (100), 208 (36), 147 (22), 129 (74), 115 (28), 102 (54), 90 (20) and 77 (61).

The data were identical to those in the literature.[68]

The following yields and additional results were obtained when the reaction conditions were optimised: NBS (1.0 equiv.), 15 min, r.t., 15%; NBS (1.2 equiv.), 30 min, r.t., 27%; NBS (1.2 equiv.), 25 min, r.t., 34%; NBS (1.2 equiv.), 1 min, r.t., 15%; NBS (1.2 equiv.), 30 min, 0 ˚C, 15%; NBS (0.5 equiv.), 30 min, 0 ˚C, 5%; NBS (2.0 equiv.), 40 min, -78 ˚C , 0%.

3-[2-(1*H*-Indol-3-yl)ethyl]-4(3*H*)-quinazolinone 39

Potassium *tert*-butoxide (0.14 g, 1.3 mmol) was added to a solution of 3*H*-quinazolin-4-one (2.24 g, 15.4 mmol) in DMF (20 cm^3) and the mixture stirred for 1 h. 3-(2-Bromoethyl)-1*H*-indole (4.13 g, 18.4 mmol) was added and stirring continued for a further 12 h. The crude mixture was diluted with EtOAc and the solution washed with H_2O and brine. The organic layer was dried and evaporated under reduced pressure. The crude product was purified by column chromatography using silica gel as absorbent and light petroleum/EtOAc (2:1) as eluent to yield 3-[2-(1*H*-indol-3-yl)ethyl]-4(3*H*)-quinazolinone **39** as colourless crystals (1.72 g, 5.9 mmol, 39%), mp 166-167 °C (lit.,[69] 167-168 °C); (Found: MH^+, 290.1291. $C_{18}H_{14}N_3O$. requires 290.1288); ν_{max}(thin film)/cm^{-1} 3441, 2099, 1650, 1643, 1530, 1474, 1376, 1021, 996, 642 and 631; δ_H 3.28 (2 H, t, *J* 7.0, CH_2), 4.31 (2 H, t, *J* 7.0, NCH_2), 6.86 (1 H, d, *J* 2.0, 2'-H), 7.14 (1 H, ddd, *J* 8.0, 6.8, 0.8, ArH), 7.21 (1 H, ddd, *J* 8.0, 6.8, 0.8, ArH), 7.37-7.35 (1 H, m, ArH), 7.54-7.50 (2 H, m, ArH), 7.67-7.63 (2 H, m, ArH), 7.76-7.77 (1 H, m, ArH) and 8.38-8.35 (1 H, m, ArH); δ_C 25.0 (CH_2), 47.5 (NCH_2), 111.4 (4a-C), 111.5 (CH), 118.4 (CH), 119.8 (CH), 122.1 (3'-C), 122.4 (CH), 122.8 (2'a-C), 126.7 (CH), 126.8 (3'a-C), 127.1 (CH), 127.4 (CH), 134.2 (CH), 136.5 (7'a-C), 146.7 (CH), 148.2 (8a-C) and 161.1 (4-C); *m/z* (Electrospray) 289 (M^+, 5%), 143 (100) 129 (58), 115 (13), 102 (14) and 77 (27).

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