SUPPORTING INFORMATION

**Title:** Versatile Base-Catalyzed Route to Polycyclic Heteroaromatic Compounds by Intramolecular Aza-Michael Addition

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**General Methods.** $^1$H-NMR spectra were recorded on Varian 200 (200 MHz), Varian 300 (300 MHz) spectrometers. Chemical shifts are reported in ppm from TMS with the solvent resonance as the internal standard (deuterochloroform: $\delta$ 7.27 ppm). Data are reported as follows: chemical shift, multiplicity ($s$ = singlet, $d$ = douplet, $pd$ = pseudo douplet, $t$ = triplet, $q$ = quartet, $br$ = broad, $br\ s$ = broad singlet, $m$ = multiplet), coupling constants (Hz). $^{13}$C-NMR spectra were recorded with complete proton decoupling. Chemical shifts are reported in ppm from TMS with the solvent as the internal standard (deuterochloroform: $\delta$ 77.0 ppm). GC-MS spectra were taken by EI ionization at 70 eV with GC injection. They are reported as: $m/z$ (rel. intense). LC-electrospray ionization mass spectra were obtained with single-quadrupole mass spectrometer. Chromatographic purification was done with 240-400 mesh silica gel. IR analysis are expressed by wavenumber (cm$^{-1}$). Melting points are not corrected. The diffraction experiment for the $3a$ was carried out at room temperature diffractometer using graphite monochromated Mo-K$\alpha$ radiation ($\lambda$ = 0.71073 Å). Intensity data were measured over full diffraction spheres using 0.3° wide $\omega$ scans, crystal-to-detector distance 5.0 cm. The software SMART$^1a$ was used for collecting frames of data, indexing reflections and determination of lattice parameters. The collected frames were then processed for integration by software SAINT$^1a$ and an empirical absorption correction was applied with SADABS.$^1b$ The structures were solved by direct methods (SIR 97)$^1c$ and subsequent Fourier syntheses, and refined by full-matrix least-squares calculations on F$^2$ (SHELXTL)$^2$ attributing anisotropic thermal parameters to the non-hydrogen atoms. The aromatic hydrogen atoms were placed in calculated positions and refined with idealized geometry C(sp$^2$)-H = 0.93 Å whereas the other H atoms were located in the Fourier map and refined isotropically.
5a. White solid; washing solvents: c-Hex and Et₂O; yield: 76%; mp = 124-127 °C; ¹H-NMR (200 MHz, CDCl₃): (fluxional) d 1.33 (t, J = 7.0 Hz, 3H), 4.25 (q, J = 7.0 Hz, 2H), 4.39 (br, 2H), 4.98 (br, 2H), 6.05 (br, 1H), 6.76, (br, 1H) 7.40 (t, J = 7.1 Hz, 1H), 7.28-7.62 (m, 9H), 9.36 (br, 1H); ¹³C-NMR (50 MHz, CDCl₃): (diagnostic signals) d 14.2, 60.7, 105.6, 111.7, 120.6, 122.1, 123.3, 124.8, 127.6, 127.9 (2C), 128.1, 128.3, 129.2(2C), 135.8, 136.1, 163.7, 165.8; IR (neat): ? 1377, 1527, 1597, 1705, 2923, 3275 cm⁻¹; ESI-MS: 363 (M+1).

5b. Yellow solid; washing solvents: c-Hex and Et₂O; flash chromatography (c-Hex:AcOEt = 7:3) yield: 40%; mp = 118-121 °C; ¹H-NMR (200 MHz, CDCl₃): (fluxional) d 1.27 (t, J = 6.9 Hz, 3H), 3.82 (s, 3H), 4.23 (q, J = 6.9 Hz, 2H), 4.36 (br, 1H), 4.95 (br, 2H), 6.03 (br, 1H), 6.69 (s, 1H), 7.00 (d, J = 9.0 Hz, 3H), 7.30-7.37 (m, 7H), 9.40 (br, 1H); ¹³C-NMR (75 MHz, CDCl₃): (diagnostic signals) 14.2, 55.6, 60.6, 102.3, 105.1, 112.6, 116.4, 123.2, 126.7, 127.8, 128.0, 128.8, 129.0, 131.1, 136.2, 142.2, 154.6, 163.5, 165.8; IR (neat): ? 1176, 1413, 1532, 1615, 1718, 2922, 3286 cm⁻¹; ESI-MS: 377 (M+1).

5c. Pale yellow solid; washing solvents: c-Hex and Et₂O; yield: 65%; mp = 113 °C (decomposition); ¹H-NMR (300 MHz, CDCl₃): (fluxional) d 1.31 (t, J = 7.2 Hz, 3H), 2.42 (s, 3H), 4.22 (q, J = 7.2 Hz, 2H), 5.01 (br, 2H), 6.60 (s, 1H), 7.04-7.35 (m, 9H), 9.42 (br, 1H); ¹³C-NMR (75 MHz, CDCl₃): (diagnostic signals) 14.5, 21.7, 60.9, 105.3, 111.8, 121.6, 123.5, 127.0, 128.1(2C), 128.2 128.4, 128.7, 129.3 (2C), 130.1, 134.6, 136.5, 164.1, 166.1; IR (neat): ? 1037, 1180, 1270, 1368, 1452, 1529, 16134, 1717, 2923, 3299 (br) cm⁻¹; ESI-MS: 377 (M+1).

5d. Pale yellow solid; washing solvents: c-Hex and Et₂O; yield: 87%; mp = 137-140 °C; ¹H-NMR (300 MHz, CDCl₃): (fluxional, diagnostic signals) d 1.31 (t, J = 7.0 Hz, 3H), 4.19 (q, J = 7.0 Hz, 2H), 5.59 (br, 1H), 6.65 (br, 1H), 7.00 (br, 1H), 7.23-7.38 (m, 7H), 9.33 (br, 1H); ¹³C-NMR (75 MHz, CDCl₃): (diagnostic signals) 14.2, 60.7, 104.8,112.7, 121.4, 123.4, 125.4, 128.0, 129.2, 133.9, 142.0, 163.1, 165.7; IR (neat): ? 1037, 1174, 1276, 1371, 1446, 1525, 1607, 1716, 2981, 3064, 3272 cm⁻¹; ESI-MS: 397 (M+1).

5e. Yellow viscous oil, washing solvent: c-Hex; yield: 24%; ¹H-NMR (300 MHz, CDCl₃): (fluxional, diagnostic signals) d 1.27 (t, J = 7.0 Hz, 3H), 1.59 (d, J = 7 Hz, 3 H), 2.44 (s, 3H), 3.84 (q, J = 7 Hz, 1H), 4.14 (q, J = 7.0 Hz, 2H), 5.81 (d, J = 16 Hz, 1H), 6.19 (q, J = 7 Hz, 1H), 6.72-6.78 (m, 1H), 6.86-6.95 (dt, J = 16.0, 4.0 Hz, 1H), 7.14 (d,
$J = 7.0 \text{ Hz, } 1H), 7.26-7.40 \text{ (m, } 6H), 9.27 \text{ (br, } 1H); ^{13}\text{C-NMR (200 MHz, CDCl}_3, \text{ diagnostic signals):}$

$d 14.3, 21.6, 60.6, 105.0, 111.6, 121.4, 122.4, 126.4, 126.7, 127.4, 127.5, 127.9, 128.1, 128.2, 129.0, 129.1, 130.0, 134.4, 140.0, 144.7, 163.9, 166.0; \text{ IR (neat): } \gamma 1039, 1181, 1270, 1443, 1528, 1627, 1716, 2924, 3065, 3303 \text{ (br) cm}^{-1}. \text{ ESI-MS: 391 (M+1).}$

6a. White solid; yield: 92% (conv. > 98%); reaction time = 10 min; mp = 110-112 °C; flash-chromatography, $c$-Hex:AcOEt = 8:2; $^1\text{H-NMR (200 MHz, CDCl}_3):$ d 1.13 (t, $J = 7.1 \text{ Hz, } 3H), 2.52-2.56 \text{ (m, } 2H), 3.59 \text{ (dd, } J =12.8, 1.2 \text{ Hz, } 1H), 3.89-4.02 \text{ (m, } 3H), 4.41 \text{ (d, } J = 14.2 \text{ Hz, } 1H), 4.87-4.91 \text{ (m, } 1H), 5.18 \text{ (d, } J = 14.2 \text{ Hz, } 1H), 7.15-7.35 \text{ (m, } 8H), 7.72 \text{ (d, } J = 7.6 \text{ Hz, } 1H); ^{13}\text{C-NMR (50 MHz, CDCl}_3):$ d 13.9, 35.9, 47.3, 48.4, 49.5, 60.9, 107.2, 109.6, 120.9, 122.9, 124.8, 127.7, 127.8, 128.2, 128.8(2C), 129.3 (2C), 135.3, 136.6, 159.7, 170.4; IR (nujol): 1318, 1375, 1550, 1643, 1725, 2951 cm$^{-1}$; ESI-MS: 363 (M+1); Anal. calcd for (C$_{22}$H$_{22}$N$_2$O$_3$: 362.16): C 72.91; H, 6.12; N, 7.73; Found: C, 72.85; H, 6.20; N, 7.70.

6b. Pale yellow solid, yield: 89% (conv. > 96%); reaction time = 4 h; mp = 98-101 °C; flash-chromatography, $c$-Hex:AcOEt = 9:1; $^1\text{H-NMR (200 MHz, CDCl}_3):$ d 1.14 (t, $J = 7.2 \text{ Hz, } 3H), 2.51-2.55 \text{ (m, } 2H), 3.54 \text{ (d, } J = 13.0 \text{ Hz, } 1H), 3.88 \text{ (s, } 3H), 3.98-4.03 \text{ (m, } 2H), 4.38 \text{ (d, } J = 14.8 \text{ Hz, } 1H), 4.87-4.90 \text{ (m, } 1H), 5.18 \text{ (d, } J = 14.8 \text{ Hz, } 1H), 6.98-7.03 \text{ (m, } 1H), 7.13 \text{ (d, } J = 1.8 \text{ Hz, } 1H), 7.20 \text{ (s, } 1H), 7.26-7.27 \text{ (m, } 2H), 7.28-7.37 \text{ (m, } 5H); ^{13}\text{C-NMR (50 MHz, CDCl}_3):$ d 13.9, 35.9, 47.4, 48.4, 49.4, 55.7, 61.0, 103.0, 106.6, 110.5, 116.2, 127.8, 128.1, 128.5, 128.8(4C), 130.7, 136.6, 154.9, 170.4; IR (neat): ? 1033, 1164, 1228, 1368, 1525, 1605, 1716, 2852, 2925, 3288 (br) cm$^{-1}$; ESI-MS: 393 (M+Na); Anal. calcd for (C$_{23}$H$_{24}$N$_2$O$_3$: 376.18): C 73.38; H, 6.43; N, 7.44; Found: C, 73.85; H, 6.40; N, 7.39.

6c. Pale yellow solid, yield: 72% (conv. > 98%); reaction time = 2 h; mp = 93-96 °C; flash-chromatography, $c$-Hex:AcOEt = 9:1; $^1\text{H-NMR (300 MHz, CDCl}_3):$ d 1.13 (t, $J = 7.2 \text{ Hz, } 3H), 2.44 \text{ (s, } 3H), 2.51-2.55 \text{ (m, } 2H), 3.56 \text{ (dd, } J = 3.2, 1.5 \text{ Hz, } 1H), 3.92-3.99 \text{ (m, } 3H), 4.39 \text{ (d, } J = 14.4 \text{ Hz, } 1H), 4.85-4.89 \text{ (m, } 1H), 5.16 \text{ (d, } J = 14.4 \text{ Hz, } 1H), 7.16-7.36 \text{ (m, } 8H), 7.49 \text{ (s, } 1H); ^{13}\text{C-NMR (75 MHz, CDCl}_3):$ d 13.9, 21.4, 35.8, 47.3, 48.4, 49.4, 60.9, 106.6, 109.2, 122.3, 126.7, 127.8, 128.0, 128.2, 128.8 (4C), 130.4, 133.8, 136.7; 159.8, 170.4 IR (neat): ? 1029, 1261, 1454, 1549, 1651, 1731, 2923; ESI-MS: 377 (M+1); Anal. calcd for (C$_{23}$H$_{24}$N$_2$O$_4$: 392.17): C 70.39; H, 6.16; N, 7.14; Found: C, 70.32; H, 6.15; N, 7.13.
6d. Pale yellow solid, yield: 69% (conv. >99%), reaction time = 2 h, flash chromatography (c-Hex:AcOEt = 9:1), mp = 88-91 °C. $^1$H-NMR (200 MHz, CDCl$_3$): δ 1.14 (t, J = 7.2 Hz, 3H), 2.51-2.55 (m, 2H), 3.54 (d, J = 13.0 Hz, 1H), 3.90-4.05 (m, 2H), 4.40 (d, J = 14.8 Hz, 1H), 4.85-4.94 (m, 1H), 5.19 (d, J = 14.8 Hz, 1H), 7.26-7.34 (m, 8H), 7.70 (s, 1H); $^{13}$C-NMR (75 MHz, CDCl$_3$): δ 14.2, 36.2, 47.7, 48.6, 49.7, 61.4, 106.7, 111.0, 122.3, 125.5, 126.9, 127.9, 128.2, 128.8, 129.1, 129.2, 129.6, 133.9, 135.5, 136.7, 159.5, 170.4. IR (neat): ? 1029, 1176, 1261, 1373, 1453, 1549, 1652, 1731, 2923 cm$^{-1}$ ESI-MS: 397 (M+1); Anal. calcd for (C$_{22}$H$_{20}$ClN$_2$O$_3$): 395.12): C 66.75; H, 5.09; N, 7.08; Found: C, 66.69; H, 5.05; N, 7.07.

6e. Yellow highly viscous oil, yield: 70% (conv. 93%), reaction time = 2 h, flash chromatography (c-Hex:AcOEt = 9:1); dr: 65:35 (determined GC-MS on the reaction crude); GC-MS (m/z) major diastereoisomer: 390, 375, 281, 230, 199, 184, 158, 105, 77; minor diastereoisomer: 390, 375, 281, 230, 199, 184, 158, 105, 77; $^1$H-NMR (300 MHz, CDCl$_3$): major diastereoisomer: δ 1.26 (t, J = 7.5 Hz, 3H), 1.60 (d, J = 4.5 Hz, 3H), 2.45 (s, 3H), 2.73 (dd, J = 9.6 Hz, J = 4.5 Hz, 2H), 3.39-3.46 (m, 2H), 4.09-4.21 (m, 2H), 4.86-4.89 (m, 1H), 6.34 (q, J = 7.5 Hz, 1H) 7.14-7.50 (m, 9H); minor diastereoisomer: δ 1.27 (t, J = 7.5 Hz, 3H), 1.61 (d, J = 4.5 Hz, 3H), 2.45 (s, 3H), 2.24-2.31 (m, 2H), 3.80-3.82 (m, 2H), 4.16 (m, 3H), 4.79 (m, 1H), 6.27 (q, J = 7.5 Hz, 1H) 7.41-7.50 (m, 9H), $^{13}$C-NMR (50 MHz, CDCl$_3$): major diastereoisomer: δ 14.1, 21.4, 29.7, 35.9, 44.0, 47.4, 49.0, 61.1, 106.6, 109.2, 122.2, 126.6, 127.4 (2C), 127.67, 127.8, 128.0, 128.7 (2C), 130.3, 133.6, 139.4, 159.6, 170.6; minor diastereoisomer: δ 13.8, 21.4, 29.7, 34.8, 43.0, 46.8, 49.6, 60.7, 106.4, 109.2, 122.2, 126.5, 127.4 (2C), 127.7, 127.8, 128.3, 128.6 (2C), 130.3, 140.0, 159.4, 170.2; IR (neat): ? 1029, 1175, 1309, 1378, 1451, 1548, 1646, 1728, 2853, 2924, 3432 (br) cm$^{-1}$. 
Synthesis and cyclization of 3-substituted indolyl derivatives 6f-g.

Suzuki cross-coupling:

To a solution of methyl-3-iodoindole-2-carboxylate\(^3\) (0.66 mmol, 1 equiv) in 15 ml EtOH/toluene mixture (2:1) were added in sequence: 1.99 mmol (3 equiv) of aryl boronic acid (0.03 mmol, 5 mol%), \([\text{Pd(PPh}_3]_4\) and 2 ml of a 2 M solution of \(\text{Na}_2\text{CO}_3\) (6 equiv). The reaction mixture was brought to reflux for 16 h. After cooling to r. t., 5 ml \(\text{H}_2\text{O}\) were added and the mixture was filtered through a pad of celite. The volatiles were removed under reduced pressure and the aqueous phase was extracted with \(\text{CH}_2\text{Cl}_2\). The organics were dried over \(\text{Na}_2\text{SO}_4\) and brought to dryness under reduced pressure.

The obtained 3-aryl substituted indolyl methyl esters were transformed to the corresponding carboxylic acids under basic conditions following a known procedure\(^4\).

**5f.** Following the previously reported procedure starting from 3.1 mmol of the corresponding 2-carboxylic acid. Yellow viscous oil, washing solvent: \(c\)-Hex; yield: 62%; reaction time = 4 h. \(^1\text{H-NMR}\) (300 MHz, CDCl\(_3\)): (fluxional, diagnostic signals) \(\delta\) 1.30 (br, 3H), 3.37 (br, 1H), 4.19 (br, 3H), 4.65 (br, 1H) 6.95 (br, 1H), 7.15-7.54 (m, 12H), 7.77 (d, \(J = 8.2\), 1H), 9.21 (br, 1H); \(^{13}\text{C-NMR}\) (50 MHz, diagnostic signals): \(\delta\) 14.1, 60.4, 111.9, 120.0, 120.5, 123.3, 123.8, 125.9, 126.6, 127.1, 127.7, 127.9, 128.1, 128.2, 128.3 (2C), 128.5 (2C), 128.7, 128.9, 129.2 (2C), 136.1, 166.0; IR (neat): \(\tilde{\nu}\) 696, 1038, 1078, 1176, 1278, 1301, 1414, 1450, 1494, 1527, 1613, 1719, 2981, 3275 cm\(^{-1}\); ESI-MS: 439 (M+1).

**6f.** Yellow solid, yield: 80%, reaction time = 4 h, flash chromatography (\(c\)-Hex:AcOEt = 85:15); mp = 120-122 °C; \(^1\text{H-NMR}\) (300 MHz, CDCl\(_3\)): \(\delta\) 1.13 (t, \(J = 7.0\) Hz, 3H), 2.55 (d, \(J = 8.0\) Hz, 2H), 3.61 (dd, \(J = 13.0, 1.0\) Hz, 1H), 3.95 (q, \(J = 7.0\) Hz, 2H), 4.06 (dd, \(J = 14.0\) Hz, 1H), 4.19 (d, \(J = 14.0\) Hz, 1 H), 4.95 (m, 1H), 5.33 (d, \(J = 14.1\) Hz, 1H), 7.18-7.24 (m, 2H), 7.30-7.42 (m, 8H), 7.48-7.52 (m, 2H), 7.65-7.72 (m, 2H); \(^{13}\text{C-NMR}\) (50 MHz): \(\delta\) 14.0, 35.9, 47.3, 47.9, 49.2, 61.1, 109.5, 121.2, 122.1, 122.6, 123.7, 125.5, 127.3, 127.9 (2C), 128.0 (2C), 128.9 (2C), 129.0 (2C), 130.7 (2C), 133.5, 134.4, 136.9, 159.6, 170.5. IR (neat): \(\tilde{\nu}\) 1029, 1180, 1259, 1370, 1484, 1558, 1652, 1728 2361, 2924, 3440 (br) cm\(^{-1}\); GC-MS (m/z): 438 (350, 273, 260, 246, 231, 217, 204, 190, 165, 91; Anal. calcd for (C\(_{28}\)H\(_{26}\)N\(_2\)O\(_3\): 383.19): C 76.69; H, 5.98; N, 6.39; Found: C, 76.61; H, 5.99; N, 6.33.
Pale yellow solid, yield: 87%, flash chromatography (c-Hex:AcOEt = 95:5) mp: 174-183 °C. $^1$H-NMR (300 MHz, CDCl$_3$): d 3.82 (s, 3H), 7.13-7.93 (m, 10H), 8.05 (s, 1H), 9.08 (br, 1H); $^{13}$C-NMR (50 MHz, CDCl$_3$): d 52.0, 109.6, 111.9, 117.9, 121.2, 121.9, 123.7, 126.1 (2C), 126.6, 127.4, 127.8, 129.2, 129.3, 129.4, 129.9, 123.8, 133.4, 136.0, 162.9. IR (neat): ? 735, 1242, 2605, 1687, 2848, 2933, 3048, 3330, 3424 (br); GC-MS (m/z): 301 (269, 240, 213, 120, 106).

Pale yellow solid, yield 83%, mp = 189-193 °C. $^1$H-NMR (300 MHz, CDCl$_3$): d 7.09-7.92 (m, 10H), 8.05 (s, 1H), 9.07 (s, 1H); $^{13}$C-NMR (50 MHz, CDCl$_3$): d 109.5, 111.9, 117.7, 121.1, 121.9, 123.6 126.0, 126.3, 126.5, 127.7, 128.1, 129.0, 129.3, 129.8, 132.7, 133.2, 134.6, 136.0, 153.4; IR (neat): ? 1249, 1319, 1429, 1548, 1650, 2328, 2361, 2851, 2921, 3423 (br).

5g. Brown solid, 90% yield, washing solvent: c-Hex; mp = 47-56 °C. $^1$H-NMR (200 MHz, CDCl$_3$) fluxional, diagnostic signals): d 1.27 (br, 3H), 3.72 (br, 2H), 4.11 (br, 2H), 6.78 (br, 1H), 7.11-7.87 (m, 16 H), 9.03 (s, 1H). $^{13}$C-NMR (50 MHz, CDCl$_3$, fluxional, diagnostic signals): d 14.1, 60.5, 109.5, 111.9, 118.1, 120.3, 120.9, 123.2, 124.2, 126.0, 126.2 126.3, 126.7, 127.5, 127.6, 127.8 (2C), 128.4, 128.6 (2C), 128.7, 129.5, 131.5, 132.5, 133.7, 135.6, 136.0, 154.1, 166.0. IR (neat): ? 1050, 1184, 1262, 1442, 1609, 1724, 2921, 2983, 3044, 3256 (br). ESI-MS: 489 (M+1).

6g. Brown, viscous oil, yield: 90%, flash-chromatography c-Hex:AcOEt = 90:10. $^1$H-NMR (300 MHz, CDCl$_3$): d 1.41 (t, J = 7.2 Hz, 3H), 2.60 (d, J = 6.6 Hz, 2H), 3.64 (d, J = 13.2 Hz, 1H), 3.89-4.09 (m, 3H), 4.22 (d, J = 14.4 Hz, 1H), 4.93-5.04 (m, 1H), 5.31 (d, J = 14.4 Hz, 1H), 7.12-7.97 (m, 15 H), 8.10 (s, 1H). $^{13}$C-NMR (50 MHz, CDCl$_3$): d 13.9, 35.7, 47.3, 47.9, 49.1, 61.0, 109.5, 117.8, 121.3, 121.9, 122.8, 123.5, 125.4, 125.7, 126.3, 126.4, 127.2, 127.7, 127.8, 128.1, 128.8, 129.0, 129.3, 131.0, 131.1, 132.7, 133.3, 134.3, 136.7; 159.4, 170.4; IR (neat): 745, 1021, 1272, 1427, 1473, 1643, 1728, 2845, 2962, 3054, 3351 (br); ESI-MS: 489 (M+1); Anal. calcd for (C$_{32}$H$_{28}$N$_2$O$_3$): C 78.67; H, 5.78; N, 5.73; Found: C, 78.55; H, 5.80; N, 5.70.

Preparation of (+/-)-N-Benzyl-longamide b 10.
7. Following the previously reported procedure starting from 0.96 mol of pyrrole 2-carboxylic acid.
Pale yellow solid; washing solvents: c-Hex and Et₂O; yield: 53%; mp = 110-117 °C; ¹H-NMR (300 MHz, CDCl₃): (fluxional) δ 1.30 (t, J = 7.1 Hz, 3H), 4.21 (q, J = 7.1, 2H), 4.29 (br, 2H), 4.86 (br, 1H), 5.99 (br, 1H), 6.21 (br, 1H), 6.45 (br, 1H), 6.96-7.34 (m, 8H), 9.65 (br, 1H); ¹³C-NMR (50 MHz, CDCl₃): (diagnostic signals) δ 14.3, 60.7, 110.1, 112.8, 121.9, 123.0, 123.8, 127.7, 128.7 (2C), 129.0 (2C), 136.6, 142.7, 163.1, 166.0; IR (neat): ν 1377, 1600, 2950, 1715, 3273 cm⁻¹; ESI-MS: 313 (M+1).

8. White solid, yield: 74% (conv. > 98%); reaction time = 1h; mp = 69-71 °C; flash-chromatography, c-Hex:AcOEt = 8:2; ¹H-NMR (200 MHz, CDCl₃): δ 1.20 (t, J = 7.0 Hz, 3H), 2.56-2.62 (m, 2H), 3.37 (dd, J = 12.8, 2.8 Hz, 1H), 3.84 (dd, J = 13.2, 4.2 Hz, 1H), 4.05-4.10 (m, 2H), 4.43 (d, J = 14.6 Hz, 1H), 4.60-4.63 (m, 1H), 5.01 (d, J = 14.6 Hz, 1H), 6.23 (t, J = 3.1 Hz, 1H), 6.75 (t, J = 2.0 Hz, 1H), 6.99 (dd, J = 4.2, 1.3 Hz, 1H), 7.25-7.38 (m, 5H); ¹³C-NMR (50 MHz, CDCl₃): δ: 14.0, 37.9, 48.8, 49.1, 50.4, 61.0, 110.3, 114.3, 122.1, 127.7, 128.6 (2C), 128.7 (2C), 137.0, 151.0, 170.13. IR (neat): ν 746.8, 1028, 1072.8, 1182, 1262, 1332, 1429, 1476, 1546, 1641, 1731, 2925, 2980, 3448 (br) cm⁻¹; ESI-MS: 313 (M+1); Anal. calcd for (C₁₈H₂₀N₂O₃): C, 69.21; H, 6.45; N, 8.97; Found: C, 69.15; H, 6.39; N, 8.95.

9. The dibromination reaction was performed as described in literature. White solid, flash-chromatography, c-Hex:AcOEt = 85:15, yield: 40% over two steps, mp = 120-132 °C; ¹H-NMR (300 MHz, CDCl₃): δ 1.18 (t, J = 6.8 Hz, 3H), 2.46-2.54 (m, 2H), 3.52 (dd, J = 13.6 Hz, J = 1.6 Hz, 1H), 3.81-4.08 (m, 3H), 4.27 (d, J = 14.6 Hz, 1H), 4.58-4.64 (m, 1H), 5.08 (d, J = 14.2 Hz, 1H), 7.03 (s, 1H), 7.31 (m, 5H); ¹³C-NMR (50 MHz, CDCl₃): δ: 13.9, 35.5, 47.2, 49.1, 50.0, 61.1, 101.1, 105.4, 116.1, 125.3, 127.8, 128.7 (2C), 128.8 (2C), 136.3, 157.3, 169.4. IR (neat): ν 1127, 1185, 1246, 1323, 1376, 1427, 1469, 1650, 1728, 3426 cm⁻¹. GC-MS (m/z): 470, 382, 252, 91.

10. The Dibromoester 9 (0.35 mmol) of was dissolved in a mixture of H₂O:MeOH = 1:1 (8 mL). 1.76 mmol of powdered KOH were added and the mixture was brought to reflux. Under 12 h the mixture was cooled to room temperature and acidified with 1.0 N HCl. The MeOH was removed under reduced pressure and the residue was extracted with CH₂Cl₂ (3 x 5 mL). The organic layers were dried over Na₂SO₄ and brought to dryness. White solid, yield: 61%, mp = 73-76°C; ¹H-NMR (300 MHz, CDCl₃): δ 2.60 (m, 2H), 3.60 (d, J = 13.2 Hz, 1H), 3.87
(dd, J = 13.8 Hz, J = 3.9 Hz, 1H), 4.48 (d, J = 14.7 Hz, 1H), 4.64 (m, 1H), 4.91 (d, J = 14.7 Hz, 1H),
7.05 (s, 1H), 7.31 (m, 5H). $^{13}$C-NMR (50 MHz, CDCl$_3$): d 35.9, 47.3, 49.6, 50.0, 101.4, 105.7,
116.5, 124.8, 128.0, 128.5, 128.6, 128.9 (2C), 135.8, 157.3, 173.0; IR (neat): ? 1125, 1259, 1324,
1431, 1470, 1525, 1636, 1718, 3419 (br) cm$^{-1}$; ESI-MS: 443 (M+1); Anal. calcd for
(C$_{16}$H$_{14}$Br$_2$N$_2$O$_3$; 439.94): C 43.47; H, 3.19; N, 6.34; Found: C, 43.50; H, 3.22; N, 6.31.

**X-ray structure of 5a**

Crystal data for 5a: C$_{22}$H$_{22}$N$_2$O$_3$, M = 362.42, a = 8.5988(9), b = 23.040(3), c = 9.7500(11) Å, β =
97.447(2)$^\circ$, U = 1915.4(4) Å$^3$, T = 298(2) K, space group $P 2(1)/c$, Z = 4, μ(Mo–Ka) = 0.084 mm$^{-1}$,
13898 reflections measured by Bruker APEX II diffractometer with a CCD detector, 3459 unique
($R_{int}$ = 0.0268) which were used in all calculations. Final $R1(F) = 0.0458$ [I > 2s (I)] and $wR2(F^2) =
0.1289, Gof = 1.068. Software contained in the SHELXTL (5.1) library (G. M. Sheldrick, Bruker
AXS, Madison, WI). CCDC-623047 contains the supplementary crystallographic data for this
paper. These data can be obtained free of charge from The Cambridge Crystallographic Data Centre
via www.ccdc.cam.ac.uk/data_request/cif.

**X-ray structure of 6a**

Crystal data for (+/-)-6a: C$_{22}$H$_{22}$N$_2$O$_3$, M = 362.42, a = 10.6062(8), b = 8.3918(6), c = 21.4964(16)
Å, β = 96.3500(10)$^\circ$, U = 1901.6(2) Å$^3$, T = 298(2) K, space group $P 2(1)/c$, Z = 4, μ(Mo–Ka) =
0.085 mm$^{-1}$, 15167 reflections measured by Bruker APEX II diffractometer with a CCD detector,
4124 unique ($R_{int}$ = 0.0225) which were used in all calculations. Final $R1(F) = 0.074$ [I > 2s (I)]
and $wR2(F^2) = 0.2225, Gof = 1.058. Software contained in the SHELXTL (5.1) library (G. M.
Sheldrick, Bruker AXS, Madison, WI). CCDC-623048 contains the supplementary crystallographic
data for this paper. These data can be obtained free of charge from The Cambridge Crystallographic Data Centre via www.ccdc.cam.ac.uk/data_request/cif.


