Supporting information for

Convenient Synthesis of Substituted Tetrahydrofuran via Lewis Base Catalyzed [3+2] Domino Reactions

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1. General Information

TLC monitored all reactions with silica gel-coated plates. Flash column chromatography was performed using 200-300 mesh silica gel. $^1$H- and $^{13}$C-NMR spectra were recorded at ambient temperature on Bruker 400 instruments using tetramethylsilane as an external standard. HRMS were obtained on Waters Xevo Q-TOF MS with ESI resource. Melting points were measured on a RY-I apparatus and are reported uncorrected. All the solvents were purified by standard methods.

2. Materials

Unless otherwise noted, all commercially available compounds were used without further purification, substrate 1f, 1g, 1h were prepared according to known literature procedures.[1]

3. General procedure for the synthesis of 1

To a dried and argon-filled two neck round bottole was added isatin derivatives A (3 mmol) and ylide B (4.5 mmol) in toluene 10 ml, the mixture was stirred at 80 °C and monitored by TLC until completion of the reaction. After purification by column chromatography on silica gel (Ethyl acetate/petroleum = 1: 2) the desired product 1 was obtained as a solid.

**Ethyl-(Z)-3-hydroxy-4-((E)-2-oxoindolin-3-ylidene)but-2-enoate (1a)**

Orange solid; Yield 20%, m.p. 114-115 °C; $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ = 12.38 (d, $J = 2.0$ Hz, 1H), 8.60 (s, 1H), 8.40 (d, $J = 8.0$ Hz, 1H), 7.26 (td, $J = 7.8, 1.2$ Hz, 1H), 7.02
(td, J = 7.6, 0.8 Hz, 1H), 6.87 (d, J = 1.6 Hz, 1H), 6.85 (s, 1H), 5.53 (s, 1H), 4.29 (q, J = 7.2 Hz, 2H), 1.34 (t, J = 7.2 Hz, 3H) ppm; $^{13}$C NMR (100MHz, CDCl$_3$) δ = 172.39, 167.49, 142.82, 133.63, 131.37, 129.01, 127.42, 122.64, 121.02, 110.05, 99.08, 60.87, 50.75, 14.17 ppm; ESI-HRMS: calcd. for $\text{C}_{14}\text{H}_{13}\text{NO}_4+\text{H}$ 260.0923, found 260.0934.

**Ethyl-(Z)-3-hydroxy-4-((E)-5-methyl-2-oxoindolin-3-ylidene)but-2-enoate (1b)**

Reddish orange solid; Yield 22%, m.p. 135-136 ºC; $^1$H NMR (400 MHz, CDCl$_3$) δ = 12.40 (d, J = 2.0 Hz, 1H), 8.37 (d, J = 7.2 Hz, 1H), 8.21 (s, 1H), 7.07 (d, J = 8.0 Hz, 1H), 6.83 (d, J = 2.0 Hz, 1H), 6.74 (d, J = 8.0 Hz, 1H), 5.52 (s, 1H), 4.29 (q, J = 7.0 Hz, 2H), 2.33 (s, 3H), 1.35 (t, J = 7.2 Hz, 3H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) δ = 172.45, 167.60, 140.49, 134.16, 132.55, 131.86, 129.50, 127.04, 121.00, 109.70, 98.87, 60.85, 50.76, 21.24, 14.18 ppm; ESI-HRMS: calcd. for $\text{C}_{15}\text{H}_{15}\text{NO}_4+\text{H}$ 274.1079, found 274.1085.

**Ethyl-(Z)-3-hydroxy-4-((E)-5-methoxy-2-oxoindolin-3-ylidene)but-2-enoate (1c)**

Red dark solid; Yield 16%, m.p. 136-137 ºC; $^1$H NMR (400 MHz, CDCl$_3$) δ = 12.42 (d, J = 2.0 Hz, 1H), 8.23 (d, J = 2.4 Hz, 1H), 8.07 (d, J = 2.8 Hz, 1H), 6.85 (d, J = 2.4 Hz, 1H), 6.83 (d, J = 2.4 Hz, 1H), 6.75 (d, J = 8.8 Hz, 1H), 5.53 (s, 1H), 4.29 (q, J = 7.2 Hz, 2H), 3.80 (s, 3H), 1.34 (t, J = 7.2 Hz, 3H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) δ = 172.42, 167.41, 155.52, 136.62, 127.56, 121.76, 120.27, 117.29, 114.74, 110.32, 99.28, 60.92, 55.81, 50.71, 14.17 ppm; ESI-HRMS: calcd. for $\text{C}_{15}\text{H}_{15}\text{NO}_5+\text{H}$ 290.1028, found 290.1029.

**Ethyl-(Z)-3-hydroxy-4-((E)-6-methoxy-2-oxoindolin-3-ylidene)but-2-enoate (1d)**

Orange solid; Yield 28%, m.p. 147-148 ºC; $^1$H NMR (400 MHz, CDCl$_3$) δ = 12.40 (d, J = 2.0 Hz, 1H), 8.33 (d, J = 8.8 Hz, 1H), 8.04 (d, J = 8.8 Hz, 1H), 6.71 (d, J =
2.0 Hz, 1H), 6.52 – 6.53 (m, 1H), 6.40 (d, J = 2.4 Hz, 1H), 5.48 (s, 1H), 4.27 (q, J = 7.0 Hz, 2H), 3.84 (s, 3H), 1.34 (t, J = 7.2 Hz, 3H) ppm; 13C NMR (100 MHz, CDCl3) δ = 172.56, 168.08, 162.60, 144.48, 131.75, 130.61, 124.19, 114.21, 107.64, 97.96, 96.78, 60.74, 55.57, 50.77, 14.20 ppm; ESI-HRMS: calcd. for C15H15NO5+H 290.1028, found 290.1030.

**Ethyl-(Z)-3-hydroxy-4-((E)-7-methyl-2-oxoindolin-3-ylidene)but-2-enoate (1e)**

Orange solid; Yield 18%, m.p. 145-146 °C; 1H NMR (400 MHz, CDCl3) δ: 12.36 (q, J = 2.0 Hz, 1H), 9.13 (s, 1H), 8.24 (d, J = 8.0 Hz, 1H), 7.09 (d, J = 7.6 Hz, 1H), 6.94 (t, J = 7.6 Hz, 1H), 6.85 (d, J = 2.0 Hz, 1H), 5.53 (s, 1H), 4.28 (q, J = 7.0 Hz, 2H), 2.28 (s, 3H), 1.34 (t, J = 7.0 Hz, 3H) ppm; 13C NMR (100 MHz, CDCl3) δ = 172.40, 170.32, 167.62, 141.65, 132.70, 127.28, 126.43, 122.43, 120.59, 119.13, 98.94, 60.82, 50.80, 16.29, 14.18 ppm.

**Ethyl-(Z)-4-((E)-1,5-dimethyl-2-oxoindolin-3-ylidene)-3-hydroxybut-2-enoate (1g)**

Red solid; Yield 25%, m.p. 110-111 °C; 1H NMR (400 MHz, CDCl3) δ = 12.40 (d, J = 2.0 Hz, 1H), 8.23 (s, 1H), 7.12 (d, J = 8.0 Hz, 1H), 6.87 (d, J = 2.0 Hz, 1H), 6.67 (d, J = 8.0 Hz, 1H), 5.51 (s, 1H), 4.28 (q, J = 7.2 Hz, 2H), 3.21 (s, 3H), 2.34 (s, 3H), 1.34 (t, J = 7.0 Hz, 3H) ppm; 13C NMR (100 MHz, CDCl3) δ = 172.49, 167.75, 143.28, 133.85, 132.33, 131.60, 129.31, 126.81, 120.46, 107.69, 98.67, 60.79, 50.79, 26.24, 21.21, 14.17 ppm; ESI-HRMS: calcd. for C16H17NO4+H 288.1236, found 288.1231.

**Ethyl-(Z)-4-((E)-5-(tert-butyl)-1-methyl-2-oxoindolin-3-ylidene)-3-hydroxybut-2-enoate (1h)**

Reddish orange solid; Yield 30%, m.p. 140-141 °C; 1H NMR (400 MHz, CDCl3) δ: 12.45 (d, J = 2.0 Hz, 1H), 8.54 (d, J = 1.6 Hz, 1H), 7.36 (dd, J = 8.2, 1.8 Hz, 1H),
6.88 (d, $J = 2.0$ Hz, 1H), 6.72 (d, $J = 8.4$ Hz, 1H), 5.54 (s, 1H), 4.29 (q, $J = 7.2$ Hz, 2H), 3.23 (s, 3H), 1.35 (s, 3H), 1.33 (s, 9H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta = 172.56$, 168.40, 167.84, 145.58, 143.16, 132.60, 128.04, 126.63, 126.09, 120.20, 107.41, 98.76, 60.81, 34.63, 31.45, 31.45, 31.45, 26.24, 14.17 ppm.

**isopropyl (Z)-3-hydroxy-4-((E)-2-oxoindolin-3-ylidene)but-2-enoate (1j)**

Yellow solid, m.p. 118-119 °C, 36%, $^1$H NMR (400 MHz, CDCl$_3$) $\delta = 12.47$ (s, 1H), 8.62 (s, 1H), 8.42 (d, $J = 7.2$ Hz, 1H), 7.27 (t, $J = 7.6$ Hz, 1H), 7.30 (t, $J = 8.0$ Hz, 1H), 6.86 (d, $J = 7.6$ Hz, 1H), 6.85 (s, 1H), 5.51 (s, 1H), 5.10-5.20 (m, 1H), 1.33 (d, $J = 6.0$ Hz, 6H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta = 172.00$, 169.93, 167.34, 142.69, 138.59, 132.14, 131.32, 129.01, 127.57, 122.65, 110.00, 99.60, 68.57, 21.84 ppm; ESI-HRMS: calcd. for C$_{15}$H$_{15}$NO$_4$+H 274.1079, found 274.1070.

**4. General procedure for the [3+2] annulation reaction:**

Allenoates (1.2 mmol) was added to a solution of methyleneoxindoles (1) (1 mmol) and catalyst DABCO (0.2 mmol) in CH$_2$Cl$_2$ (2 mL). The stirring was maintained at room temperature until completion of the reaction (the reaction was monitored by TLC plate). The residue was purified by a flash column chromatography to yield 3 as a colorless solid.

**Benzyl-(E)-2-((E)-5-(2-ethoxy-2-oxoethylidene)-4-(2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3a-E,E)**

White solid; m.p. 177-178 °C; Yield 15%; $^1$H NMR (400 MHz, CDCl$_3$) $\delta = 7.80$ (s, 1H), 7.40 (d, $J = 7.6$ Hz, 1H), 7.27 – 7.36 (m, 5H), 7.24 (t, $J = 7.6$ Hz, 1H), 7.08 (t, $J = 7.6$ Hz, 1H), 6.84 (d, $J = 8.0$ Hz, 1H), 5.83 (s, 1H), 5.65 (s, 1H), 5.10 (d, $J = 12.4$ Hz, 1H), 4.99 (d, $J = 12.4$ Hz, 1H), 4.33 (d, $J = 10.4$ Hz, 1H), 4.28 (d, $J = 2.8$ Hz, 1H), 4.19 (q, $J = 7.2$ Hz, 2H), 2.99
(ddd, $J = 19.6, 10.2, 2.4 \text{ Hz}, 1\text{H})$, 2.82 (d, $J = 19.6\text{Hz}, 1\text{H}$), 1.29 (t, $J = 7.2 \text{ Hz}, 3\text{H}$) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta = 176.73, 173.31, 171.27, 167.16, 167.08, 141.37, 136.08, 128.69, 128.48, 128.05, 128.01, 127.04, 124.31, 122.94, 109.84, 99.94, 96.01, 94.40, 65.72, 60.20, 47.89, 39.83, 30.68, 14.33 ppm; ESI-HRMS: calcd. for C$_{25}$H$_{23}$NO$_6$+H 434.1604, found 434.1609.

**Benzyl-(Z)-2-((E)-5-(2-ethoxy-2-oxoethylidene)-4-(2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3a-Z,E)**

White solid; m.p. 162-163 °C; Yield 30%; $^1$H NMR (400 MHz, CDCl$_3$) $\delta = 8.42$ (s, 1H), 7.21 – 7.43 (m, 5H), 7.18 (t, $J = 7.8 \text{ Hz}, 1\text{H}$), 7.07 (d, $J = 7.2 \text{ Hz}, 1\text{H}$), 6.92 (t, $J = 7.4 \text{ Hz}, 1\text{H}$), 6.83 (d, $J = 8.0 \text{ Hz}, 1\text{H}$), 5.84 (s, 1H), 5.36 (s, 1H), 5.05 (d, $J = 12.4 \text{ Hz}, 1\text{H}$), 4.97 (d, $J = 12.4 \text{ Hz}, 1\text{H}$), 4.53 (d, $J = 10.0 \text{ Hz}, 1\text{H}$), 4.19 – 4.31 (m, 2H), 3.04 (dd, $J = 19.2, 9.8 \text{ Hz}, 1\text{H}$), 2.73 (d, $J = 19.2 \text{ Hz}, 1\text{H}$), 1.33 (t, $J = 7.0 \text{ Hz}, 3\text{H}$) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta = 176.88, 172.89, 170.84, 166.43, 166.31, 141.99, 136.09, 128.96, 128.48, 128.08, 127.96, 124.47, 124.40, 122.58, 109.96, 96.72, 94.30, 65.60, 60.54, 47.21, 40.17, 30.39, 14.30 ppm; ESI-HRMS: calcd. for C$_{25}$H$_{23}$NO$_6$+H 434.1588, found 434.1588.

**Benzyl-(Z)-2-((E)-5-(2-ethoxy-2-oxoethylidene)-4-(2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3a-E,Z)**

White solid; m.p. 162-163 °C; Yield 45%; $^1$H NMR (400 MHz, CDCl$_3$) $\delta$: 8.42 (s, 1H), 7.21-7.43 (m, 5H), 7.18 (t, $J = 7.8 \text{ Hz}, 1\text{H}$), 7.07 (d, $J = 7.2 \text{ Hz}, 1\text{H}$), 6.92 (t, $J = 7.4 \text{ Hz}, 1\text{H}$), 6.83 (d, $J = 8.0 \text{ Hz}, 1\text{H}$), 5.84 (s, 1H), 5.36 (s, 1H), 5.05 (d, $J = 12.4 \text{ Hz}, 1\text{H}$), 4.97 (d, $J = 12.4 \text{ Hz}, 1\text{H}$), 4.53 (d, $J = 10.0 \text{ Hz}, 1\text{H}$), 4.34 (s, 1H), 4.19 – 4.31 (m, 2H), 3.04 (dd, $J = 19.2, 9.8 \text{ Hz}, 1\text{H}$), 2.73 (d, $J = 19.2 \text{ Hz}, 1\text{H}$), 1.33 (t, $J = 7.0 \text{ Hz}, 3\text{H}$) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta = 176.88, 172.89, 170.84, 166.43, 166.31, 141.99, 136.09, 128.96, 128.48, 128.08, 127.96, 124.47, 124.40, 122.58, 109.96, 96.72, 94.30, 65.60, 60.54, 47.21, 40.17, 30.39, 14.30 ppm; ESI-HRMS: calcd. for C$_{25}$H$_{23}$NO$_6$+H 434.1588, found 434.1588.
124.47, 124.40, 122.58, 109.96, 96.72, 94.30, 65.60, 60.54, 47.21, 40.17, 30.39, 14.30 ppm; ESI-HRMS: calcd. for C_{25}H_{23}NO_{6}+H 434.1604, found 434.1588.

**Ethyl-(E)-2-((E)-5-(2-methoxy-2-oxoethylidene)-3-(2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3b-E,E)**

White solid; m.p. 205-206 °C; Yield 17%; \(^1^H\) NMR (400 MHz, CDCl\(_3\)) \(\delta\): 7.48 (s, 1H), 7.41 (d, \(J = 7.6\) Hz, 1H), 7.24 (t, \(J = 8.0\) Hz, 1H), 7.09 (t, \(J = 7.4\) Hz, 1H), 6.84 (d, \(J = 8.0\) Hz, 1H), 5.82 (d, \(J = 1.2\) Hz, 1H), 5.61 (t, \(J = 1.6\) Hz, 1H), 4.34 (d, \(J = 10.4\) Hz, 1H), 4.28 (d, \(J = 3.2\) Hz, 1H), 4.19 (q, \(J = 7.2\) Hz, 2H), 3.63 (s, 3H), 2.99 (ddd, \(J = 20.0\), 10.2, 2.4 Hz, 1H), 2.83 (d, \(J = 19.6\) Hz, 1H), 1.30 (t, \(J = 7.2\) Hz, 4H) ppm; \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta\) = 176.53, 173.37, 170.98, 167.77, 167.18, 141.31, 128.71, 127.08, 124.37, 122.98, 109.77, 95.95, 94.30, 60.20, 51.08, 47.91, 39.84, 30.58, 14.35 ppm; ESI-HRMS: calcd. for C_{19}H_{19}NO_{6}+Na 380.1110, found 380.1104.

**Ethyl-(E)-2-((Z)-5-(2-methoxy-2-oxoethylidene)-3-(2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3b-Z,E)**

White solid; m.p. 207-208 °C; Yield 17%; \(^1^H\) NMR (400 MHz, CDCl\(_3\)) \(\delta\): 7.20 (t, \(J = 7.6\) Hz, 1H), 7.08 (d, \(J = 7.6\) Hz, 1H), 6.93 (t, \(J = 7.6\) Hz, 1H), 6.86 (d, \(J = 8.0\) Hz, 1H), 5.84 (s, 1H), 5.33 (s, 1H), 4.53 (d, \(J = 10.0\) Hz, 1H), 4.36 (d, \(J = 3.2\) Hz, 1H), 4.33 – 4.18 (m, 2H), 3.56 (s, 3H), 3.05 (ddd, \(J = 19.6\), 10.0, 2.4 Hz, 1H), 2.70 (d, \(J = 19.2\) Hz, 1H), 1.33 (t, \(J = 7.0\) Hz, 3H) ppm; \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta\) = 176.79, 172.96, 170.61, 167.12, 166.33, 141.94, 128.97, 124.45, 124.42, 122.60, 109.96, 96.66, 94.12, 60.55, 51.09, 47.18, 40.06, 30.29, 14.30 ppm; ESI-HRMS: calcd. for C_{19}H_{19}NO_{6}+Na 380.1110, found 380.1097.

**Ethyl-(Z)-2-((E)-5-(2-methoxy-2-oxoethylidene)-3-(2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3b-E,Z)**
White solid; m.p. 140-141 °C; Yield 17%; {superscript}1{H} NMR (400 MHz, CDCl{subscript}3) δ = 8.81 (br, 1H), 7.24 (t, J = 7.6 Hz, 1H), 7.18 (d, J = 7.6 Hz, 1H), 6.97 (t, J = 7.6 Hz, 1H), 6.90 (d, J = 8.0 Hz, 1H), 5.63 (s, 1H), 5.37 (s, 1H), 4.23 (q, J = 6.8 Hz, 2H), 3.89-3.93 (m, 1H), 3.78 (d, J = 2.8 Hz, 1H), 3.59 (s, 3H), 3.25 (ddd, J = 18.9, 10.1, 1.3 Hz, 1H), 2.49 (ddd, J = 19.1, 6.3, 1.8 Hz, 1H), 1.31 (t, J = 7.2 Hz, 3H). {superscript}1{3}C NMR (100 MHz, CDCl{subscript}3) δ = 171.09, 167.74, 167.41, 164.16, 141.70, 129.39, 124.85, 124.08, 123.12, 110.14, 95.40, 93.92, 60.26, 51.17, 48.02, 41.44, 28.57, 14.27 ppm; ESI-HRMS: calcd. for C{subscript}19H{subscript}19NO{subscript}6 +H 358.1291, found 358.1287.

Diethyl-2,2'-(3-(2-oxoindolin-3-yl)dihydrofuran-2,5-diylidene) (2E,2'E)-diacetate (3c-E,E)

White solid; m.p. 165-166 °C; Yield 10%; {superscript}1{H} NMR (400 MHz, CDCl{subscript}3) δ = 7.64 (s, 1H), 7.40 (d, J = 7.2 Hz, 1H), 7.24 (t, J = 7.6 Hz, 1H), 7.08 (t, J = 7.6 Hz, 1H), 6.84 (d, J = 7.6 Hz, 1H), 5.82 (d, J = 1.2 Hz, 1H), 5.59 (t, J = 1.8 Hz, 1H), 4.33 (d, J = 9.6 Hz, 1H), 4.28 (d, J = 3.6 Hz, 1H), 4.19 (q, J = 7.0 Hz, 2H), 4.01-4.13 (m, 2H), 2.98 (ddd, J = 20.0, 10.4, 2.5 Hz, 1H), 2.79-2.85 (m, 1H), 1.30 (t, J = 7.2 Hz, 3H), 1.20 (t, J = 7.0 Hz, 3H) ppm; {superscript}1{3}C NMR (100 MHz, CDCl{subscript}3) δ = 173.38, 170.75, 169.41, 167.36, 167.21, 141.30, 128.69, 127.09, 124.36, 122.96, 109.75, 95.86, 94.69, 60.18, 59.81, 47.87, 39.88, 30.52, 14.34, 14.24 ppm; ESI-HRMS: calcd. for C{subscript}20H{subscript}21NO{subscript}6 +H 372.1447, found 372.1451.

Diethyl-2,2'-(3-(2-oxoindolin-3-yl)dihydrofuran-2,5-diylidene) (2Z,2'E)-diacetate (3c-Z,E)
white solid; m.p. 182-183 °C; Yield 21%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\): 8.30 (s, 1H), 7.20 (t, \(J = 7.6\) Hz, 1H), 7.08 (d, \(J = 7.2\) Hz, 1H), 6.93 (t, \(J = 7.4\) Hz, 1H), 6.86 (d, \(J = 7.6\) Hz, 1H), 5.83 (s, 1H), 5.31 (s, 1H), 4.52 (d, \(J = 10.0\) Hz, 1H), 4.35 (s, 1H), 4.20 – 4.29 (m, 2H), 3.97 – 4.05 (m, 2H), 3.03 (dd, \(J = 19.2, 10.0\) Hz, 1H), 2.70 (d, \(J = 19.6\) Hz, 1H), 1.33 (t, \(J = 7.0\) Hz, 3H), 1.16 (t, \(J = 7.0\) Hz, 3H) ppm; \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta\) = 176.91, 172.78, 170.36, 166.70, 166.35, 141.94, 128.95, 124.48, 124.45, 122.60, 109.93, 96.56, 94.57, 60.53, 59.80, 47.20, 40.12, 30.24, 14.31, 14.20 ppm; ESI-HRMS: calcd. for C\(_{20}\)H\(_{21}\)NO\(_6\) +H 372.1447, found 372.1441.

**Diethyl-2,2'-(3-(2-oxoindolin-3-yl)dihydrofuran-2,5-diyldene) (2Z,2'E)-diacetate (3c-E,Z)**

White solid; m.p. 109-110 °C; Yield 31%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\): 8.32 (s, 1H), 7.24 (t, \(J = 7.6\) Hz, 1H), 7.20 (d, \(J = 7.6\) Hz, 1H), 6.80 (t, \(J = 7.6\) Hz, 1H), 6.88 (d, \(J = 8.0\) Hz, 1H), 5.61 (t, \(J = 2.0\) Hz, 1H), 5.36 (d, \(J = 1.2\) Hz, 1H), 4.23 (q, \(J = 7.2\) Hz, 2H), 4.02-4.09 (m, 2H), 3.89-3.93 (m, 1H), 3.78 (d, \(J = 3.2\)Hz, 1H), 3.25 (ddd, \(J = 18.9, 10.1, 1.9\) Hz, 1H), 2.50 (ddd, \(J = 18.9, 6.4, 2.1\) Hz, 1H), 1.32 (t, \(J = 7.2\) Hz, 3H), 1.20 (t, \(J = 7.2\) Hz, 3H) ppm; \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta\) = 176.50, 170.88, 167.78, 167.01, 164.21, 141.81, 129.35, 124.83, 124.11, 123.07, 110.19, 95.79, 93.81, 60.25, 59.94, 48.05, 41.47, 28.50, 14.26, 14.20ppm; ESI-HRMS: calcd. for C\(_{20}\)H\(_{21}\)NO\(_6\) +H 372.1447, found 372.1440.

**Benzyl-(E)-2-(((E)-5-(2-ethoxy-2-oxoethylidene)-4-(5-methyl-2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3e-E,E)**

White solid; m.p. 109-110 °C; Yield 31%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\): 8.32 (s, 1H), 7.24 (t, \(J = 7.6\) Hz, 1H), 7.20 (d, \(J = 7.6\) Hz, 1H), 6.80 (t, \(J = 7.6\) Hz, 1H), 6.88 (d, \(J = 8.0\) Hz, 1H), 5.61 (t, \(J = 2.0\) Hz, 1H), 5.36 (d, \(J = 1.2\) Hz, 1H), 4.23 (q, \(J = 7.2\) Hz, 2H), 4.02-4.09 (m, 2H), 3.89-3.93 (m, 1H), 3.78 (d, \(J = 3.2\)Hz, 1H), 3.25 (ddd, \(J = 18.9, 10.1, 1.9\) Hz, 1H), 2.50 (ddd, \(J = 18.9, 6.4, 2.1\) Hz, 1H), 1.32 (t, \(J = 7.2\) Hz, 3H), 1.20 (t, \(J = 7.2\) Hz, 3H) ppm; \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta\) = 176.50, 170.88, 167.78, 167.01, 164.21, 141.81, 129.35, 124.83, 124.11, 123.07, 110.19, 95.79, 93.81, 60.25, 59.94, 48.05, 41.47, 28.50, 14.26, 14.20ppm; ESI-HRMS: calcd. for C\(_{20}\)H\(_{21}\)NO\(_6\) +H 372.1447, found 372.1440.
White solid; m.p. 168-169 °C; Yield 15%;  
$^1$H NMR (400 MHz, CDCl$_3$) δ: 7.59 (s, 1H), 7.39 – 7.27 (m, 5H), 7.21 (s, 1H), 7.03 (d, J = 7.6 Hz, 1H), 6.73 (d, J = 7.6 Hz, 1H), 5.82 (d, J = 1.6 Hz, 1H), 5.65 (t, J = 1.8 Hz, 1H), 5.11 (d, J = 12.4 Hz, 1H), 5.00 (d, J = 12.4 Hz, 1H), 4.31 (d, J = 9.6 Hz, 1H), 4.25 (d, J = 3.2 Hz, 1H), 4.20 (q, J = 7.1 Hz, 2H), 2.98 (ddd, J = 20.0, 10.4, 2.4 Hz, 1H), 2.88 – 2.78 (m, 1H), 2.34 (s, 3H), 1.30 (t, J = 7.2 Hz, 3H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) δ = 176.75, 173.47, 171.34, 167.23, 167.08, 138.90, 136.11, 132.51, 128.97, 128.46, 128.02, 127.09, 125.00, 109.53, 95.90, 94.37, 65.70, 60.18, 47.89, 39.88, 30.66, 21.03, 14.33 ppm; ESI-HRMS: calcd. for C$_{26}$H$_{25}$NO$_6$+H 448.1760, found 448.1780.

**Benzyl-(Z)-2-((E)-5-(2-ethoxy-2-oxoethylidene)-4-(5-methyl-2-oxindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3e-Z,E)**

White solid; m.p. 178-179 °C; Yield 16%; $^1$H NMR (400 MHz, CDCl$_3$) δ = 8.24 (s, 1H), 7.18 – 7.41 (m, 5H), 6.97 (d, J = 8.0 Hz, 1H), 6.87 (s, 1H), 6.70 (d, J = 7.6 Hz, 1H), 5.84 (d, J = 1.2 Hz, 1H), 5.37 (s, 1H), 5.05 (d, J = 12.4 Hz, 1H), 4.98 (d, J = 12.4 Hz, 1H), 4.50 (d, J = 9.6 Hz, 1H), 4.29 (d, J = 4.4 Hz, 1H), 4.21 – 4.28 (m, 2H), 3.02 (ddd, J = 19.2, 10.0, 2.4 Hz, 1H), 2.71 (d, J = 19.2 Hz, 1H), 2.24 (s, 3H), 1.33 (t, J = 7.2 Hz, 4H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) δ = 176.99, 173.03, 171.06, 166.42, 166.31, 139.53, 136.09, 132.02, 129.20, 128.48, 128.08, 127.97, 125.12, 124.44, 109.65, 96.66, 94.15, 65.54, 60.53, 47.26, 40.17, 30.42, 21.07, 14.31 ppm; ESI-HRMS: calcd. for C$_{26}$H$_{25}$NO$_6$+H 448.1760, found 448.1752.
Benzyl-(E)-2-((Z)-5-(2-ethoxy-2-oxoethylidene)-4-(5-methyl-2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3e-E,Z)

White solid; m.p. 187-188 °C; Yield 31%;
$^1$H NMR (400 MHz, CDCl$_3$) δ = 8.36 (s, 1H), 7.28-7.36 (m, 5H), 7.02 (d, $J = 8.0$ Hz, 1H), 6.98 (s, 1H), 6.75 (d, $J = 8.0$ Hz, 1H), 5.69 (t, $J = 1.8$ Hz, 1H), 5.34 (d, $J = 1.2$ Hz, 1H), 5.08 (d, $J = 12.4$ Hz, 1H), 5.04 (d, $J = 12.4$ Hz, 1H), 4.20-4.28 (m, 2H), 3.86-3.90 (m, 1H), 3.73 (d, $J = 2.8$ Hz, 1H), 3.26 (ddd, $J = 18.8$, 10.1, 1.7 Hz, 1H), 2.53 (ddd, $J = 18.9$, 6.7, 2.0 Hz, 1H), 2.26 (s, 3H), 1.32 (t, $J = 7.2$ Hz, 3H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) δ = 176.60, 171.52, 167.73, 166.77, 164.19, 139.35, 136.07, 132.61, 129.68, 128.47, 128.06, 127.94, 125.39, 124.17, 109.94, 95.43, 93.82, 65.72, 60.23, 47.92, 41.49, 28.69, 21.13, 14.26 ppm; ESI-HRMS: calcd. for C$_{26}$H$_{25}$NO$_6$+H 448.1760, found 448.1780.

Ethyl-(E)-2-((E)-5-(2-methoxy-2-oxoethylidene)-3-(5-methyl-2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3f-E,E)

White solid; m.p. 184-185 °C; Yield 12%; $^1$H NMR (400 MHz, CDCl$_3$) δ = 7.62 (s, 1H), 7.22 (s, 1H), 7.03 (d, $J = 7.6$ Hz, 1H), 6.73 (d, $J = 7.6$ Hz, 1H), 5.82 (s, 1H), 5.60 (s, 1H), 4.32 (d, $J = 10.4$ Hz, 1H), 4.24 (d, $J = 2.8$ Hz, 1H), 4.20 (q, $J = 7.2$ Hz, 2H), 3.62 (s, 3H), 2.98 (ddd, $J = 19.6$, 10.4, 2.4 Hz, 1H), 2.81 (d, $J = 19.6$ Hz, 1H), 2.34 (s, 3H), 1.30 (t, $J = 7.0$ Hz, 3H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) δ = 176.67, 173.50, 171.04, 167.74, 167.25, 138.91, 132.54, 128.99, 127.15, 125.04, 109.50, 95.86, 94.29, 60.17, 51.03, 39.92, 30.58, 21.04, 14.34 ppm; ESI-HRMS: calcd. for C$_{21}$H$_{23}$NO$_6$+H 372.1447, found 372.1447.
Ethyl-(E)-2-((Z)-3-(5-methyl-2-oxoindolin-3-yl)-5-(2-(methylperoxy)-2-oxoethylidene)dihydrofuran-2(3H)-ylidene)acetate (3f-Z,E)

White solid; m.p. 168-169 °C; Yield 24%; ¹H NMR (400 MHz, CDCl₃) δ: 7.98 (s, 1H), 6.99 (d, J = 7.6 Hz, 1H), 6.87 (s, 1H), 6.74 (d, J = 8.0 Hz, 1H), 5.84 (d, J = 1.2 Hz, 1H), 5.34 (s, 1H), 4.51 (d, J = 10.0 Hz, 1H), 4.31 (d, J = 3.2 Hz, 1H), 4.29 – 4.20 (m, 2H), 3.57 (s, 3H), 3.04 (ddd, J = 19.2 Hz, 10.0 Hz, 2.4 Hz, 1H), 2.68 (d, J = 19.2 Hz, 1H), 2.25 (s, 3H), 1.33 (t, J = 7.0 Hz, 3H) ppm; ¹³C NMR (100 MHz, CDCl₃) δ = 176.68, 173.03, 170.80, 167.13, 166.30, 139.44, 132.09, 129.21, 125.17, 124.53, 109.56, 96.68, 94.01, 60.52, 51.07, 47.21, 40.12, 30.35, 21.06, 14.32ppm; ESI-HRMS: calcd. for C$_{21}$H$_{23}$NO$_6$+H 372.1447, found 372.1441.

Ethyl-(Z)-2-((E)-5-(2-methoxy-2-oxoethylidene)-3-(5-methyl-2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3f-E,Z)

White solid; m.p. 165-166 °C; Yield 37%; ¹H NMR (400 MHz, CDCl₃) δ = 8.54 (s, 1H), 7.03 (d, J = 7.6 Hz, 1H), 6.97 (s, 1H), 6.78 (d, J = 8.0 Hz, 1H), 5.65 (s, 1H), 5.35 (d, J = 1.2 Hz, 1H), 4.21-4.27 (m, 2H), 3.87-3.91 (m, 1H), 3.74 (d, J = 2.8 Hz, 1H), 3.26 (ddd, J = 18.8 Hz, 10.1 Hz, 1.6 Hz, 1H), 2.49 (ddd, J = 18.9 Hz, 6.9 Hz, 2.0 Hz, 1H), 2.26 (s, 3H), 1.32 (t, J = 7.2 Hz, 3H) ppm; ¹³C NMR (100 MHz, CDCl₃) δ = 176.68, 171.18, 167.80, 167.40, 164.19, 139.40, 132.62, 129.69, 125.37, 124.23, 109.98, 95.38, 93.76, 60.21, 51.15, 47.95, 41.47, 28.59, 21.12, 14.26 ppm; ESI-HRMS: calcd. for C$_{21}$H$_{23}$NO$_6$+H 372.1447, found 372.1445.

Diethyl-2,2'-(3-(5-methyl-2-oxoindolin-3-yl)dihydrofuran-2,5-diylidene)(2E,2'E)-diacetate (3g-E,E)
White solid; m.p. 176-177 °C; Yield 26%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta = 7.57\) (br, 1H), 7.22 (s, 1H), 7.03 (d, \(J = 8.0\) Hz, 1H), 6.72 (d, \(J = 8.0\) Hz, 1H), 5.82 (s, 1H), 5.59 (s, 1H), 4.31 (d, \(J = 9.6\) Hz, 1H), 4.24 (d, \(J = 2.8\) Hz, 1H), 4.20 (q, \(J = 7.1\) Hz, 2H), 4.15 – 4.01 (m, 2H), 2.97 (ddd, \(J = 20.0, 10.4, 2.4\) Hz, 1H), 2.81 (d, \(J = 20.0\) Hz, 1H), 2.34 (s, 3H), 1.30 (t, \(J = 7.0\) Hz, 3H), 1.20 (t, \(J = 7.0\) Hz, 3H) ppm; \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta = 176.72, 173.55, 170.81, 167.32, 167.27, 138.91, 132.51, 128.96, 127.15, 125.01, 109.49, 95.76, 94.67, 60.16, 59.77, 47.92, 39.94, 30.51, 21.03, 14.34, 14.23\) ppm; ESI-HRMS: calcd. for C\(_{21}\)H\(_{23}\)NO\(_6\)+H 408.1423, found 408.1412.

**Diethyl-2,2'-(3-(5-methyl-2-oxoindolin-3-yl)dihydrofuran-2,5-diylidene)(2\(\text{Z},2'\text{E}\))-diacetate (3g-\(\text{Z},\text{E}\))**

White solid; m.p. 198-199 °C; Yield 26%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta = 8.35\) (s, 1H), 6.99 (d, \(J = 8.0\) Hz, 1H), 6.87 (s, 1H), 6.75 (d, \(J = 8.0\) Hz, 1H), 5.84 (s, 1H), 5.32 (s, 1H), 4.50 (d, \(J = 9.6\) Hz, 1H), 4.30 (d, \(J = 2.8\) Hz, 1H), 4.28 – 4.20 (m, 2H), 4.07 – 3.97 (m, 2H), 3.02 (ddd, \(J = 19.6, 10.0, 2.4\) Hz, 1H), 2.69 (d, \(J = 19.6\) Hz, 1H), 2.25 (s, 3H), 1.33 (t, \(J = 7.2\) Hz, 3H), 1.17 (t, \(J = 7.0\) Hz, 3H) ppm; \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta = 176.97, 173.11, 170.56, 166.69, 166.34, 139.47, 132.02, 129.17, 125.14, 124.50, 109.62, 96.51, 94.45, 60.51, 59.80, 47.26, 40.12, 30.27, 21.07, 14.32, 14.20\) ppm; ESI-HRMS: calcd. for C\(_{21}\)H\(_{23}\)NO\(_6\)+H 408.1423, found 408.1404.

**Diethyl-2,2'-(3-(5-methyl-2-oxoindolin-3-yl)dihydrofuran-2,5-diylidene)(2\(\text{Z},2'\text{E}\))-diacetate (3g-\(\text{E},\text{Z}\))**
Benzyl-(E)-2-((E)-5-(2-ethoxy-2-oxoethylidene)-4-(5-methoxy-2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3h-E,E)

White solid; m.p. 142-143 °C; Yield 27%; $^1$H NMR (400 MHz, CDCl$_3$) $\delta = 8.34$ (s, 1H), $7.04$ (d, $J = 7.6$ Hz, 1H), $6.98$ (s, 1H), $6.77$ (d, $J = 8.0$ Hz, 1H), $5.64$ (s, 1H), $5.34$ (s, 1H), $4.21$-$4.27$ (m, 2H), $4.04$-$4.10$ (m, 2H), $3.87$-$3.91$ (m, 1H), $3.74$ (d, $J = 2.8$ Hz, 1H), $3.26$ (dd, $J = 18.8$, $10.1$ Hz, 1H), $2.49$ (ddd, $J = 18.8$, $6.9$, $1.9$ Hz, 1H), $2.26$ (s, 3H), $1.32$ (t, $J = 6.8$ Hz, 3H), $1.20$ (t, $J = 7.2$ Hz, 3H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta = 176.86$, $171.02$, $167.91$, $167.07$, $164.32$, $139.48$, $132.62$, $129.70$, $125.41$, $124.27$, $110.05$, $95.83$, $93.66$, $60.27$, $60.00$, $47.94$, $41.54$, $28.55$, $21.18$, $14.30$, $14.24$ ppm; ESI-HRMS: calcd. for C$_{21}$H$_{23}$NO$_6$+H 408.1423, found 408.1413.

Ethyl-(E)-2-((Z)-3-(5-methyl-2-oxoindolin-3-yl)-5-(2-oxo-3-phenylpropylidene)dihydrofuran-2(3H)-ylidene)acetate (3h-Z,E)

White solid; m.p. 152-153 °C; Yield 9%; $^1$H NMR (400 MHz, CDCl$_3$) $\delta = 7.52$ (s, 1H), $7.28$ -$7.37$(m, 5H), $7.00$ (s, 1H), $6.78$ (dd, $J = 8.4$, $2.4$ Hz, 1H), $6.75$ (d, $J = 8.8$ Hz, 1H), $5.83$ (d, $J = 0.8$ Hz, 1H), $5.65$ (s, 1H), $5.11$ (d, $J = 12.4$ Hz, 1H), $4.28$-$4.31$ (m, 2H), $4.19$ (q, $J = 7.0$ Hz, 2H), $3.81$ (s, 3H), $2.99$ (ddd, $J = 19.6$, $10.0$, $2.4$ Hz, 1H), $2.83$ (d, $J = 20.0$ Hz, 1H), $1.30$ (t, $J = 7.2$ Hz, 3H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta = 176.49$, $173.23$, $171.25$, $167.19$, $167.07$, $156.26$, $136.17$, $134.76$, $128.48$, $128.41$, $128.05$, $128.02$, $113.67$, $111.23$, $110.23$, $96.06$, $94.45$, $65.71$, $60.18$, $55.91$, $48.26$, $40.01$, $30.68$, $14.34$ ppm; ESI-HRMS: calcd. for C$_{26}$H$_{25}$NO$_7$+H 464.1709, found 464.1705.
White solid; m.p. 150-151 °C; Yield 27%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta = 8.45 \ (s, 1H), 7.21 - 7.39 \ (m, 5H), 6.74 \ (d, J = 8.8 \ Hz, 1H), 6.72 \ (d, J = 2.4 \ Hz, 1H), 6.68 \ (s, 1H), 5.84 \ (d, J = 1.2 \ Hz, 1H), 5.40 \ (s, 1H), 5.06 \ (d, J = 12.4 \ Hz, 1H), 4.99 \ (d, J = 12.4 \ Hz, 1H), 4.51 \ (d, J = 10.0 \ Hz, 1H), 4.32 \ (d, J = 3.2 \ Hz, 1H), 4.20 - 4.30 \ (m, 2H), 3.71 \ (s, 3H), 3.05 \ (dd, J = 19.6, 10.0, 2.6 \ Hz, 1H), 2.73 \ (d, J = 19.2 \ Hz, 1H), 1.33 \ (t, J = 7.0 \ Hz, 3H) \ ppm; \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta = 176.86, 172.86, 170.89, 166.41, 166.28, 155.75, 136.13, 135.50, 128.49, 128.09, 128.00, 125.77, 113.76, 111.66, 110.32, 96.76, 94.36, 65.62, 60.54, 55.87, 47.64, 40.15, 30.41, 14.30 \ ppm; ESI-HRMS: calcd. for C\(_{26}\)H\(_{25}\)NO\(_7\)+H 464.1709, found 464.1710.

**Benzyl-\((E)\)-2-((\(Z\))-5-(2-ethoxy-2-oxoethylidene)-4-(5-methoxy-2-oxoindolin-3-yl)dihydrofuran-2(3\(H\))-ylidene)acetate (3h-E,Z)**

White solid; m.p. 121-122 °C; Yield 36%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta = 7.30-7.38 \ (m, 5H), 6.82 \ (s, 1H), 6.75-6.79 \ (m, 2H), 5.70 \ (t, J = 2.0 \ Hz, 1H), 5.35 \ (d, J = 1.6 \ Hz, 1H), 5.10 \ (d, J = 12.4 \ Hz, 1H), 5.06 \ (d, J = 12.4 \ Hz, 1H), 4.24 \ (qd, J = 7.1, 1.5 \ Hz, 1H), 3.89-3.93 \ (m, 1H), 3.76 \ (d, J = 3.2 \ Hz, 1H), 3.74 \ (s, 3H), 3.28 \ (dd, J = 18.9, 10.1, 1.8 \ Hz, 1H), 2.57 \ (ddd, J = 18.9, 6.5, 2.1 \ Hz, 1H), 1.33 \ (t, J = 7.2 \ Hz, 3H). \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta = 171.48, 167.48, 166.83, 164.12, 155.97, 136.10, 128.53, 128.12, 128.00, 125.49, 113.87, 111.97, 110.70, 95.47, 94.03, 65.78, 60.30, 55.78, 48.38, 41.48, 28.79, 14.29 \ ppm; ESI-HRMS: calcd. for C\(_{26}\)H\(_{25}\)NO\(_7\)+H 464.1709, found 464.1705.

**Diethyl-2,2’-(3-(5-methoxy-2-oxoindolin-3-yl)dihydrofuran-2,5-diylidene)(2\(E\),2’\(E\))-diacetate (3i-E,E)**
Yield 24%; $^1$H NMR (400 MHz, CDCl$_3$) $\delta = 7.36$ (s, 1H), 7.01 (s, 1H), 6.78 (dd, $J = 8.4$, 2.4Hz, 1H), 6.75 (d, $J = 8.4$ Hz, 1H), 5.82 (d, $J = 1.2$ Hz, 1H), 5.59 (s, 1H), 4.27-4.32 (m, 2H), 4.19 (q, $J = 7.2$ Hz, 2H), 4.08 (m, 2H), 3.81 (s, 3H), 2.98 (ddd, $J = 19.2$, 10.0, 2.4 Hz, 1H), 2.83 (d, $J = 20.0$ Hz, 1H), 1.30 (t, $J = 7.0$ Hz, 3H), 1.21 (t, $J = 7.0$ Hz, 3H) ppm; $^{13}$C NMR (100MHz, CDCl$_3$) $\delta = 176.44$, 173.32, 170.72, 167.34, 167.24, 156.21, 134.68, 128.41, 113.59, 111.21, 110.19, 95.88, 94.71, 60.17, 59.80, 55.90, 48.23, 40.01, 30.49, 14.35, 14.25 ppm; ESI-HRMS: calcd. for C$_{21}$H$_{23}$NO$_7$+H 402.1553, found 402.1548.

**Diethyl-2,2'-(3-(5-methoxy-2-oxoindolin-3-yl)dihydrofuran-2,5-diylidene)(2Z,2'E)-diacetate (3i-Z,E)**

Yield 24%; $^1$H NMR (400 MHz, CDCl$_3$) $\delta = 8.25$ (s, 1H), 6.77 (d, $J = 8.4$ Hz, 1H), 6.74 (dd, $J = 8.4$, 2.2 Hz, 1H), 6.69 (s, 1H), 5.84 (d, $J = 1.2$ Hz, 1H), 5.35 (s, 1H), 4.51 (d, $J = 10.0$ Hz, 1H), 4.33 (d, $J = 3.2$ Hz, 1H), 4.20 – 4.30 (m, 2H), 3.98 – 4.08 (m, 2H), 3.73 (s, 3H), 3.05 (ddd, $J = 19.6$, 10.0, 2.6 Hz, 1H), 2.71 (d, $J = 19.2$ Hz, 1H), 1.33 (t, $J = 7.2$ Hz, 3H), 1.17 (t, $J = 7.0$ Hz, 3H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta = 176.88$, 172.97, 170.42, 166.62, 166.33, 155.70, 135.46, 125.75, 113.73, 111.54, 110.32, 96.57, 94.62, 60.53, 59.82, 55.86, 47.63, 40.07, 30.25, 14.31, 14.21 ppm; ESI-HRMS: calcd. for C$_{21}$H$_{23}$NO$_7$+H 402.1553, found 402.1554.

**Diethyl-2,2'-(3-(5-methoxy-2-oxoindolin-3-yl)dihydrofuran-2,5-diylidene)(2Z,2'E)-diacetate (3i-E,Z)**
White solid; m.p. 99.0-100 °C; Yield 24%;

$^1$H NMR (400 MHz, CDCl$_3$) $\delta$ = 8.16 (s, 1H), 6.81 (d, $J$ = 2.4 Hz, 1H), 6.79 (d, $J$ = 2.4 Hz, 1H), 6.76 (s, 1H), 5.63 (t, $J$ = 2.0 Hz, 1H), 5.33 (d, $J$ = 1.6 Hz, 1H), 4.22 (qd, $J$ = 7.1, 1.8 Hz, 2H), 4.04 - 4.10 (m, 2H), 3.87-3.92 (m, 1H), 3.75 (d, $J$ = 3.2 Hz, 1H), 3.73 (s, 3H), 3.26 (ddd, $J$ = 18.9, 10.1, 1.9 Hz, 1H), 2.53 (ddd, $J$ = 18.9, 6.6, 2.1 Hz, 1H), 1.31 (t, $J$ = 6.8 Hz, 3H), 1.21 (t, $J$ = 7.2 Hz, 3H); $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ = 176.37, 170.86, 167.54, 167.02, 164.11, 155.91, 135.13, 125.49, 113.77, 111.94, 110.58, 95.79, 93.78, 60.24, 59.96, 55.74, 48.26, 41.45, 28.55, 14.26, 14.21 ppm; ESI-HRMS: calcd. for C$_{21}$H$_{23}$NO$_7$+H 402.1553, found 402.1541.

Benzy1-($E$)-2-((($E$)-5-(2-ethoxy-2-oxoethylidene)-4-(6-methoxy-2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3j-E,E)

White solid; m.p. 178-179 °C; Yield 17%; $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ = 7.38 (s, 1H), 7.27 – 7.36 (m, 6H), 6.59 (dd, $J$ = 8.0, 2.2 Hz, 1H), 6.42 (d, $J$ = 2.4 Hz, 1H), 5.81 (d, $J$ = 1.2 Hz, 1H), 5.65 (t, $J$ = 1.8 Hz, 1H), 5.12 (d, $J$ = 12.4 Hz, 1H), 5.02 (d, $J$ = 12.4 Hz, 1H), 4.25 – 4.32 (m, 1H), 4.14 – 4.23 (m, 3H), 3.81 (s, 3H), 2.97 (ddd, $J$ = 20.0, 10.0, 2.4 Hz, 1H), 2.83 (dt, $J$ = 20.0, 1.8 Hz, 1H), 1.30 (t, $J$ = 7.2 Hz, 3H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ = 177.17, 173.30, 171.35, 167.19, 167.13, 160.42, 142.46, 136.15, 128.51, 128.06, 125.06, 118.87, 107.62, 97.27, 96.03, 94.43, 65.75, 60.21, 55.56, 47.39, 40.12, 30.65, 14.36 ppm; ESI-HRMS: calcd. for C$_{26}$H$_{25}$NO$_7$+H 464.1709, found 464.1703.
Benzyl-(Z)-2-((E)-5-(2-ethoxy-2-oxoethylidene)-4-(6-methoxy-2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3j-Z,E)

White solid; m.p. 198-199 °C; Yield 17%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta = 8.29 (s, 1H), 7.22 - 7.38 (m, 5H), 6.95 (d, J = 8.2 Hz, 1H), 6.40 - 6.47 (m, 2H), 5.82 (d, J = 1.2 Hz, 1H), 5.38 (t, J = 2.0 Hz, 1H), 5.07 (d, J = 12.4 Hz, 1H), 4.99 (d, J = 12.4 Hz, 1H), 4.45 - 4.54 (m, 1H), 4.17 - 4.33 (m, 3H), 3.76 (s, 3H), 3.03 (ddd, J = 19.6, 10.0, 2.4 Hz, 1H), 2.73 (dt, J = 19.2, 1.6 Hz, 1H), 1.33 (t, J = 7.0 Hz, 3H) ppm; \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta = 173.06, 170.95, 166.52, 166.34, 160.56, 143.20, 128.51, 128.09, 127.94, 125.16, 116.02, 107.42, 97.24, 96.57, 94.22, 65.64, 60.52, 55.44, 46.75, 40.25, 30.36, 14.30 ppm; ESI-HRMS: calcd. for C\(_{26}\)H\(_{25}\)NO\(_7\)+H 464.1709, found 464.1706.

Benzyl-(E)-2-((Z)-5-(2-ethoxy-2-oxoethylidene)-4-(6-methoxy-2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3j-E,Z)

White solid; m.p. 155-156 °C; Yield 34%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta = 8.31 (s, 1H), 7.27 - 7.38 (m, 5H), 7.07 (d, J = 8.3 Hz, 1H), 6.48 (dd, J = 8.3, 2.3 Hz, 1H), 6.45 (d, J = 2.2 Hz, 1H), 5.68 (t, J = 2.0 Hz, 1H), 5.36 (d, J = 1.5 Hz, 1H), 5.09 (d, J = 12.5 Hz, 1H), 5.04 (d, J = 12.5 Hz, 1H), 4.27 - 4.19 (m, 2H), 3.90 - 3.83 (m, 1H), 3.76 (s, 3H), 3.72 (d, J = 3.1 Hz, 1H), 3.23 (ddd, J = 18.9, 10.1, 1.9 Hz, 1H), 2.51 (ddd, J = 18.9, 6.3, 2.1 Hz, 1H), 1.32 (t, J = 7.1 Hz, 3H); \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta = 177.33, 171.61, 167.91, 166.87, 164.25, 160.84, 143.15, 136.10, 128.53, 128.11, 127.95, 125.57, 115.75, 107.68, 97.69, 94.22, 93.94, 65.79, 60.31, 55.50, 47.73, 41.64, 28.60, 14.30 ppm; ESI-HRMS: calcd. for C\(_{26}\)H\(_{25}\)NO\(_7\)+H 464.1709, found 464.1707.
Benzyl-(E)-2-((E)-5-(2-ethoxy-2-oxoethylidene)-4-(7-methyl-2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3k-E,E)

White solid; m.p. 140-141 °C; Yield 12%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta = 7.83\) (s, 1H), 7.26 – 7.36 (m, 5H), 7.23 (d, \(J = 7.2\) Hz, 1H), 7.06 (d, \(J = 7.6\) Hz, 1H), 7.00 (t, \(J = 7.6\) Hz, 1H), 5.82 (d, \(J = 0.8\) Hz, 1H), 5.64 (s, 1H), 5.10 (d, \(J = 12.4\) Hz, 1H), 5.01 (d, \(J = 12.4\) Hz, 1H), 4.28 – 4.36 (m, 2H), 4.19 (q, \(J = 7.2\) Hz, 2H), 3.00 (ddd, \(J = 20.0, 10.2, 2.4\) Hz, 1H), 2.80 (dt, \(J = 20.0, 1.8\) Hz, 1H), 2.22 (s, 3H), 1.29 (t, \(J = 7.2\) Hz, 3H) ppm; \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta = 176.95, 173.45, 171.42, 167.14, 167.10, 140.12, 136.12, 130.04, 128.48, 128.05, 127.97, 126.62, 122.89, 121.67, 118.97, 95.96, 94.31, 65.72, 60.18, 48.35, 39.80, 30.76, 16.35, 14.33 ppm; ESI-HRMS: calcd. for C\(_{26}\)H\(_{25}\)NO\(_6\)+H 448.1760, found 448.1766.

Benzyl-(Z)-2-((E)-5-(2-ethoxy-2-oxoethylidene)-4-(7-methyl-2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3k-Z,E)

White solid; m.p. 161-162 °C; Yield 25%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta = 9.10\) (s, 1H), 7.21 – 7.36 (m, 5H), 7.01 (d, \(J = 7.6\) Hz, 1H), 6.92 (d, \(J = 7.2\) Hz, 1H), 6.84 (t, \(J = 7.6\) Hz, 1H), 5.84 (d, \(J = 1.2\) Hz, 1H), 5.39 (t, \(J = 1.8\) Hz, 1H), 5.05 (d, \(J = 12.4\) Hz, 1H), 4.99 (d, \(J = 12.4\) Hz, 1H), 4.49 – 4.57 (m, 1H), 4.37 (d, \(J = 3.6\) Hz, 1H), 4.20 – 4.30 (m, 2H), 3.07 (ddd, \(J = 19.2, 10.0, 2.6\) Hz, 1H), 2.72 (dt, \(J = 19.6, 1.8\) Hz, 1H), 2.25 (s, 3H), 1.34 (t, \(J = 7.0\) Hz, 3H) ppm; \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta = 177.65, 173.05, 171.01, 166.50, 166.34, 140.99, 136.07, 130.24, 128.46, 128.04, 127.86, 123.99, 122.48, 121.65, 119.44, 96.69, 94.19, 65.59, 60.52, 47.69, 39.99, 30.43, 16.53, 14.26 ppm; ESI-HRMS: calcd. for C\(_{26}\)H\(_{25}\)NO\(_6\)+H 448.1760, found 448.1764.

Benzyl-(E)-2-((Z)-5-(2-ethoxy-2-oxoethylidene)-4-(7-methyl-2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3k-E,Z)
White solid; m.p. 77-78 °C; Yield 37%; 
$^1$H NMR (400 MHz, CDCl$_3$) $\delta = 8.69$ (s, 1H), 7.28-7.35 (m, 5H), 7.06 (d, $J = 7.6$ Hz, 1H), 7.03 (d, $J = 7.6$ Hz, 1H), 6.90 (t, $J = 7.6$ Hz, 1H), 5.69 (t, $J = 2.0$ Hz, 1H), 5.36 (d, $J = 1.5$ Hz, 1H), 5.08 (d, $J = 12.5$ Hz, 1H), 5.04 (d, $J = 12.5$ Hz, 1H), 4.23 (q, $J = 7.0$ Hz, 2H), 3.96 – 3.88 (m, 1H), 3.79 (d, $J = 3.1$ Hz, 1H), 3.27 (ddd, $J = 18.9$, 10.1, 1.8 Hz, 1H), 2.25 (s, 3H), 1.31 (t, $J = 7.1$ Hz, 3H). $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta = 177.04$, 171.54, 167.69, 166.85, 164.16, 140.63, 136.07, 130.68, 128.48, 128.06, 127.91, 123.69, 123.03, 122.12, 119.60, 95.40, 93.93, 65.73, 60.24, 48.34, 41.39, 28.67, 16.47, 14.26 ppm; ESI-HRMS: calcd. for C$_{26}$H$_{25}$NO$_6$+H 448.1760, found 448.1754.

Benzyl-($E$)-2-((($E$)-5-(2-ethoxy-2-oxoethylidene)-4-(1-methyl-2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3l-E,E)

White solid; m.p. 131-132 °C; Yield 30%; 
$^1$H NMR (400 MHz, CDCl$_3$) $\delta = 7.41$ (d, $J = 7.6$ Hz, 1H), 7.27 – 7.36 (m, 6H), 7.10 (td, $J = 7.6$, 0.8 Hz, 1H), 6.81 (d, $J = 7.6$ Hz, 1H), 5.83 (d, $J = 1.2$ Hz, 1H), 5.65 (t, $J = 2.0$ Hz, 1H), 5.10 (d, $J = 12.4$ Hz, 1H), 5.03 (d, $J = 12.4$ Hz, 1H)$, 4.30 – 4.38$ (m, 1H), 4.26 (d, $J = 3.6$ Hz, 1H), 4.18 (q, $J = 7.2$ Hz, 2H), 3.10 (s, 3H), 2.94 (ddd, $J = 19.6$, 10.4, 2.4 Hz, 1H), 2.68 (dt, $J = 19.6$, 2.0 Hz, 1H), 1.29 (t, $J = 7.2$ Hz, 3H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta = 174.86$, 173.59, 171.36, 167.25, 167.08, 142.10, 136.18, 132.53, 128.89, 128.47, 128.03, 128.00, 126.41, 124.71, 108.02, 95.91, 94.34, 65.63, 60.13, 47.54, 39.89, 30.59, 26.07, 21.03, 14.33 ppm; ESI-HRMS: calcd. for C$_{21}$H$_{23}$NO$_6$+H 448.1760, found 448.1773.

Benzyl-($Z$)-2-((($E$)-5-(2-ethoxy-2-oxoethylidene)-4-(1-methyl-2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3l-Z,E)
White solid; m.p. 99-100 °C; Yield 30%; $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ = 7.33 – 7.37 (m, 1H), 7.27 (m, 5H), 7.09 (d, $J$ = 7.6 Hz, 1H), 6.95 (t, $J$ = 7.4 Hz, 1H), 6.75 (d, $J$ = 7.6 Hz, 1H), 5.83 (d, $J$ = 0.8 Hz, 1H), 5.36 (s, 1H), 5.04 (d, $J$ = 12.4 Hz, 1H), 4.95 (d, $J$ = 12.4 Hz, 1H), 4.53 (d, $J$ = 10.0 Hz, 1H), 4.30 (d, $J$ = 3.2 Hz, 1H), 4.18 – 4.28 (m, 2H), 3.19 (s, 3H), 2.98 (ddd, $J$ = 19.2, 10.0, 2.6 Hz, 1H), 2.54 (d, $J$ = 19.6 Hz, 1H), 1.33 (t, $J$ = 7.2 Hz, 3H) ppm; $^{13}$C NMR (101 MHz, CDCl$_3$) $\delta$ = 174.80, 172.91, 170.91, 166.47, 166.23, 144.91, 136.05, 128.96, 128.49, 128.08, 127.93, 124.11, 123.82, 122.60, 108.23, 96.81, 94.21, 65.59, 60.55, 46.81, 40.16, 30.38, 26.35, 14.29 ppm; ESI-HRMS: calcd. for C$_{21}$H$_{23}$NO$_6$+H 448.1760, found 448.1744.

**Benzyl-(E)-2-((Z)-5-(2-ethoxy-2-oxoethylidene)-4-(1-methyl-2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3l-E,Z)**

Yield 30%; $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ = 7.27-7.37 (m, 6H), 7.20 (d, $J$ = 7.6 Hz, 1H), 7.00 (t, $J$ = 7.6 Hz, 1H), 6.82 (d, $J$ = 7.6 Hz, 1H), 5.67 (t, $J$ = 2.0 Hz, 1H), 5.36 (d, $J$ = 1.6 Hz, 1H), 5.07 (d, $J$ = 12.8 Hz, 1H), 5.02 (d, $J$ = 12.8 Hz, 1H), 4.23 (q, $J$ = 7.2 Hz, 2H), 3.91-3.95 (m, 1H), 3.73 (d, $J$ = 2.8 Hz, 1H), 3.21 (s, 3H), 3.15-3.20 (m, 1H), 2.37 (ddd, $J$ = 19.2, 6.4, 2.0 Hz, 1H), 1.32 (t, $J$ = 7.2 Hz, 3H). $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ = 174.47, 171.46, 167.84, 166.78, 164.13, 144.71, 136.01, 129.36, 128.48, 128.06, 127.92, 124.46, 123.43, 123.08, 108.55, 95.43, 93.90, 65.72, 60.23, 47.63, 41.44, 28.55, 26.46, 14.26 ppm; ESI-HRMS: calcd. for C$_{21}$H$_{23}$NO$_6$+H 448.1760, found 448.1775.

**Diethyl-2,2'-(3-(1-methyl-2-oxoindolin-3-yl)dihydrofuran-2,5-diylidene)(2E,2'E)-diacetate (3m-E,E)**
White solid; m.p. 130-131 °C; Yield 19%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\): 7.42 (d, \(J = 7.2\) Hz, 1H), 7.31 (t, \(J = 7.8\) Hz, 1H), 7.10 (t, \(J = 7.6\) Hz, 1H), 6.82 (d, \(J = 7.6\) Hz, 1H), 5.82 (d, \(J = 1.2\) Hz, 1H), 5.59 (t, \(J = 2.0\) Hz 1H), 4.33 (d, \(J = 9.6\) Hz, 1H), 4.27 (d, \(J = 3.2\) Hz, 1H), 4.18 (q, \(J = 7.2\) Hz, 2H), 4.02 – 4.12 (m, 2H), 3.14 (s, 3H), 2.94 (ddd, \(J = 20.0, 10.4, 2.4\) Hz, 1H), 2.68 (m, 1H), 1.29 (t, \(J = 7.2\) Hz, 3H), 1.21 (t, \(J = 7.0\) Hz, 3H) ppm; \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta\): 174.99, 173.52, 170.78, 167.34, 167.23, 144.49, 128.70, 126.46, 123.91, 122.93, 108.29, 95.87, 94.64, 60.13, 59.75, 47.58, 39.86, 30.47, 26.11, 14.35, 14.26 ppm; ESI-HRMS: calcd. for C\(_{21}\)H\(_{23}\)NO\(_6\)+H 386.1604, found 386.1602.

**Diethyl-2,2'-(3-(1-methyl-2-oxoindolin-3-yl)dihydrofuran-2,5-diyldene)(2\text{Z},2'\text{E})-diacetate (3m-Z,E)**

White solid; m.p. 140-141 °C; Yield 19%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\): 7.26 (t, \(J = 7.8\) Hz, 1H), 7.09 (d, \(J = 7.2\) Hz, 1H), 6.95 (td, \(J = 7.6, 0.4\) Hz, 1H), 6.79 (d, \(J = 8.0\) Hz, 1H), 5.82 (d, \(J = 1.2\) Hz, 1H), 5.30 (t, \(J = 1.8\) Hz, 1H), 4.56 – 4.51 (m, 1H), 4.32 (d, \(J = 3.6\) Hz, 1H), 4.19 – 4.29 (m, 2H), 3.92 – 4.08 (m, 2H), 3.23 (s, 3H), 2.98 (ddd, \(J = 19.2, 10.0, 2.6\) Hz, 1H), 2.48 – 2.57 (dt, \(J = 19.6, 1.8\) Hz, 1H), 1.33 (t, \(J = 7.0\) Hz, 2H), 1.15 (t, \(J = 7.2\) Hz, 2H) ppm; \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta\): 174.85, 173.00, 170.41, 166.67, 166.26, 144.92, 128.93, 124.10, 123.87, 122.59, 108.20, 96.63, 94.47, 60.51, 59.72, 46.81, 40.10, 30.22, 26.38, 14.28, 14.18 ppm; ESI-HRMS: calcd. for C\(_{21}\)H\(_{23}\)NO\(_6\)+H 386.1604, found 386.1629.

**Diethyl-2,2'-(3-(1-methyl-2-oxoindolin-3-yl)dihydrofuran-2,5-diylidene)(2\text{Z},2'\text{E})-diacetate (3m-E,Z)**

White solid; m.p. 142-143 °C; Yield 37%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta\): 7.30 (t, \(J = 8.0\) Hz, 1H), 7.20 (d, \(J = 7.6\) Hz, 1H), 7.00 (t, \(J = 7.2\) Hz,
1H), 6.83 (t, J = 7.6 Hz, 1H), 5.61 (t, J = 2.0 Hz, 1H), 5.35 (d, J = 1.6 Hz, 1H), 4.20-4.25 (m, 2H), 4.01-4.08 (m, 2H), 3.90-3.95 (m, 1H), 3.74 (d, J = 3.2 Hz, 1H), 3.22 (s, 3H), 3.17 (ddd, J = 18.8, 12.0, 2.0 Hz, 1H), 2.35 (ddd, J = 18.9, 6.6, 2.2 Hz, 1H), 1.31 (t, J = 7.2 Hz, 3H), 1.19 (t, J = 7.2 Hz, 3H).

$^{13}$C NMR (100 MHz, CDCl$_3$) δ = 174.56, 170.97, 167.99, 167.03, 164.22, 144.78, 129.38, 124.51, 123.54, 123.11, 108.58, 95.77, 93.76, 60.24, 59.93, 47.66, 41.49, 28.43, 26.51, 14.30, 14.23 ppm; ESI-HRMS: calcd. for C$_{21}$H$_{23}$NO$_6$+H 386.1604, found 386.1636.

Ethyl-(E)-2-((E)-3-(1,5-dimethyl-2-oxoindolin-3-yl)-5-(2-methoxy-2-oxoethylidene)dihydrofuran-2(3H)-ylidene)acetate (3n-E,E)

White solid; m.p. 159-160 °C; Yield 13%; $^1$H NMR (400 MHz, CDCl$_3$) δ = 7.24 (s, 1H), 7.03 – 7.17 (m, 1H), 6.71 (d, J = 7.6 Hz, 1H), 5.82 (d, J = 2.0 Hz, 1H), 5.60 (t, J = 2.0 Hz, 1H), 4.26 – 4.39 (m, 1H), 4.23 (d, J = 3.2 Hz, 1H), 4.19 (q, J = 7.0 Hz, 2H), 3.62 (s, 3H), 3.11 (s, 3H), 2.94 (ddd, J = 20.0, 10.4, 2.6 Hz, 1H), 2.67 (dt, J = 19.6, 2.0 Hz, 1H), 2.35 (s, 3H), 1.29 (t, J = 7.0 Hz, 3H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) δ = 174.89, 173.68, 171.10, 167.76, 167.26, 142.10, 132.54, 128.89, 126.41, 124.71, 108.02, 95.82, 94.16, 60.13, 51.02, 47.60, 39.82, 30.49, 26.00, 21.04, 14.33 ppm; ESI-HRMS: calcd. for C$_{21}$H$_{23}$NO$_6$+Na 386.1604, found 408.1442.

Ethyl-(E)-2-((Z)-3-(1,5-dimethyl-2-oxoindolin-3-yl)-5-(2-methoxy-2-oxoethylidene)dihydrofuran-2(3H)-ylidene)acetate (3n-Z,E)

White solid; m.p. 151-152 °C; Yield 13%; $^1$H NMR (400 MHz, CDCl$_3$) δ = 7.05 (dt, J = 7.6, 0.8 Hz, 1H), 6.89 (s, 1H), 6.68 (d, J = 8.0 Hz, 1H), 5.83 (d, J = 1.2 Hz, 1H), 5.33 (t, J = 2.0 Hz, 1H), 4.52 (m, 1H), 4.17 – 4.33 (m, 3H), 3.56 (s, 3H), 3.21 (s, 3H), 2.99 (ddd, J = 19.2, 10.2, 2.4 Hz, 1H), 2.51 (dt, J = 19.2, 2.0 Hz, 1H), 2.26 (s, 3H), 1.33 (t, J = 7.2 Hz, 3H) ppm; $^{13}$C
NMR (100 MHz, CDCl$_3$) $\delta$ = 174.75, 173.09, 170.90, 167.13, 166.22, 142.55, 132.08, 129.09, 124.85, 123.88, 107.92, 96.72, 93.85, 60.51, 51.02, 46.86, 40.05, 30.30, 26.41, 21.05, 14.29 ppm; ESI-HRMS: calcd. for C$_{21}$H$_{23}$NO$_6$+H 386.1604, found 386.1631.

**Ethyl-(Z)-2-((E)-3-(1,5-dimethyl-2-oxoindolin-3-yl)-5-(2-methoxy-2-oxoethylidene)dihydrofuran-2(3H)-ylidene)acetate (3n-E,Z)**

White solid; m.p. 124-125 ºC; Yield 25%; $^1$H NMR (400 MHz, CDCl$_3$) $\delta$ = 7.10 (d, $J$ = 8.0 Hz, 1H), 6.99 (s, 1H), 6.72 (d, $J$ = 8.0 Hz, 1H), 5.65 (t, $J$ = 2.0 Hz, 1H), 5.34 (d, $J$ = 1.6 Hz, 1H), 4.24 (qd, $J$ = 7.1, 2.5 Hz, 2H), 3.89-3.95 (m, 1H), 3.71 (d, $J$ = 2.8 Hz, 1H), 3.61 (s, 3H), 3.21 (ddd, $J$ = 18.6, 10.2, 1.9 Hz, 3H), 2.36 (ddd, $J$ = 18.9, 7.0, 2.2 Hz, 1H), 2.27 (s, 3H), 1.32 (t, $J$ = 6.8 Hz, 3H). $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ = 174.50, 171.29, 168.05, 167.46, 164.23, 142.42, 132.70, 129.63, 125.19, 123.59, 108.35, 95.37, 93.68, 60.23, 51.19, 47.51, 41.49, 28.48, 26.53, 21.15, 14.30 ppm; ESI-HRMS: calcd. for C$_{21}$H$_{23}$NO$_6$+H 386.1604, found 386.1628.

**Diethyl-2,2'-(3-(1,5-dimethyl-2-oxoindolin-3-yl)dihydrofuran-2,5-diylidene)(2E,2'E)-diacetate (3o-E,E)**

White solid; m.p. 140-141 ºC; Yield 25%; $^1$H NMR (400 MHz, CDCl$_3$) $\delta$: 7.23 (s, 1H), 7.09 (d, $J$ = 7.6 Hz, 1H), 6.70 (d, $J$ = 8.0 Hz, 1H), 5.81 (d, $J$ = 1.2 Hz, 1H), 5.58 (s, 1H), 4.31 (d, $J$ = 9.6 Hz, 1H), 4.23 (d, $J$ = 3.2 Hz, 1H), 4.18 (q, $J$ = 7.2 Hz, 2H), 4.01 – 4.12 (m, 2H), 3.11 (s, 3H), 2.93 (ddd, $J$ = 19.6, 10.2, 2.4 Hz, 1H), 2.67 (d, $J$ = 20.0 Hz, 1H), 2.35 (s, 3H), 1.29 (t, $J$ = 7.2 Hz, 3H), 1.21 (t, $J$ = 7.2 Hz, 3H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) $\delta$ = 174.91, 173.69, 170.84, 167.33, 167.29, 142.08, 132.52, 128.87, 126.38, 124.63, 108.00, 95.73, 94.58, 60.11, 59.66, 47.56, 39.87, 30.43,
26.11, 21.03, 14.33, 14.25 ppm; ESI-HRMS: calcd. for C$_{22}$H$_{25}$NO$_6$+H 400.1760, found 400.1769.

**Diethyl-2,2'-(3-(1,5-dimethyl-2-oxoindolin-3-yl)dihydrofuran-2,5-diylidene)(2Z,2'E)-diacetate (3o-Z,E)**

White solid; m.p. 151-152 °C; Yield 25%; $^1$H NMR (400 MHz, CDCl$_3$) δ = 7.05 (d, J = 8.0 Hz, 1H), 6.89 (s, 1H), 6.68 (d, J = 8.0 Hz, 1H), 5.83 (d, J = 1.6 Hz, 1H), 5.31 (t, J = 2.0 Hz, 1H), 4.45 – 4.57 (m, 1H), 4.16 – 4.33 (m, 3H), 3.91 – 4.10 (m, 2H), 3.21 (s, 3H), 2.97 (ddd, J = 19.6, 10.2, 2.6 Hz, 1H), 2.51 (dt, J = 19.6, 1.8 Hz, 1H), 2.26 (s, 3H), 1.33 (t, J = 7.0 Hz, 3H), 1.16 (t, J = 7.0 Hz, 3H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) δ = 174.81, 173.13, 170.63, 166.69, 166.28, 142.56, 132.10, 129.09, 124.92, 123.91, 107.90, 96.63, 94.37, 60.52, 59.74, 46.88, 40.14, 30.28, 26.41, 21.06, 14.30, 14.21 ppm; ESI-HRMS: calcd. for C$_{22}$H$_{25}$NO$_6$+H 400.1760, found 400.1774.

**Diethyl-2,2'-(3-(1,5-dimethyl-2-oxoindolin-3-yl)dihydrofuran-2,5-diylidene)(2Z,2'E)-diacetate (3o-E,Z)**

White solid; m.p. 123-124 °C; Yield 26%; $^1$H NMR (400 MHz, CDCl$_3$) δ = 7.10 (d, J = 6.8 Hz, 1H), 7.00 (s, 1H), 6.72 (d, J = 7.6 Hz, 1H), 5.64 (t, J = 2.0 Hz, 1H), 5.34 (d, J = 1.6 Hz, 1H), 4.24 (qd, J = 7.1, 2.5 Hz, 2H), 4.03-4.09 (m, 2H), 3.88-3.94 (m, 1H), 3.71 (d, J = 3.2 Hz, 1H), 3.21 (s, 3H), 3.20 (ddd, J = 18.6, 10.1, 1.9 Hz, 3H), 2.36 (ddd, J = 18.8, 7.0, 2.2 Hz, 1H), 2.28 (s, 3H), 1.32 (t, J = 7.2 Hz, 3H), 1.20 (t, J = 6.8 Hz, 3H). $^{13}$C NMR (100 MHz, CDCl$_3$) δ = 174.50, 171.02, 168.02, 167.03, 164.24, 142.38, 132.66, 129.58, 125.20, 124.80, 123.57, 108.29, 95.76, 93.55, 60.19, 59.92, 47.44, 41.52, 28.40, 26.49, 21.13, 14.27, 14.20 ppm; ESI-HRMS: calcd. for C$_{22}$H$_{25}$NO$_6$+H 400.1760, found 400.1768.

**Benzyl-(E)-2-((E)-4-(5-(tert-butyl)-1-methyl-2-oxoindolin-3-yl)-5-(2-ethoxy-2-oxoethylidene)dihydrofuran-2(3H)-ylidene)acetate (3p-E,E)**
White solid; m.p. 109-110 °C; Yield 17%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta = 7.40\) (s, 1H), 7.27 – 7.35 (m, 6H), 6.73 (d, \(J = 8.0\) Hz, 1H), 5.83 (d, \(J = 1.6\) Hz, 1H), 5.65 (t, \(J = 2.0\) Hz, 1H), 5.10 (d, \(J = 12.4\) Hz, 1H), 5.04 (d, \(J = 12.8\) Hz, 1H), 4.30 – 4.38 (m, 1H), 4.25 (d, \(J = 3.6\) Hz, 1H), 4.19 (q, \(J = 7.2\) Hz, 2H), 3.08 (s, 3H), 2.94 (ddd, \(J = 20.0, 10.4, 2.4\) Hz, 1H), 2.69 (dt, \(J = 19.6, 2.0\) Hz, 1H), 1.34 (s, 9H), 1.30 (t, \(J = 7.2\) Hz, 3H) ppm; \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta = 175.04, 173.39, 171.39, 167.20, 167.17, 146.23, 142.07, 136.15, 128.48, 128.05, 128.00, 126.03, 125.36, 120.95, 107.77, 96.11, 94.29, 65.67, 60.14, 47.60, 39.93, 34.61, 31.61, 30.64, 26.08, 14.34 ppm; ESI-HRMS: calcd. for C\(_{30}\)H\(_{33}\)NO\(_6\)+H 504.2386, found 504.2382.

**Benzyl-(Z)-2-((E)-4-(5-(tert-butyl)-1-methyl-2-oxoindolin-3-yl)-5-(2-ethoxy-2-oxoethylidene)dihydrofuran-2(3H)-ylidene)acetate (3p-Z,E)**

Yield 36%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta = 7.28 - 7.38\) (m, 5H), 7.24 (d, \(J = 1.6\) Hz, 1H), 7.11 (s, 1H), 6.65 (d, \(J = 8.0\) Hz, 1H), 5.85 (s, 1H), 5.31 (s, 1H), 4.99 (s, 2H), 4.53 (d, \(J = 9.2\) Hz, 1H), 4.22 – 4.33 (m, 2H), 4.20 (d, \(J = 3.2\) Hz, 1H), 3.17 (s, 3H), 2.90 (ddd, \(J = 19.2, 9.8, 2.4\) Hz, 1H), 2.54 (d, \(J = 19.2\) Hz, 1H), 1.24 (s, 12H) ppm; \(^{13}\)C NMR (100 MHz, CDCl\(_3\)) \(\delta = 173.91, 172.22, 169.96, 165.96, 165.23, 144.59, 141.40, 135.13, 127.45, 127.03, 126.86, 124.27, 122.41, 120.49, 106.57, 95.72, 93.18, 64.46, 59.58, 46.25, 39.36, 33.35, 30.35, 29.36, 28.68, 25.35, 13.30 ppm; ESI-HRMS: calcd. for C\(_{30}\)H\(_{33}\)NO\(_6\)+H 504.2386, found 504.2384.

**Benzyl-(E)-2-((Z)-4-(5-(tert-butyl)-1-methyl-2-oxoindolin-3-yl)-5-(2-ethoxy-2-oxoethylidene)dihydrofuran-2(3H)-ylidene)acetate (3p-E,Z)**

Yield 36%; \(^1\)H NMR (400 MHz, CDCl\(_3\)) \(\delta = 7.23 - 7.34\) (m, 7H), 6.71 (d, \(J = 8.0\) Hz, 1H),
5.58 (t, J = 2.0 Hz, 1H), 5.38 (d, J = 1.2 Hz, 1H), 5.03 (s, 2H), 4.24 (qd, J = 7.1, 1.6 Hz, 1H), 3.88-3.93 (m, 1H), 3.68 (d, J = 3.2 Hz, 1H), 3.18 (s, 3H), 3.07 (ddd, J = 19.0, 10.1, 2.2 Hz, 1H), 2.43 (ddd, J = 19.0, 4.9, 1.9 Hz, 1H), 1.32 (t, J = 7.2 Hz, 3H), 1.24 (s, 9H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) δ = 174.57, 171.66, 167.92, 166.67, 164.14, 146.23, 142.23, 136.12, 128.47, 128.05, 127.88, 125.75, 123.07, 121.68, 107.92, 95.11, 94.30, 65.61, 60.21, 48.67, 41.60, 34.43, 31.32, 28.86, 26.44, 14.30 ppm; ESI-HRMS: calcd. for C$_{30}$H$_{33}$NO$_6$+H 504.2386, found 504.2388.

**benzyl (E)-2-((E)-5-(2-isopropoxy-2-oxoethylidene)-4-(2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3q-E,E)**

$^1$H NMR (400 MHz, CDCl$_3$) δ = 7.51 (s, 1H), 7.41 (d, J = 7.6 Hz, 1H), 7.23 – 7.36 (m, 6H), 7.08 (td, J = 7.6, 1.2 Hz, 1H), 6.84 (d, J = 8.0 Hz, 1H), 5.79 (d, J = 1.2 Hz, 1H), 5.65 (t, J = 1.9 Hz, 1H), 4.99 – 5.14 (m, 3H), 4.31 – 4.36 (m, 1H), 4.30 (d, J = 3.2 Hz, 1H), 2.98 (qd, J = 19.8, 10.2 Hz, 2.6 Hz, 1H), 2.82 (dt, J = 19.6, 1.8 Hz, 1H), 1.26 (d, J = 6.0 Hz, 6H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) δ = 176.53, 172.96, 171.31, 167.14, 166.64, 141.29, 136.11, 128.69, 128.49, 128.06, 128.02, 127.08, 124.39, 122.96, 109.74, 96.56, 94.32, 76.68, 67.47, 65.71, 47.88, 39.81, 30.71, 22.01, 21.99 ppm. ESI-HRMS: calcd. for C$_{26}$H$_{25}$NO$_6$+H 448.1760, found 448.1751.

**benzyl (Z)-2-((E)-5-(2-isopropoxy-2-oxoethylidene)-4-(2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3q-Z,E)**

$^1$H NMR (400 MHz, CDCl$_3$) δ: 8.47 (s, 1H), 7.18 – 7.38 (m, 6H), 7.10 (d, J = 7.2 Hz, 1H), 6.94 (t, J = 8.0 Hz, 1H), 6.85 (d, J = 7.6 Hz, 1H), 5.83 (s, 1H), 5.38 (s, 1H), 5.16 (m, 1H), 4.96 – 5.10 (q, J = 12.4 Hz, 2H), 4.54 (d, J = 10.0 Hz, 1H), 4.35 (s, 1H), 3.05 (dd, J = 19.6, 10.0 Hz, 1H), 2.74 (d, J = 19.6 Hz, 1H), 1.33 (d, J = 6.2 Hz, 6H) ppm; $^{13}$C NMR (100 MHz, CDCl$_3$) δ: 195.94, 176.91, 172.56, 170.88, 166.46, 165.79, 141.99,
benzyl (E)-2-((Z)-5-(2-isopropoxy-2-oxoethylidene)-4-(2-oxoindolin-3-yl)dihydrofuran-2(3H)-ylidene)acetate (3q-E,Z)

$^{1}H$ NMR (400 MHz, CDCl$_3$) $\delta$ = 8.44 (s, 1H), 7.17-7.36 (m, 7H), 6.98 (t, $J$ = 7.6 Hz, 1H), 6.86 (d, $J$ = 7.6 Hz, 1H), 5.66 (t, $J$ = 2.0 Hz, 1H), 5.35 (d, $J$ = 1.6 Hz, 1H), 5.16-5.17 (m, 1H), 5.00-5.10 (m, 2H), 3.87-3.92 (m, 1H), 3.76 (d, $J$ = 3.2 Hz, 1H), 3.23 (ddd, $J$ = 18.9, 10.1, 2.1 Hz, 1H), 2.50 (ddd, $J$ = 18.9, 6.3, 2.2 Hz, 1H), 1.30 (dd, $J$ = 6.0, 3.6 Hz, 6H) ppm; $^{13}C$ NMR (100 MHz, CDCl$_3$) $\delta$ = 176.50, 171.46, 167.45, 166.77, 163.68, 141.80, 136.05, 129.34, 128.54, 128.47, 128.06, 127.97, 127.92, 124.81, 124.05, 123.05, 110.20, 95.36, 94.47, 67.63, 65.71, 48.11, 41.43, 28.65, 21.93 ppm; ESI-HRMS: calcd. for C$_{26}$H$_{25}$NO$_6$+H 448.1760, found 448.1755.


5. Representative spectra of 3.
6. 2D NMR

HMQC-3cZ,E
**Dept-135**

**NOESY-3c-Z,E**
7. X-Ray crystal structure of 3l-E,E