

## Supporting Information

© Copyright Wiley-VCH Verlag GmbH & Co. KGaA, 69451 Weinheim, 2014

### **Synthesis, Anti-tubulin and Antiproliferative SAR of Steroidomimetic Dihydroisoquinolinones**

Mathew P. Leese,<sup>[a]</sup> Fabrice L. Jourdan,<sup>[a]</sup> Meriel R. Major,<sup>[a]</sup> Wolfgang Dohle,<sup>[a]</sup>  
Mark P. Thomas,<sup>[a]</sup> Ernest Hamel,<sup>[b]</sup> Eric Ferrandis,<sup>[c]</sup> Mary F. Mahon,<sup>[d]</sup> Simon P. Newman,<sup>[e]</sup>  
Atul Purohit,<sup>[e]</sup> and Barry V. L. Potter<sup>\*[a]</sup>

cmdc\_201400017\_sm\_miscellaneous\_information.pdf

**Contents:**

<b><sup>13</sup>C NMR Data</b>	<b>Pages 1-4</b>
<b>Elemental Analyses</b>	<b>Pages 4-6</b>
<b>Computational Methods</b>	<b>Pages 6-7</b>

**<sup>13</sup>C NMR data for selected compounds.**

**4** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 25.4, 36.4, 51.3, 104.0, 111.1, 129.5, 146.9, 150.9, 152.5, 206.0.

**6a** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.0, 40.5, 56.3, 70.9, 110.6, 111.7, 121.8, 127.3, 128.1, 128.7, 132.4, 136.5, 148.4, 151.4, 166.4.

**6c** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 13.0, 18.0, 27.8, 40.5, 55.6, 111.0, 118.9, 122.1, 132.3, 149.2, 150.0, 166.9.

**7a** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 27.9, 45.4, 46.3, 55.4, 56.3, 65.9, 110.2, 110.3, 111.1, 111.2, 120.7, 120.8, 122.3, 124.9, 125.6, 128.2, 128.4, 128.9, 129.4, 131.7, 148.4, 151.1, 156.5, 157.6, 164.8.

**7b1** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 13.0, 18.0, 27.5, 45.7, 50.4, 55.3, 55.6, 111.5, 112.8, 113.6, 118.5, 120.4, 122.6, 129.6, 131.5, 139.3, 148.9, 150.0, 159.9, 164.6.

**7b2** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 27.6, 45.6, 50.4, 55.2, 56.2, 70.8, 111.5, 112.6, 112.8, 113.6, 118.5, 119.4, 120.4, 122.3, 129.7, 129.8, 131.6, 138.2, 139.3, 148.5, 151.0, 159.9, 164.7.

**7c** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 13.0, 18.0, 27.4, 45.6, 49.9, 55.3, 55.6, 111.5, 113.9, 118.5, 122.4, 129.5, 129.9, 131.4, 148.8, 150.0, 158.9, 164.8.

**7d** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 27.8, 45.5, 50.5, 55.5, 56.3, 70.9, 99.3, 106.0, 111.2, 111.5, 122.3, 127.3, 128.1, 128.8, 131.6, 136.6, 140.2, 148.6, 151.0, 161.1, 164.7.

**7e** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 27.8, 45.5, 50.6, 56.3, 61.0, 70.9, 105.0, 111.2, 111.5, 122.3, 127.2, 128.1, 128.8, 131.5, 133.5, 136.5, 137.2, 148.6, 151.1, 153.5, 164.7.

**8a** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 27.7, 45.5, 46.3, 55.5, 56.3, 110.3, 110.5, 112.7, 120.7, 121.9, 125.7, 128.4, 129.3, 132.6, 145.5, 148.9, 157.6, 164.9.

**8b** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 27.6, 45.6, 50.4, 55.3, 56.3, 110.6, 112.7, 112.9, 113.6, 120.4, 121.7, 129.8, 132.5, 139.4, 145.7, 148.9, 159.9, 164.7.

**8c** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 27.5, 45.5, 49.9, 55.3, 56.2, 110.6, 112.8, 114.0, 121.5, 129.4, 129.7, 132.4, 145.8, 149.0, 159.0, 164.8.

## Supporting information

**8d** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 27.6, 45.6, 50.5, 55.5, 56.3, 99.3, 105.9, 110.6, 112.7, 121.6, 132.6, 140.2, 145.7, 148.9, 161.1, 164.8.

**8e** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 27.7, 45.5, 50.6, 56.2, 56.3, 61.0, 104.9, 110.5, 112.8, 121.6, 132.5, 133.5, 137.2, 145.7, 149.0, 153.5, 164.8.

**9a** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 27.1, 45.8, 46.1, 55.4, 56.7, 110.4, 113.0, 120.8, 122.8, 125.1, 128.8, 129.4, 129.6, 131.7, 141.1, 150.4, 157.6, 163.6.

**9b** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 27.1, 45.8, 50.7, 55.3, 56.6, 113.0, 113.1, 113.7, 120.3, 122.9, 128.9, 129.8, 131.5, 138.6, 141.2, 150.6, 159.9, 163.6.

**9c** (67.5 MHz, CDCl<sub>3</sub>/methanol-*d*<sub>4</sub> 10:1):  $\delta$  = 27.0, 45.3, 50.2, 55.3, 56.4, 112.8, 114.1, 122.7, 128.6, 129.0, 129.4, 131.3, 141.3, 150.6, 159.1, 163.8.

**9d** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 27.0, 46.0, 50.4, 55.7, 56.5, 99.3, 106.0, 112.4, 122.3, 128.1, 131.7, 140.5, 141.8, 151.0, 161.2, 163.3.

**9e** (67.5 MHz, DMSO-*d*<sub>6</sub>):  $\delta$  = 27.0, 45.8, 50.4, 56.4, 56.5, 56.6, 105.3, 112.5, 122.3, 128.2, 131.8, 133.9, 137.1, 141.8, 151.0, 153.5, 163.9.

**10a** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.5, 45.3, 56.2, 56.3, 70.9, 111.1, 111.2, 112.1, 120.8, 120.9, 127.3, 127.5, 128.3, 128.8, 132.4, 133.7, 135.4, 136.1, 148.8, 152.5, 156.6, 163.4.

**10b** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.5, 45.1, 55.7, 56.1, 70.8, 111.0, 111.1, 113.2, 119.9, 120.3, 120.6, 127.1, 128.2, 128.7, 129.8, 133.4, 135.9, 140.4, 148.8, 152.6, 159.5, 163.3.

**10c** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.7, 45.0, 55.7, 56.2, 71.0, 111.1, 111.2, 114.0, 120.9, 127.2, 128.3, 128.8, 130.8, 130.9, 133.5, 136.0, 148.9, 152.6, 163.5, 163.7.

**10d** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.7, 45.2, 56.2, 71.0, 111.1, 111.3, 120.4, 126.9, 127.2, 128.3, 128.4, 128.9, 130.1, 133.6, 133.8, 135.0, 135.9, 141.0, 149.0, 152.9, 163.4.

**10e** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.3, 44.9, 53.2, 56.2, 70.9, 111.0, 111.3, 120.7, 127.3, 128.3, 128.8, 129.1, 130.6, 132.3, 133.4, 133.7, 134.0, 136.1, 137.9, 148.8, 152.7, 163.5, 167.2.

**11a** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.4, 45.3, 56.3, 56.3, 110.7, 112.1, 112.9, 120.4, 120.7, 127.6, 132.4, 134.6, 135.4, 145.9, 150.5, 156.6, 163.4.

**11b** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.4, 45.1, 55.7, 56.2, 110.6, 112.8, 113.1, 120.0, 120.2, 120.3, 129.8, 134.4, 140.5, 145.9, 150.6, 159.5, 163.3.

**11c** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 23.4, 44.9, 55.6, 56.2, 110.5, 112.8, 113.9, 120.2, 130.7, 130.8, 134.4, 145.9, 150.5, 163.4, 163.6.

**11d** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.5, 45.3, 56.3, 110.6, 113.0, 119.9, 126.9, 128.5, 130.1, 133.8, 134.6, 135.0, 141.0, 146.1, 150.9, 163.4.

**11e** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.2, 44.9, 53.2, 56.3, 110.5, 112.9, 120.2, 129.1, 130.5, 132.4, 133.3, 133.7, 134.9, 137.9, 145.9, 150.6, 163.6, 167.3.

Supporting information

- 12a** (67.5 MHz, DMSO-*d*<sub>6</sub>):  $\delta$  = 27.7, 45.6, 56.6, 57.0, 112.6, 113.6, 120.8, 122.5, 126.5, 127.3, 131.8, 133.5, 136.3, 143.4, 151.3, 157.0, 162.4.
- 12c** (100 MHz, DMSO-*d*<sub>6</sub>):  $\delta$  = 27.2, 44.8, 55.8, 56.1, 112.0, 114.2, 121.9, 125.8, 130.1, 130.6, 132.9, 142.9, 150.7, 162.1, 163.4.
- 12d** (67.5 MHz, DMSO-*d*<sub>6</sub>):  $\delta$  = 27.7, 45.5, 56.7, 112.6, 122.5, 126.0, 127.3, 128.2, 131.8, 133.7, 134.1, 134.6, 141.2, 143.6, 151.3, 162.9.
- 12e** (67.5 MHz, DMSO-*d*<sub>6</sub>):  $\delta$  = 27.5, 45.0, 53.8, 56.6, 112.6, 122.5, 126.2, 129.7, 131.3, 132.7, 133.0, 133.5, 134.8, 137.0, 143.5, 151.3, 162.6, 167.5.
- 14f** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 27.8 and 29.0, 40.5 and 49.5, 44.4 and 45.3, 55.5, 56.1, 71.1, 101.9, 104.6, 105.0, 109.2, 109.9, 110.7, 114.2, 125.6, 127.3, 128.0, 128.7, 137.1, 138.1, 146.9, 160.9.
- 15a** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.3, 43.4, 55.7, 56.2, 70.9, 110.8, 111.2, 111.4, 120.8, 121.1, 127.3, 127.5, 128.3, 128.5, 128.9, 131.5, 134.8, 136.1, 148.7, 152.6, 155.6, 165.0, 170.8.
- 15b** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.2, 44.6, 55.5, 56.2, 71.0, 111.4, 111.5, 113.2, 117.4, 120.4, 120.7, 127.3, 128.3, 128.9, 129.2, 134.5, 136.1, 138.0, 148.9, 152.8, 159.4, 165.6, 174.5.
- 15c** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.1, 44.4, 56.1, 71.0, 111.3, 111.4, 112.4, 118.1, 120.0, 127.1, 128.2, 127.8, 129.0, 131.5, 131.9, 134.3, 134.5, 135.8, 138.0, 149.0, 153.1, 165.4, 172.1.
- 15d** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 29.7, 44.9, 55.5, 56.2, 70.9, 111.3, 111.5, 113.4, 121.1, 127.3, 128.3, 128.5, 128.9, 130.9, 134.4, 136.1, 148.7, 152.6, 158.3, 162.6, 174.1.
- 15e** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 27.5, 44.3, 55.2, 55.3, 55.4, 70.2, 109.2, 110.6, 110.7, 110.8, 120.8, 122.5, 127.2, 128.2, 128.5, 128.7, 134.3, 136.0, 148.6, 148.8, 152.1, 152.6, 165.7, 174.2.
- 15f** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.2, 44.6, 55.6, 56.1, 71.0, 103.4, 105.8, 111.4, 111.5, 120.7, 127.2, 128.2, 128.8, 134.5, 136.0, 138.7, 148.8, 152.7, 160.4, 165.5, 174.5.
- 15g** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.2, 45.0, 56.2, 56.3, 61.0, 71.0, 105.7, 111.4, 111.5, 120.7, 127.3, 128.4, 128.9, 131.8, 134.4, 136.1, 141.1, 148.9, 152.8, 152.9, 165.6, 174.4.
- 16a** (67.5 MHz, DMSO-*d*<sub>6</sub>):  $\delta$  = 27.8, 43.5, 56.1, 111.7, 111.9, 114.5, 119.2, 120.8, 128.2, 128.5, 131.4, 136.1, 147.5, 152.6, 155.8, 164.7, 170.3.
- 16b** (67.5 MHz, DMSO-*d*<sub>6</sub>):  $\delta$  = 27.7, 45.0, 55.8, 56.1, 111.7, 113.8, 114.6, 116.9, 118.9, 120.7, 129.7, 136.2, 138.8, 147.5, 152.7, 159.4, 165.4, 174.2.
- 16c** (67.5 MHz, acetone-*d*<sub>6</sub>):  $\delta$  = 27.4, 44.5, 55.5, 111.2, 112.0, 113.9, 118.1, 119.4, 129.3, 131.5, 132.2, 133.9, 136.2, 139.0, 147.0, 152.1, 165.1, 172.0.
- 16d** (67.5 MHz, DMSO-*d*<sub>6</sub>):  $\delta$  = 27.2, 44.8, 55.4, 55.6, 111.2, 113.3, 114.1, 118.6, 128.4, 130.7, 135.5, 146.9, 152.0, 162, 165.1, 173.6.

## Supporting information

**16e** (100 MHz, DMSO-*d*<sub>6</sub>):  $\delta$  = 27.2, 44.9, 55.5, 55.6, 55.7, 110.6, 111.2, 111.6, 114.1, 118.6, 122.6, 128.5, 135.5, 147.0, 148.1, 151.8, 152.1, 165.1, 173.7.

**16f** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.1, 44.7, 55.6, 56.2, 103.3, 105.8, 111.0, 113.1, 120.1, 135.4, 138.8, 146.0, 150.8, 160.2, 165.5, 174.4.

**16g** (67.5 MHz, CDCl<sub>3</sub>):  $\delta$  = 28.0, 45.0, 56.2, 56.3, 61.0, 105.7, 111.0, 113.2, 120.2, 131.9, 135.4, 141.1, 146.1, 150.8, 152.9, 165.6, 174.4.

**17a** (100 MHz, DMSO-*d*<sub>6</sub>):  $\delta$  = 27.4, 43.4, 56.0, 56.1, 111.4, 112.4, 120.3, 122.0, 126.3, 127.2, 128.1, 131.2, 133.8, 142.7, 150.6, 155.4, 163.7, 169.9.

**17b** (100 MHz, DMSO-*d*<sub>6</sub>):  $\delta$  = 26.8, 44.4, 55.3, 56.0, 112.4, 113.4, 116.7, 120.3, 122.1, 126.0, 129.3, 134.0, 137.8, 142.9, 150.6, 158.9, 164.3, 173.7.

**17c** (67.5 MHz, acetone-*d*<sub>6</sub>):  $\delta$  = 27.0, 44.5, 55.7, 112.1, 112.7, 118.0, 123.0, 126.8, 129.4, 131.6, 132.3, 134.2, 134.3, 138.5, 143.4, 151.4, 165.1, 172.0.

**17d** (67.5 MHz, CDCl<sub>3</sub>/methanol-*d*<sub>4</sub> 5:1):  $\delta$  = 28.9, 46.5, 56.9, 57.7, 114.8, 114.9, 115.0, 124.3, 128.5, 129.2, 132.5, 135.1, 144.5, 152.5, 164.4, 166.7, 176.5.

**17e** (67.5 MHz, acetone-*d*<sub>6</sub>):  $\delta$  = 27.9, 45.8, 56.1, 56.2, 56.4, 111.2, 113.0, 113.3, 123.7, 123.8, 128.0, 129.3, 134.7, 143.8, 149.6, 152.1, 153.6, 165.4, 174.6.

**17f** (67.5 MHz, CDCl<sub>3</sub>/methanol-*d*<sub>4</sub> 10:1):  $\delta$  = 27.6, 44.6, 55.5, 56.4, 103.7, 105.9, 113.1, 122.9, 127.0, 133.7, 138.1, 143.1, 150.9, 160.6, 165.0, 174.4.

**17g** (67.5 MHz, DMSO-*d*<sub>6</sub>):  $\delta$  = 27.2, 45.2, 56.5, 56.7, 56.8, 106.4, 112.9, 122.5, 126.7, 132.3, 134.4, 140.9, 143.3, 151.1, 153.0, 164.7, 174.1.

## Elemental Analyses for selected compounds.

Compound	Formula	Found			Expected		
		C	H	N	C	H	N
<b>7a</b>	C <sub>26</sub> H <sub>27</sub> NO <sub>5</sub>	71.9	6.27	3.16	72.04	6.28	3.23
<b>7b2</b>	C <sub>26</sub> H <sub>27</sub> NO <sub>5</sub>	71.7	6.26	3.25	72.04	6.28	3.23
<b>7d</b>	C <sub>26</sub> H <sub>27</sub> NO <sub>5</sub>	72.2	6.25	3.22	72.04	6.28	3.23
<b>7e</b>	C <sub>27</sub> H <sub>29</sub> NO <sub>6</sub>	69.8	6.37	3.06	69.96	6.31	3.02
<b>8a</b>	C <sub>18</sub> H <sub>19</sub> NO <sub>4</sub>	68.6	6.10	4.30	68.99	6.11	4.47
<b>8b</b>	C <sub>18</sub> H <sub>19</sub> NO <sub>4</sub>	68.9	6.28	4.28	68.99	6.11	4.47
<b>8c</b>	C <sub>18</sub> H <sub>19</sub> NO <sub>4</sub>	68.5	6.17	4.45	68.99	6.11	4.47
<b>8d</b>	C <sub>19</sub> H <sub>21</sub> NO <sub>5</sub>	65.0	6.16	3.60	66.46	6.16	4.08
<b>8e</b>	C <sub>20</sub> H <sub>23</sub> NO <sub>6</sub>	63.9	6.16	3.60	64.33	6.21	3.75
<b>9a</b>	C <sub>18</sub> H <sub>20</sub> N <sub>2</sub> O <sub>6</sub> S	54.8	5.38	7.50	55.09	5.14	7.14
<b>9b</b>	C <sub>18</sub> H <sub>20</sub> N <sub>2</sub> O <sub>6</sub> S	54.8	5.21	6.99	55.09	5.14	7.14

## Supporting information

<b>9c</b>	$C_{18}H_{20}N_2O_6S$	54.7	5.12	6.99	55.09	5.14	7.14
<b>9d</b>	$C_{19}H_{22}N_2O_7S$	53.1	5.33	6.32	54.02	5.25	6.63
<b>9e</b>	$C_{20}H_{24}N_2O_8S$	52.9	5.35	6.04	53.09	5.35	6.19
<b>10a</b>	$C_{24}H_{23}NO_6S$	63.5	5.11	3.20	63.56	5.11	3.09
<b>11a</b>	$C_{17}H_{17}NO_6S$	55.7	4.68	3.85	56.19	4.72	3.85
<b>11b</b>	$C_{17}H_{17}NO_6S$	56.0	4.80	3.67	56.19	4.72	3.85
<b>11d</b>	$C_{16}H_{14}ClNO_5S$	52.0	4.02	3.66	52.25	3.84	3.81
<b>11e</b>	$C_{18}H_{17}NO_7S$	55.3	3.42	4.42	55.24	4.38	3.58
<b>12a</b>	$C_{17}H_{18}N_2O_8S_2$	45.8	4.04	6.20	46.15	4.10	6.33
<b>12c</b>	$C_{17}H_{18}N_2O_8S_2$	45.8	4.08	6.21	46.15	4.10	6.33
<b>12d</b>	$C_{16}H_{15}ClN_2O_7S_2$	42.9	3.43	6.20	43.0	3.38	6.27
<b>12e</b>	$C_{18}H_{18}N_2O_9S_2$	46.0	3.93	5.87	45.95	3.86	5.95
<b>14a</b>	$C_{25}H_{25}NO_4$	73.8	6.41	3.29	74.42	6.25	3.47
<b>14b</b>	$C_{25}H_{25}NO_4$	74.1	6.36	3.46	74.42	6.25	3.47
<b>14d</b>	$C_{25}H_{25}NO_4$	74.1	6.45	3.53	74.42	6.25	3.47
<b>14e</b>	$C_{26}H_{27}NO_5$	72.2	6.32	3.06	72.04	6.28	3.23
<b>14f</b>	$C_{26}H_{27}NO_5$	71.7	6.13	3.36	72.02	6.28	3.23
<b>14g</b>	$C_{27}H_{29}NO_6$	69.5	6.14	3.01	69.96	6.31	3.02
<b>15a</b>	$C_{25}H_{23}NO_5$	71.6	5.55	3.35	71.93	5.55	3.36
<b>15b</b>	$C_{25}H_{23}NO_5$	71.6	5.53	3.34	71.93	5.55	3.36
<b>15c</b>	$C_{25}H_{20}N_2O_4$ 0.25H <sub>2</sub> O	71.7	4.84	6.71	72.02	4.96	6.72
<b>15d</b>	$C_{25}H_{23}NO_5$	71.7	5.54	3.26	71.93	5.55	3.36
<b>15e</b>	$C_{26}H_{25}NO_6$	69.7	5.61	3.09	69.79	5.63	3.13
<b>15f</b>	$C_{26}H_{25}NO_6$	69.4	5.64	3.18	69.79	5.63	3.13
<b>15g</b>	$C_{27}H_{27}NO_7$	67.5	5.73	2.91	67.91	5.70	2.93
<b>16a</b>	$C_{18}H_{17}NO_5$ 0.5H <sub>2</sub> O	64.3	5.08	4.17	64.28	5.39	4.16
<b>16b</b>	$C_{18}H_{17}NO_5$	65.8	5.20	4.21	66.05	5.23	4.28
<b>16c</b>	$C_{18}H_{14}N_2O_4$	66.5	4.55	8.39	67.07	4.38	8.69
<b>16d</b>	$C_{18}H_{17}NO_5$	66.2	5.25	4.14	66.05	5.23	4.28
<b>16e</b>	$C_{19}H_{19}NO_6$	63.6	5.34	3.98	63.86	5.36	3.92
<b>16f</b>	$C_{19}H_{19}NO_6$	63.8	5.37	3.90	63.86	5.36	3.92
<b>16g</b>	$C_{20}H_{21}NO_7$ 0.5H <sub>2</sub> O	60.4	5.58	3.49	60.60	5.59	3.53
<b>17a</b>	$C_{18}H_{18}N_2O_7S$	52.6	4.54	6.70	53.20	4.46	6.89
<b>17b</b>	$C_{18}H_{18}N_2O_7S$	53.2	4.53	6.66	53.20	4.46	6.89
<b>17c</b>	$C_{18}H_{15}N_3O_6S$	53.4	3.83	10.1	53.86	3.77	10.47
<b>17d</b>	$C_{18}H_{18}N_2O_7S$	53.1	4.41	6.85	53.20	4.46	6.89
<b>17e</b>	$C_{19}H_{20}N_2O_8S$	52.1	4.62	6.36	52.29	4.62	6.42
<b>17f</b>	$C_{19}H_{20}N_2O_8S$	52.3	4.68	6.32	52.29	4.62	6.42

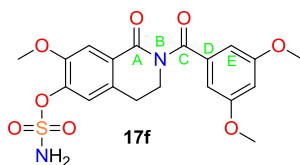
## Supporting information

<b>17g</b>	C <sub>20</sub> H <sub>22</sub> N <sub>2</sub> O <sub>9</sub> S	52.0	4.92	5.57	51.50	4.75	6.01
<b>18a</b>	C <sub>19</sub> H <sub>21</sub> NO <sub>5</sub>	66.8	6.10	4.00	66.46	6.16	4.08
<b>18b</b>	C <sub>19</sub> H <sub>21</sub> NO <sub>5</sub>	66.3	6.39	4.03	66.46	6.16	4.08
<b>19a</b>	C <sub>19</sub> H <sub>22</sub> N <sub>2</sub> O <sub>7</sub> S	54.4	5.43	6.38	54.02	5.25	6.63
<b>19b</b>	C <sub>19</sub> H <sub>22</sub> N <sub>2</sub> O <sub>7</sub> S	53.7	5.49	6.50	54.02	5.25	6.63

## Computational Methods.

The Schrödinger software running under Maestro version 9.2.112 was used for all computational work. The crystal structure of **17f** has been solved. One molecule was taken from this structure and run through a brief geometry optimisation procedure. This resulted in a slight change in the dihedral angle A-B-C-D from 31.6° to 29.0° and in the dihedral angle B-C-D-E from 48.1° to 47.2° (Figure 1).

**Figure 1.** Dihedral angles ABCD and BCDE in **17f**.



The Current Energy protocol within the MacroModel program was used to calculate the energy in the compound.

Total Energy =	-224.1113 kJ/mol
Stretch =	13.3092 kJ/mol
Bend =	42.5224 kJ/mol
Torsion =	80.0845 kJ/mol
Improper Torsion =	6.7536 kJ/mol
VDW =	89.2127 kJ/mol
Electrostatic =	-344.3110 kJ/mol
Explicit Hydrogen Bonds =	0.0000 kJ/mol
Cross Terms =	0.0000 kJ/mol
Solvation =	-111.6828 kJ/mol

Both dihedral angles were manually and independently adjusted in steps of 30° and the energy of the conformers was calculated as above. **16g** and **17g** were built by altering the crystal structure of **17f** to yield the desired structure which was then run through a brief geometry optimisation procedure. Conformers were generated and molecular energies calculated as described above.

**Table 1.** Conformer Energies for **17f**. <sup>a</sup>Data in kJ/mol.

Dihedral A-B-C-D	Dihedral B-C-D-E					
	17.2	47.2	77.2	107.2	137.2	167.2
<b>29.0</b>	-153.8	-224.1	-215.9	-187.1	7098.6	23188.6
<b>59.0</b>	-202.3	-204.3	-192.5	-178.7	-30.8	-157.6

Supporting information

<b>89.0</b>	-179.4	-177.3	-165.3	-165.3	-174.4	-176.7
<b>119.0</b>	-165.7	-66.7	-156.7	-166.6	-179.4	-180.8
<b>149.0</b>	2743.1	5097.0	-165.4	-183.4	-195.4	-139.4
<b>179.0</b>	3118.5	-86.8	-185.3	-187.5	-109.5	3146.5
<b>209.0</b>	-71.2	-200.9	-192.6	-171.8	11999.6	3011.5
<b>239.0</b>	-181.4	-188.7	-177.1	-159.9	178.7	0.013
<b>269.0</b>	-173.6	-171.1	-162.1	-162.4	-168.7	-168.6
<b>299.0</b>	-107.4	300.1	-159.4	-176.2	-188.2	-183.6
<b>329.0</b>	159239.8	2400.1	-178.4	-200.0	-203.7	87.4
<b>359.0</b>	34002.1	-133.4	-208.0	-204.5	48.8	20604.9