

## SUPPLEMENTARY DATA

### **‘Carba’-carfentanil (*trans* isomer): a $\mu$ opioid receptor (MOR) partial agonist with a distinct binding mode**

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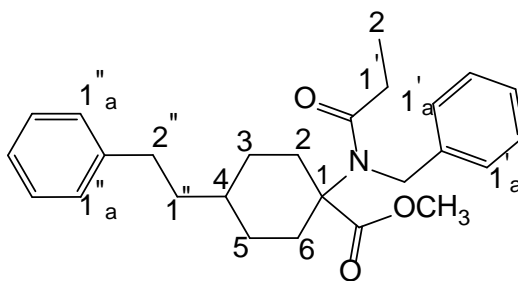
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### **Stereochemical assignment of compounds **8a** and **8b****

Resonance assignments were based on 2D <sup>1</sup>H-<sup>1</sup>H COSY and NOESY as well as <sup>1</sup>H-<sup>13</sup>C HSQC correlation spectra. The two isomers have very different NOE patterns between aromatic protons and those on the cyclohexane ring. From this, it can be concluded that isomer **8a** is *cis* and isomer **8b** is *trans*.

Table 1 Proton and carbon-13 resonance assignments of compounds **8a** and **8b**



	<b>8a</b>		<b>8b</b>	
	<sup>1</sup> H	<sup>13</sup> C	<sup>1</sup> H	<sup>13</sup> C
4	1.26	34.18	1.07	35.65
3,5a	0.90	26.55	1.28	28.46
3,5e	1.46	26.55	1.58	28.46
2,6a	1.72	30.81	1.13	33.27
2,6e	2.06	30.81	2.17	33.27
2'	0.81	9.12	0.82	9.12
1'	1.80	28.21	1.74	28.21
1' <sub>a</sub>	7.50	130.93	7.30	130.13
-OCH <sub>3</sub>	3.64	52.00	3.64	51.44
2''	2.47	32.46	2.51	32.42
1''	1.35	37.26	1.40	38.10
1'' <sub>a</sub>	7.12	128.08	7.13	127.99

Figure 1. 1-D  $^1\text{H}$  NMR spectra of compounds **8a** and **8b**

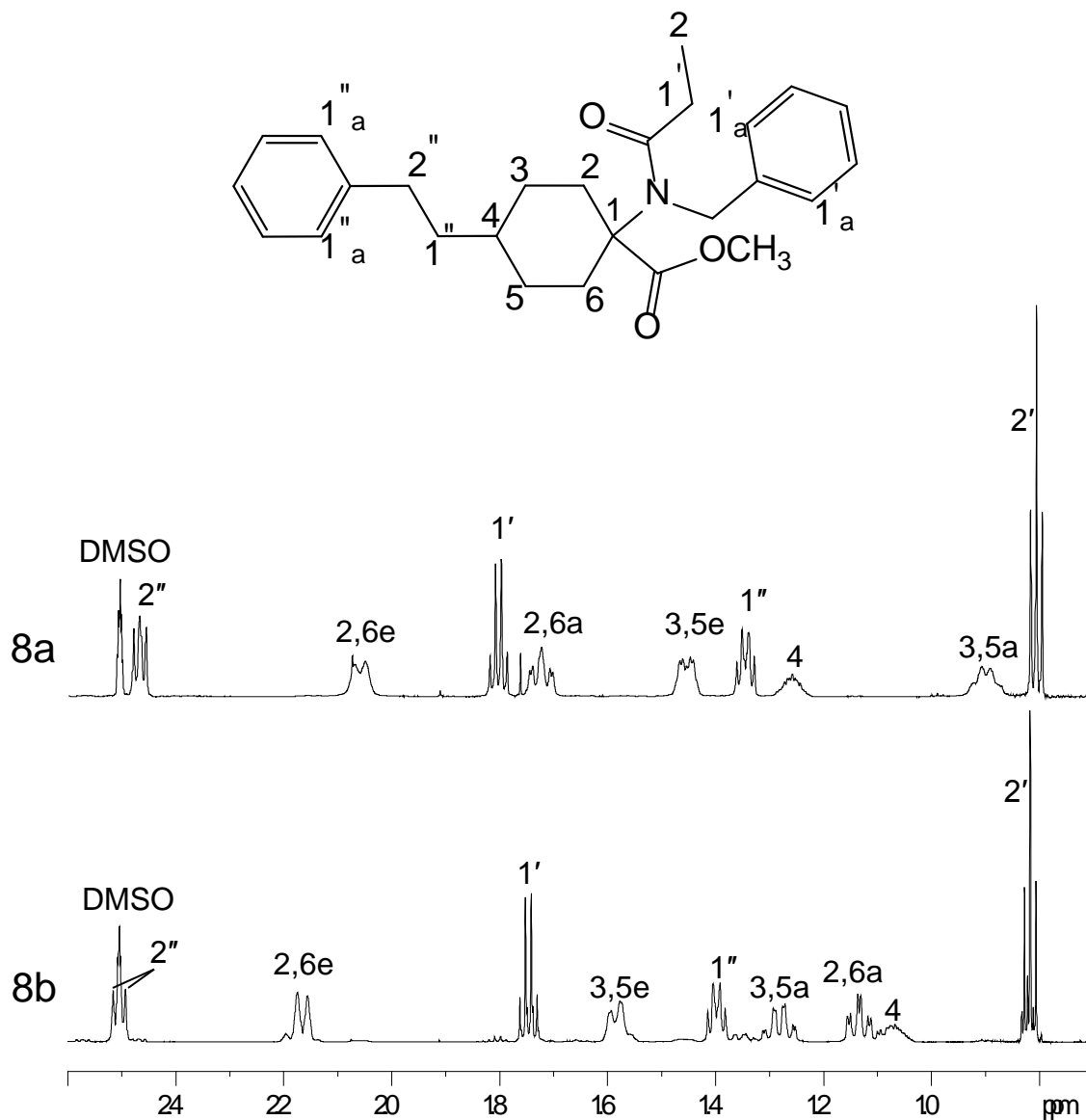


Figure 2.  $^1\text{H}$ - $^1\text{H}$  COSY spectra of **8a** and **8b**

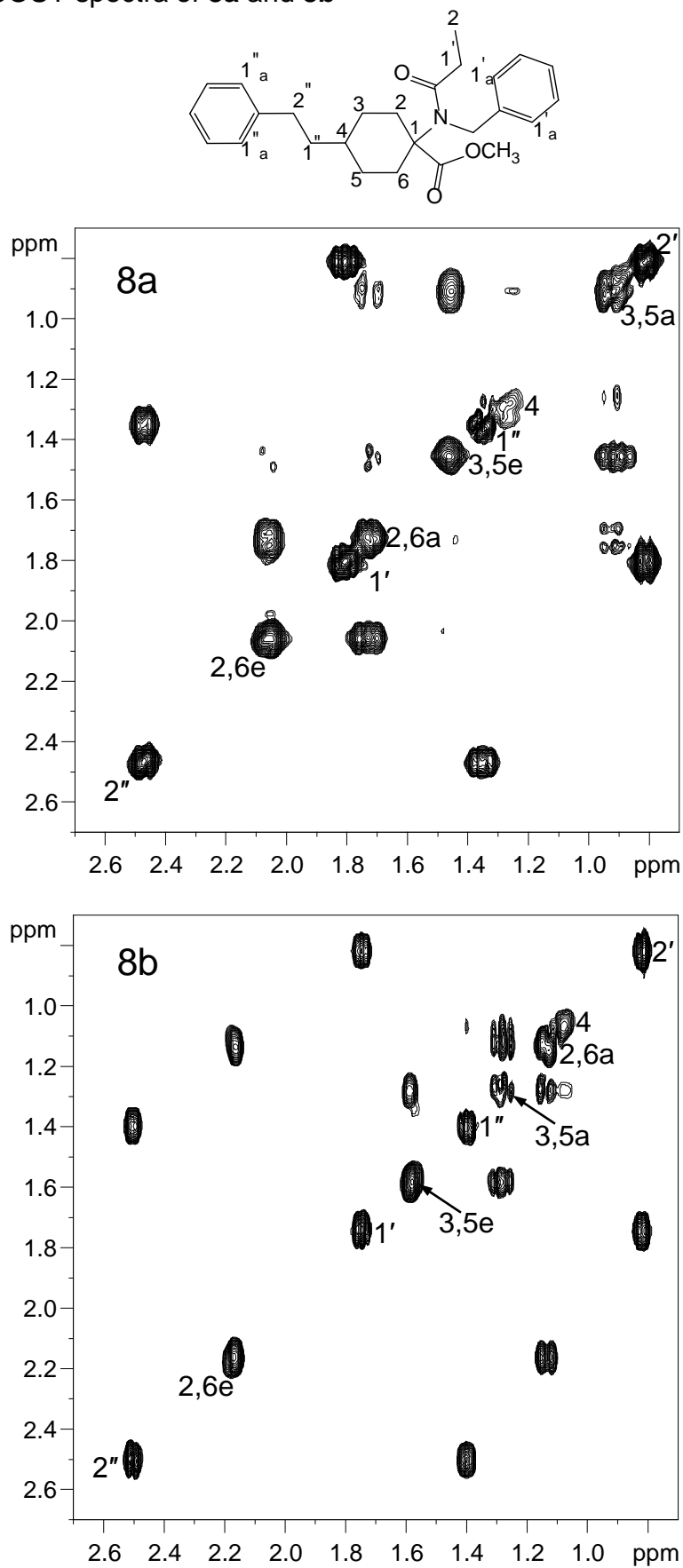


Figure 3.  $^1\text{H}$ - $^{13}\text{C}$  HSQC spectra of **8a** and **8b**

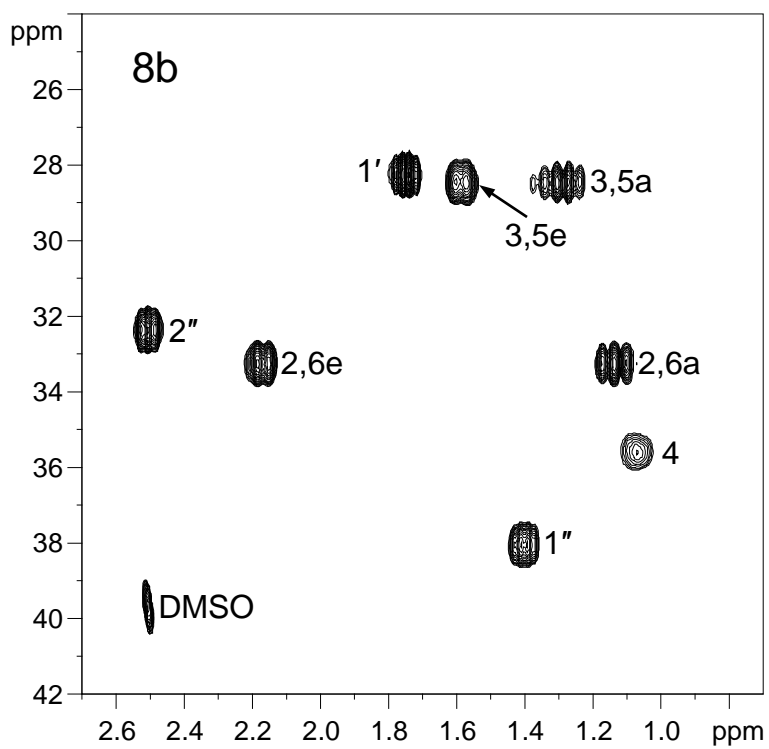
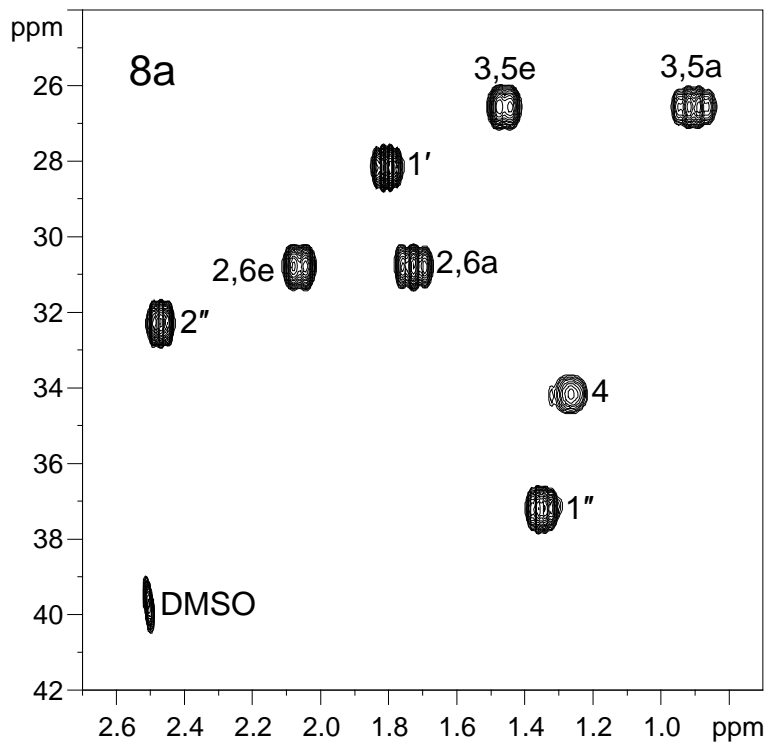
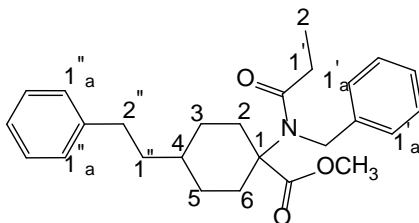


Figure 4.  $^1\text{H}$ - $^1\text{H}$  NOESY spectra of **8a** and **8b**

