



Fig. 2S  $^{15}\text{N}$  chemical shifts as a function of water or heavy water addition

- a)  $^{15}\text{N}$  chemical shift of **2** (open circles) and **3** (open squares) as a function of  $\text{D}_2\text{O}$  addition. The straight line shows solvent effect. The chemical shifts for **2** is -349.1 ppm and for **3** -347.0 ppm. The one-bond isotope effects on  $^{15}\text{N}$  chemical shifts,  $^1\Delta\text{N}(\text{D})$ , derived are for **2** 0.86 ppm and for **3** 0.89 ppm.
- b) Effects of water addition on  $^{15}\text{N}$  chemical shifts of morpholine and piperazine hydrochloride as a function of water addition. Positive slopes are from morpholine at different concentrations. Negative slopes are from piperazine hydrochloride.