An NMR Approach for the Structural and Dynamic Characterization of SOUL, a Heme Binding Protein

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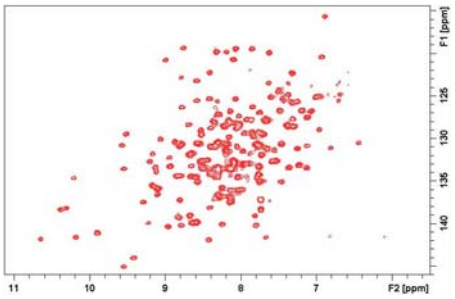
SOUL is the protein product of a domestic chicken gene that is expressed in the retina and pineal gland; this protein has more than 40% sequence homology with p22HBP, both being members of a new family of heme-binding proteins. NMR has been used to get information about structure function relationship of the human SOUL (hSOUL), a 23 kDa protein.

Assignment of the proton resonances is underway using triple resonance methods. In order to improve resolution and sensitivity of the NMR spectra, we have prepared deuterated samples (triple labelled ^{2}H, ^{13}C and ^{15}N) of hSOUL.



Trosy spectrum of human Soul.

A preliminary X-Ray structure of human SOUL was obtained by molecular replacement,[1] using the NMR structure solution of murine p22HBP (2GOV) as model.[2] The protein is proposed to become hexameric upon heme binding; a His residue is proposed to be involved as an axial ligand of the Fe(III) heme complex.[3] hSOUL has only one His residue in the amino acid sequence that can be detected by ^{1}H,^{15}N-HSQC experiments, and together with heme titrations of the protein, followed by NMR, will allows us to elucidate the mechanism of heme binding. Relaxation studies have also been performed, which will help to understand the dynamic behaviour of human SOUL.

[1] Freire F. *et al* (2008) in preparation
[2] Dias J.S. *et al* **(2006)** J. Biol. Chem. 281: 31553-31561.
[3] Sato E. *et al* **(2004)** Biochemistry 43: 14189-14198.

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