

## Complex I studied by Pulsed EPR Spectroscopy

Th. Maly, F. MacMillan, K. Zwicker<sup>a</sup>, N. Kashani-Poor<sup>a</sup>, L. Grgic<sup>a</sup>, U. Brandt<sup>a</sup>, & T. F. Prisner

Institute of Physical & Theoretical Chemistry, J.W. Goethe University Frankfurt, Marie-Curie Str. 11, D-60439 Frankfurt am Main, Germany, <sup>a</sup>Gustav-Embden Centre for Biological Chemistry, J.W. Goethe University Frankfurt, Theodor-Stern-Kai 7, D-60590, Frankfurt am Main, Germany

The proton-pumping NADH:ubiquinone oxidoreductase is the initial complex (Complex I) of the respiratory chain of many bacteria and also of mitochondria from most eukaryotes. It couples the transfer of electrons (from NADH to ubiquinone) with the concomitant translocation of protons across the membrane.

One flavin mononucleotide (FMN), up to nine iron-sulphur (FeS) clusters and up to three quinones participate in this redox chain and it is generally accepted that the immediate electron donor to ubiquinone is a Fe<sub>4</sub>S<sub>4</sub> cluster known as N2<sup>1</sup>. Very little is known about the function, location and direct ligation of Cluster N2. Recent comparisons with Hydrogenases have suggested that a histidine may form its fourth ligand to the protein backbone<sup>2</sup>.

A pulsed-electron paramagnetic resonance (EPR) study to characterise several of these paramagnetic centres is presented dealing with

- i) The selective study of cluster N2 with respect to the whole EPR signal using T<sub>1</sub>-selected EPR
- ii) The ligation-sphere of cluster N2 using Electron Spin Envelop Echo Modulation (ESEEM) spectroscopy
- iii) The characterisation of semiquinone radicals arising in Complex I

[1] Brandt U., *Biochim. Biophys. Acta*, 1318, 79 – 91 (1997)

[2] Volbeda A., *Nature*, 373, 580 – 587 (1995)

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