

## Direct Electrochemical Response of NO Reductase

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Nitric-oxide reductase (NOR) is an important enzyme involved in the biological denitrification pathway, promoting the two electrons reduction of nitric oxide to nitrous oxide. The enzyme is composed by two subunits (NorC and NorB) containing a heme *c*, two *b* type hemes and a non-heme iron (Fe<sub>B</sub>) as metal centers. The catalytic site is described as the binuclear center formed by a heme *b* moiety and the Fe<sub>B</sub>, and the proposed mechanism, under discussion, may require the fully reduction of the iron centers with the cleavage of an oxo-bridge between the two binuclear iron atoms [1].

The electrochemical behaviour of the NOR purified from *Pseudomonas nautica* was studied, by cyclic and square wave voltammetry. The enzyme was immobilised at the electrode by solvent casting, with the resultant protein adsorption on the graphite surface. The NOR direct electrochemical response was observed, both in aerobic and anaerobic conditions, and redox potentials were determined and compared with reported values [2]. The NOR electrocatalytic activity and the inhibitors effect were evaluated and related with the NO reduction mechanism. It was observed, as previous suggested [3], that this enzyme also presents catalytic activity towards the O<sub>2</sub> reduction.

1. H. Kumita, K. Matsuura, T. Hino, S. Takahashi, H. Hori, Y. Fukumori, I. Morishima, Y. Shiro, *J. Biol. Chem.*, 279 (2004) 55247-55254.
2. K. L. C. Grönberg, M. D. Roldán, L. Prior, G. Butland, M. R. Cheesman, D. J. Richardson, S. Spiro, A. J. Thomson, N. J. Watmough, *Biochemistry*, 38 (1999) 13780-13786.
3. T. Fujiwara, Y. Fukumori, *J. Bacteriol.*, 178 (1996) 1866-1871.

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