Nitrobindin protein family as nitric oxide sensors

Giovanna DE SIMONE - Department of Sciences, Roma Tre University

Nitrobindins (Nbs) form a new class of evolutionary conserved heme-proteins characterized by a 10-stranded anti-parallel β-barrel fold. Although the physiological role(s) of Nbs are still unclear, it has been postulated that they are involved in the NO/O_2 metabolism. Indeed, NO facilitates the reduction of the heme-Fe(III)-atom leading to the nitrosylation of the metal center (Nb(II)-NO) with a OH−-dependent reaction via the transient formation of the Nb-heme-Fe(III)-NO complex. Furthermore, Nbs catalyze the isomerization of peroxynitrite to NO_3^- and NO_2^-, in the absence and presence of CO_2. Lastly, O_2 scavenging by Nb(II)-NO leads to NO_3^- and Nb(III) via the transient formation of the Nb-heme-Fe(III)-NO(O)O adduct. Interestingly, the rigid β-barrel scaffold of Nb provides a suitably sized cavity to host catalytic metal centers opening new avenues in the production of hybrid biocatalysts.