Probing the Q-Proton Pathway of *ba*$_3$- Cytochrome *c* Oxidase by Time-Resolved Fourier Transform Infrared Spectroscopy

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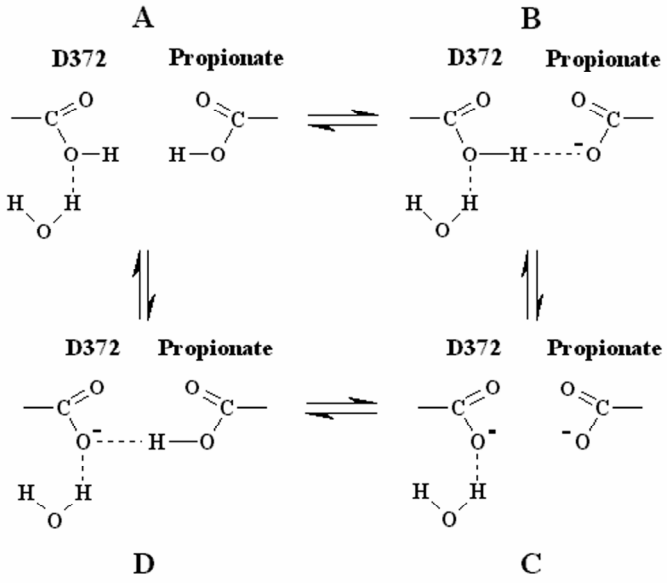
We have applied FTIR and time-resolved step-scan Fourier transform infrared (TRS^2-FTIR) spectroscopies to investigate the protonation/deprotonation events in the Q-proton pathway of *ba*$_3$- cytochrome *c* oxidase at ambient temperature. The photolysis of CO from heme a_3 and its transient binding to Cu_B is dynamically linked to structural changes that can be tentatively attributed to ring A propionate of heme a_3 (1695/1708 cm^{-1}) and to deprotonation of Asp372 (1726 cm^{-1}). The implications of these results with respect to the role of the ring A propionate of heme a_3-Asp372-H2O site as a proton carrier to the exit/output proton channel (H_2O pool) that is conserved among all structurally known heme-copper oxidases, and is part of the Q-proton pathway in *ba*$_3$-cytochrome *c* oxidase, will be presented.

The figure shown here presents a schematic view of the protonic connectivity between the ring A heme a_3 propionate-Asp372-H_2O of the Q-proton pathway in *ba*$_3$-cytochrome *c* oxidase.



References

1. Koutsoupakis C, Soulimane T, Varotsis C. *Biophys. J.* 2004, **86**, 2438-2444.
2. Koutsoupakis K, Stavrakis S, Pinakoulaki E, Soulimane T., Varotsis C. *J. Biol. Chem*. 2002, **277**, 32860-32866.