

FeFe-hydrogenase active site assembly: the case of HydE

Yvain NICOLET

Metalloproteins Unit, Institut de Biologie Structurale, Grenoble

Transition metals are essential to all living organisms because they open chemistries that would not be possible when using only the 22 amino acids that constitute enzymes. Therefore, transition metals are often found at the heart of important reactions, notably in energy metabolism. For instance, transition metals play a key role in the metabolism of gases (H₂, CO₂, N₂) by microorganisms.¹ The organometallic cofactors, which constitute the active sites of the corresponding metalloenzymes (hydrogenase, COdH or nitrogenase) are nowadays inserted into the apo-enzymes by dedicated multiprotein machineries.

In this presentation, we will focus on the assembly of the [2Fe]_H center of the FeFe-hydrogenase. This center contains two irons, both bound to cyanide and carbon monoxide ligands and an azadithiolate bridging molecule.² Notably we will discuss in details the role of the two radical *S*-adenosyl-L-methionine (SAM) enzymes HydG and HydE in this process.³

Références

1. Fontecilla-Camps, J. C., Amara, P., Cavazza, C., Nicolet, Y. & Volbeda, A. Structure-function relationships of anaerobic gas-processing metalloenzymes. *Nature* **460**, 814–822 (2009).
2. Britt, R. D., Rao, G. & Tao, L. Biosynthesis of the catalytic H-cluster of [FeFe] hydrogenase: the roles of the Fe-S maturase proteins HydE, HydF, and HydG. *Chem. Sci.* **11**, 10313–10323 (2020).
3. Nicolet, Y., Cherrier, M.V. and Amara, P. Radical SAM Enzymes and Metallocofactor Assembly: A Structural Point of View. *ACS Bio Med Chem Au* **2**, 36–52 (2022).