

# Mechanistic investigations of anaerobic Sulfatase-Maturing Enzymes

## Radical *S*-adenosylmethionine enzymes involved in protein post-translational modification

*Olivier Berteau*<sup>1</sup>, *Alhosna Benjdia*<sup>1</sup>, *Sowmya Subramanian*<sup>2</sup>, *Jérôme Leprince*<sup>3</sup>, *Hubert Vaudry*<sup>3</sup>, *Corine Sandström*<sup>4</sup>, *Michael K. Johnson*<sup>2</sup>

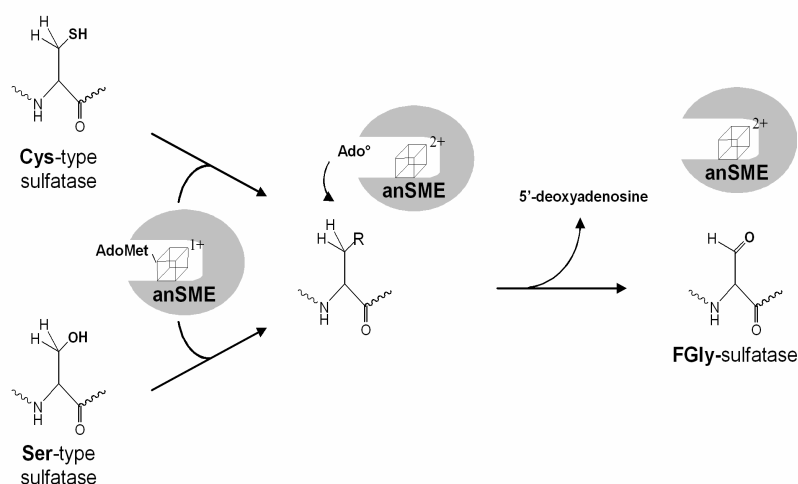
<sup>1</sup> INRA, UPR 910, UEPSD, F-78352 Jouy-en-Josas – France

<sup>2</sup> Department of Chemistry and Center for Metalloenzyme Studies, University of Georgia– USA

<sup>3</sup> INSERM U-413, IFRMP23, UA CNRS, Université de Rouen, 76821 Mont-Saint-Aignan – France

<sup>4</sup> Department of Chemistry, SLU, P.O. Box 7015, SE-750 07 Uppsala – Sweden

Sulfatases are essential enzymes found in prokaryotes and eukaryotes. To be active, sulfatases must undergo a unique post-translational modification leading to the conversion of a critical cysteine or serine residue into a C $\alpha$ -formylglycine (FGly). Recently, putative members of the radical *S*-adenosyl-L-methionine enzymes superfamily, called anaerobic sulfatase-maturing enzyme (anSME), were identified as being involved in the maturation of sulfatases [1-3]. In addition to the C $X_3$ C $X_2$ C motif common to all radical SAM enzymes, anSMEs possess two other strictly conserved cysteine clusters. Nevertheless, the function of these additional clusters as well as the detailed anSME mechanism remained to be elucidated. We thus investigated the anSME mechanism notably in studying cysteine clusters mutants.



### Proposed mechanism for anSMEs

#### References :

(1) Berteau O, Guillot A, Benjdia A, Rabot S. – 2006 – A new type of bacterial sulfatase reveals a novel maturation pathway in prokaryotes. *J Biol Chem.* 281(32):22464-70.

(2) Benjdia A, Leprince J, Guillot A, Vaudry H, Rabot S, Berteau O. – 2007 – Anaerobic sulfatase-maturing enzymes: radical SAM enzymes able to catalyze *in vitro* sulfatase post-translational modification. *J Am Chem Soc.* 129(12):3462-3.

(3) Benjdia A, Subramanian S, Leprince J, Vaudry H, Johnson MK, Berteau O. – 2008 – Anaerobic sulfatase-maturing enzymes - First dual substrate radical *S*-adenosylmethionine enzymes. *J Biol Chem. In press*