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**RESEARCH INTERESTS****Enzyme Biochemistry and Biophysics**

- Enzyme / Protein dynamics and structure
- enzyme mechanism, kinetics and biophysics
- protein/protein and protein/RNA interaction
- Flavoenzymology and flavin biophysical chemistry
- Time resolved spectroscopy and optical spectroscopies coupled to high pressure (stopped-flow; absorbance, fluorescence, circular dichroism...)
- RNA modification

SUMMARY

I study the structures and mechanisms of enzymes and seek to understand at the atomic level how redox enzymes function. I employ a variety of High technology biophysical approaches including X-Ray crystallography, pressure-perturbation spectroscopy, fluorescence resonance energy transfer, and absorbance, circular dichroism spectroscopy, fast kinetics in order to provide compelling evidence regarding conformational changes resulting from ligand binding and/or protein-protein interactions that play a key role in substrate binding and turnover, volume of transient states during catalysis...

I am particularly interested in electron transfer and redox catalysis. I am studying the mechanism of cofactor-dependent catalysis in flavo- and hemoproteins and aim to reveal the molecular details of the interaction of flavoenzymes with their redox partners (dug metabolizing system: cytochrome P450, b5 and cytochrome P450 reductase).

PUBLICATIONS**2011**

- Insights into folate/FAD-dependent tRNA methyltransferase mechanism: role of two highly conserved cysteines in catalysis. **Hamdane D**, Argentini M, Cornu D, Myllykallio H,

Skouloubris S, Hui-Bon-Hoa G, Golinelli-Pimpaneau B. *J Biol Chem*. 2011 Oct 21;286(42):36268-80.

- A catalytic intermediate and several flavin redox states stabilized by folate-dependent tRNA methyltransferase from *Bacillus subtilis*. **Hamdane D**, Guerinéau V, Un S, Golinelli-Pimpaneau B. *Biochemistry*. 2011 Jun 14;50(23):5208-19.
- Kinetics inside the protein: shape of the geminate kinetics in myoglobin. **Hamdane D**, Kiger L, Hui-Bon-Hoa G, Marden MC. *J Phys Chem B*. 2011 Apr 14;115(14):3919-23. Conformational changes of NADPH-cytochrome P450 oxidoreductase are essential for catalysis and cofactor binding. Xia C, **Hamdane D**, Shen AL, Choi V, Kasper CB, Pearl NM, Zhang H, Im SC, Waskell L, Kim JJ. *J Biol Chem*. 2011 May 6;286(18):16246-60.
- Conformational changes of NADPH-cytochrome P450 oxidoreductase are essential for catalysis and cofactor binding. Xia C, **Hamdane D**, Shen AL, Choi V, Kasper CB, Pearl NM, Zhang H, Im SC, Waskell L, Kim JJ. *J Biol Chem*. 2011 May 6;286(18):16246-60.

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- Expression and purification of untagged and histidine-tagged folate-dependent tRNA:m⁵U54 methyltransferase from *Bacillus subtilis*. **Hamdane D**, Skouloubris S, Myllykallio H, Golinelli-Pimpaneau B. *Protein Expr Purif*. 2010 Sep;73(1):83-9.

2009

- tert-Butylphenylacetylene is a potent mechanism-based inactivator of cytochrome P450 2B4: inhibition of cytochrome P450 catalysis by steric hindrance. Zhang H, Lin HL, Walker VJ, **Hamdane D**, Hollenberg PF. *Mol Pharmacol*. 2009 Nov;76(5):1011-8.
- Effect of conformational dynamics on substrate recognition and specificity as probed by the introduction of a de novo disulfide bond into cytochrome P450 2B1. Zhang H, Kanaan C, **Hamdane D**, Hoa GH, Hollenberg PF. *J Biol Chem*. 2009 Sep 18;284(38):25678-86.
- Neuroglobin and prion cellular localization: investigation of a potential interaction. Lechauve C, Rezaei H, Celier C, Kiger L, Corral-Debrinski M, Noinville S, Chauvierre C, **Hamdane D**, Pato C, Marden MC. *J Mol Biol*. 2009 May 22;388(5):968-77.
- Pseudo-merohedral twinning in monoclinic crystals of wild-type human brain neuroglobin. **Hamdane D**, Lechauve C, Marden MC, Golinelli-Pimpaneau B. *Acta Crystallogr D Biol Crystallogr*. 2009 Apr;65(Pt 4):388-92.
- Structure and function of an NADPH-cytochrome P450 oxidoreductase in an open conformation capable of reducing cytochrome P450. **Hamdane D**, Xia C, Im SC, Zhang H, Kim JJ, Waskell L. *J Biol Chem*. 2009 Apr 24;284(17):11374-84.

2008

- Oxygen activation by cytochrome P450 monooxygenase. **Hamdane D**, Zhang H, Hollenberg P. *Photosynth Res*. 2008 Oct-Dec;98(1-3):657-66.
- Cytochrome b5 inhibits electron transfer from NADPH-cytochrome P450 reductase to ferric cytochrome P450 2B4. Zhang H, **Hamdane D**, Im SC, Waskell L. *J Biol Chem*. 2008 Feb 29;283(9):5217-25.

2007

- Exploiting a list of protein sequences. Marden MC, Dewilde S, Kiger L, **Hamdane D**, Uzan J, Burmester T, Hankeln T, Moens L, Baudin-Creuza V, Celier C, Wajcman H. *Gene*. 2007 Aug 15;398(1-2):35-41.
- Reversible hexacoordination of alpha-hemoglobin-stabilizing protein (AHSP)/alpha-hemoglobin Versus pressure. Evidence for protection of the alpha-chains by their chaperone. **Hamdane D**, Vasseur-Godbillon C, Baudin-Creuza V, Hoa GH, Marden MC. *J Biol Chem*. 2007 Mar 2;282(9):6398-404.

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- High-yield expression in *Escherichia coli* of soluble human alpha-hemoglobin complexed with its molecular chaperone. Vasseur-Godbillon C, **Hamdane D**, Marden MC, Baudin-Creuza V. *Protein Eng Des Sel*. 2006 Mar;19(3):91-7.

2005

- High pressure enhances hexacoordination in neuroglobin and other globins. **Hamdane D**, Kiger L, Hoa GH, Dewilde S, Uzan J, Burmester T, Hankeln T, Moens L, Marden MC. *J Biol Chem*. 2005 Nov 4;280(44):36809-14.
- Hyperthermal stability of neuroglobin and cytoglobin. **Hamdane D**, Kiger L, Dewilde S, Uzan J, Burmester T, Hankeln T, Moens L, Marden MC. *FEBS J*. 2005 Apr;272(8):2076-84.

2004

- Neuroglobin ligand binding kinetics. Kiger L, Uzan J, Dewilde S, Burmester T, Hankeln T, Moens L, **Hamdane D**, Baudin-Creuzat V, Marden M. *IUBMB Life*. 2004 Nov-Dec;56(11-12):709-19.
- Neuroglobin and other hexacoordinated hemoglobins show a weak temperature dependence of oxygen binding. Uzan J, Dewilde S, Burmester T, Hankeln T, Moens L, **Hamdane D**, Marden MC, Kiger L. *Biophys J*. 2004 Aug;87(2):1196-204.
- Zebrafish reveals different and conserved features of vertebrate neuroglobin gene structure, expression pattern, and ligand binding. Fuchs C, Heib V, Kiger L, Haberkamp M, Roesner A, Schmidt M, **Hamdane D**, Marden MC, Hankeln T, Burmester T. *J Biol Chem*. 2004 Jun 4;279(23):24116-22.
- Coupling of the heme and an internal disulfide bond in human neuroglobin. **Hamdane D**, Kiger L, Dewilde S, Green BN, Pesce A, Uzan J, Burmester T, Hankeln T, Bolognesi M, Moens L, Marden MC. *Micron*. 2004;35(1-2):59-62.

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- The redox state of the cell regulates the ligand binding affinity of human neuroglobin and cytoglobin. **Hamdane D**, Kiger L, Dewilde S, Green BN, Pesce A, Uzan J, Burmester T, Hankeln T, Bolognesi M, Moens L, Marden MC. *J Biol Chem*. 2003 Dec 19;278(51):51713-21.