

Dr Béatrice Golinelli-Pimpaneau (DR2 CNRS, HDR)

Address: Laboratoire de Chimie des
Processus Biologiques, Collège de
France, 11 place Marcelin Berthelot,
75 005 Paris, France
Phone number: 33 1 44 27 12 52
E mail: beatrice.golinelli@college-de-france.fr



RESEARCH INTERESTS

Mechanistic and Structural Enzymology

- Enzyme/protein dynamics and structure
- Enzyme mechanisms
- Protein/protein and protein/RNA Interaction
- Ammonia-channeling enzymes
- RNA modification/thiolation
- X-ray crystallography
- Iron-sulfur cluster

SUMMARY

My goal is to understand enzymatic catalysis at the molecular level. I use various techniques such as X-ray crystallography, molecular modeling, site-directed mutagenesis, RNA and protein mass spectrometry, RNA transcription, to study the catalytic mechanism and structure of enzymes. My main subjects of interest are catalytic antibodies, an ammonia-channeling enzyme called glucosamine-6P synthase, and RNA-modification enzymes including [4Fe-4S]-dependent thiolation enzymes.

PUBLICATIONS

GolinelliPimpaneau B OR Golinelli-Pimpaneau B in web of science

RECENT PUBLICATIONS

* : corresponding author

2026

- o The thiolation of U34 at carbon 2 in tRNA by Escherichia coli MnmA precedes modification at carbon 5 and is dependent on a [4Fe-4S] cluster. S. Gervason, S. Sen, J. Zhou, M. Libiad, K. Podskoczyj, G. Leszczynska, S. Caillat, J.-L. Ravanat, M. Fontecave, B. **Golinelli-Pimpaneau***. **J Inorg Biochem.** 2026, 274, 113064.
doi: 10.1016/j.jinorgbio.2025.113064; Corrigendum doi:10.1016/j.jinorgbio.2025.113096

2025

- o Deciphering the influence of the [4Fe-4S] cluster of tRNA thiolation enzymes on tRNA binding. S. Gervason, S. Sen, J.-L. Ravanat, S. Caillat, D. Hamdane*, **B. Golinelli-Pimpaneau***. *RNA*. 2025, 31, 735-742. doi: 10.1261/rna.080292.124
- o Dissecting the mechanism of biosynthesis of sulfurated biomolecules: the case of tRNA sulfuration, S. Gervason, M. Fontecave, **B. Golinelli-Pimpaneau***, *Acc Chem Res.* 2025, 58, 3146-3153. doi: 10.1021/acs.accounts.5c00485
- o Evolution, structure and function of L-cysteine desulfidase, an enzyme involved in sulfur metabolism in the methanogenic archeon *Methanococcus maripaludis*. S. Gervason, P. Zecchin, E. B. Shelton, N. He, L. Pecqueur, P. S. Garcia, T. Akinyemi, N. Touati, O. Bimai, C. Velours, J.-L. Ravanat, B. Faivre, W.B. Whitman, M. Fontecave, **B. Golinelli-Pimpaneau***. *Commun. Biol.*, 2025, 8, 1667, doi: 10.1038/s42003-025-09053-0

2024

- o "[4Fe-4S]-dependent enzymes in non-redox tRNA thiolation". S. Gervason, S. Sen, M. Fontecave, **B. Golinelli-Pimpaneau***. *Biochim Biophys Acta Mol Cell Res.* 2024, 1871, 119807
- o "Structure-based insights into the mechanism of [4Fe-4S]-dependent sulfur insertase LarE". P. Zecchin, L. Pecqueur, J. Oltmanns, C. Velours, V. Schünemann, M. Fontecave, **B. Golinelli-Pimpaneau**. *Protein Sci.* 2024, 33, e4874

2023

- o The thiolation of uridine 34 in tRNA, which controls protein translation, depends on a [4Fe-4S] cluster in the archeum *Methanococcus maripaludis*. O. Bimai, J. Zhou, M. Lénon, P. Legrand, J.-L. Ravanat, N. Touati, F. Barras, M. Fontecave, **B. Golinelli-Pimpaneau***. *Sci Rep.* 2023, 13, 5351.
- o TudS desulfidases recycle 4-thiouridine-5'-monophosphate at a catalytic [4Fe-4S] cluster. J. Fuchs, R. Jamontas, M. H. Hooek, J. Oltmanns, **B. Golinelli-Pimpaneau**, V. Schünemann, A. J. Pierik, R. Meškys, A. Aučynaitė, M. Boll*. *Comm. Biol.* 2023, 6, 1092

2022

- o Structural Insights into the Dimeric Form of *Bacillus subtilis* RNase Y Using NMR and AlphaFold. N. Morellet*, P. Hardouin, N. Assrir, C. van Heijenoort, **B. Golinelli-Pimpaneau***, *Biomolecules* 2022, 12, 1798.
- o A subclass of archaeal U8-tRNA sulfurases requires a [4Fe-4S] cluster for catalysis. N. He, J. Zhou, O. Bimai, J. Oltmanns, J. L. Ravanat, C. Velours, V. Schünemann, M. Fontecave, **B. Golinelli-Pimpaneau***, *Nucleic Acids Res.*, 2022, 50, 12969-12978.
- o TtuA and TudS, two [4Fe-4S]-dependent enzymes catalyzing non-redox sulfuration or desulfuration reactions. J. Zhou, O. Bimai, S. Arragain, L. Pecqueur, **B. Golinelli-Pimpaneau***. In *Encyclopedia of Inorganic and Bioinorganic Chemistry*, R.A. Scott (Ed.). 2022 <https://doi.org/10.1002/9781119951438.eibc2811>
- o Prediction of the Iron-Sulfur Binding Sites in Proteins Using the Highly Accurate Three-Dimensional Models Calculated by AlphaFold and RoseTTAFold. **B. Golinelli-Pimpaneau***. *Inorganics* 2022, 10, 2
- o Determination of the absolute molar mass of [Fe-S]-containing proteins using Size Exclusion Chromatography-Multi Angle Light Scattering (SEC-MALS). C. Velours, J. Zhou, P. Zecchin, N. He, M. Salameh, M.-P. Golinelli-Cohen, **B. Golinelli-Pimpaneau***. *Biomolecules*, 2022, 12, 270

2021

- o Structural evidence for a [4Fe-5S] intermediate in the non-redox desulfuration of thiouracil. J. Zhou, L. Pecqueur, A. Aučynaitė, J. Fuchs, R. Rasa, J. Vaitekūnas, R. Meškys, M. Boll, M. Fontecave, J. Urbonavičius*, **B. Golinelli-Pimpaneau***. *Angew. Chem. Intl. Ed*, 2021, 60, 424-431
- o "Iron sulfur biology invades tRNA modification: the case of U34 sulfuration. " J. Zhou, M. Lénon, N. Touati, JL Ravanat, C. Velours, M. Fontecave, F. Barras*, **B. Golinelli-Pimpaneau***. *Nucleic Acids Res.* 2021, 49, 3997-4007
- o "De novo crystal structure determination of double stranded RNA binding domain using only the sulfur anomalous diffraction in SAD phasing". B. Guimaraes, **B. Golinelli-Pimpaneau*** *Cur. Res. Struct. Biol.*, 2021, 3, 112-120

2020

- o Structure-based mechanistic insights into catalysis by tRNA thiolation enzymes.” O. Bimai, S. Arragain, **B. Golinelli-Pimpaneau**. *Curr Opin Struct Biol*. 2020, 65, 69-78.

2018

- o Dissociation of the dimer of the intrinsically disordered domain of RNase Y upon antibody binding. Hardouin P., Velours C., Bou-Nader C., Assrir N., Laalami S., Putzer H., Durand D., **Golinelli-Pimpaneau B**. *Biophys. J*. 2018 Dec 4; 115(11): 2102-2113.

2017

- o Nonredox thiolation in tRNA occurring via sulfur activation by a [4Fe-4S] cluster. Arragain S, Bimai O, Legrand P, Caillat S, Ravanat JL, Touati N, Binet L, Atta M, Fontecave M, **Golinelli-Pimpaneau B**. *Proc Natl Acad Sci U S A*. 2017 Jul 11;114(28):7355-7360.

2015

- o An extended dsRBD is required for post-transcriptional modification in human tRNAs. Bou-Nader C, Pecqueur L, Bregeon D, Kamah A, Guérineau V, **Golinelli-Pimpaneau B**, Guimarães BG, Fontecave M, Hamdane D. *Nucleic Acids Res*. 2015 Oct 30;43(19):9446-56.

2014

- o Dynamics of RNA modification by a multi-site-specific tRNA methyltransferase. Hamdane D, Guelorget A, Guérineau V, **Golinelli-Pimpaneau B**. *Nucleic Acids Res*. 2015, Oct;42(18) : 11697-706.
- o The crystal structure of wild-type human brain neuroglobin reveals flexibility of the disulfide bond that regulates oxygen affinity. Guimarães BG, Hamdane D, Lechauve C, Marden MC, Golinelli-Pimpaneau B. *Acta Crystallogr D Biol Crystallogr*. 2014 Apr;70(Pt 4):1005-14.

2013

- o ubiL, a new gene in Escherichia coli coenzyme Q biosynthesis, is involved in aerobic C5-hydroxylation. Hajj Chehade M, Loiseau L, Lombard M, Pecqueur L, Ismail A, Smadja M, **Golinelli-Pimpaneau B**, Mellot-Draznieks C, Hamelin O, Aussel L, Kieffer-Jaquinod S, Labessan N, Barras F, Fontecave M, Pierrel F. *J Biol Chem*. 2013; 288(27):20085-92.

2012

- o FAD/Folate-Dependent tRNA Methyltransferase: Flavin as a new methyl-transfer agent. Hamdane D, Argentini M, Cornu D, **Golinelli-Pimpaneau B**, Fontecave M. *J Am Chem Soc*. 2012 Dec 5; 134, 19739-45.
- o Crystal structure of two anti-porphyrin antibodies with peroxidase activity. Munoz Robles V, Maréchal JD, Bahloul A, Sari MA, Mahy JP, **Golinelli-Pimpaneau B**. *Plos One*. 2012, ;7(12):e51128.
- o The Human tRNA m(5)C methyltransferase Misu is multisite-specific. Auxilien S, Guérineau V, Szweykowska-Kulińska Z, **Golinelli-Pimpaneau B**. *RNA Biol*. 2012 Sep 20;9(11).
- o Structural basis for morphecin-type allosteric regulation of E. coli glucosamine-6P synthase: equilibrium between inactive hexamer and active dimer. Mouilleron S, Badet-Denisot MA, Pecqueur L, Madiona K, Assrir N, Badet B, **Golinelli-Pimpaneau B**. *J Biol Chem*. 2012 Oct 5;287(41):34533-46.

2011

- o Structural comparison of tRNA m(1)A58 methyltransferases revealed different molecular strategies to maintain their oligomeric architecture under extreme conditions. Guelorget A, Barraud P, Tisné C, **Golinelli-Pimpaneau B**. *BMC Struct Biol*. 2011 Dec 14;11:48.
- o 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.
- o A catalytic intermediate and several flavin redox states stabilized by folate-dependent tRNA methyltransferase from Bacillus subtilis. Hamdane D, Guérineau V, Un S, **Golinelli-Pimpaneau B**. *Biochemistry*. 2011 Jun 14;50(23):5208-19.
- o Mechanism-based strategies for trapping and crystallizing complexes of RNA-modifying enzymes. Guelorget A, **Golinelli-Pimpaneau B**. *Structure*. 2011 Mar 9;19(3):282-91.
- o Dynamics of glucosamine-6-phosphate synthase catalysis. Mouilleron S, Badet-Denisot MA, Badet B, **Golinelli-Pimpaneau B**. *Arch Biochem Biophys*. 2011 Jan 1;505(1):1-12.

2010

- o Structural evidence for the functional importance of the heme domain mobility in flavocytochrome b2. Diêp Lê KH, Lederer F, **Golinelli-Pimpaneau B.** *J Mol Biol.* 2010 Jul 16;400(3):518-30.
 - o Insights into the hyperthermostability and unusual region-specificity of archaeal *Pyrococcus abyssi* tRNA m1A57/58 methyltransferase. Guelorget A, Roovers M, Guérineau V, Barbey C, Li X, **Golinelli-Pimpaneau B.** *Nucleic Acids Res.* 2010 Oct;38(18):6206-18.
 - o 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. Epub 2010 Apr 19.
- 2009**
- o 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.
- 2008**
- o The crystal structure of *Pyrococcus abyssi* tRNA (uracil-54, C5)-methyltransferase provides insights into its tRNA specificity. Walbott H, Leulliot N, Grosjean H, **Golinelli-Pimpaneau B.** *Nucleic Acids Res.* 2008 Sep;36(15):4929-40.
 - o Ordering of C-terminal loop and glutaminase domains of glucosamine-6-phosphate synthase promotes sugar ring opening and formation of the ammonia channel. Mouilleron S, Badet-Denisot MA, **Golinelli-Pimpaneau B.** *J Mol Biol.* 2008 Apr 4;377(4):1174-85.
 - o Highlights of glucosamine-6P synthase catalysis. Durand P, **Golinelli-Pimpaneau B,** Mouilleron S, Badet B, Badet-Denisot MA. *Arch Biochem Biophys.* 2008 Jun 15;474(2):302-17.
 - o Crystal structure of *Thermus thermophilus* tRNA m1A58 methyltransferase and biophysical characterization of its interaction with tRNA. Barraud P, **Golinelli-Pimpaneau B,** Atmanene C, Sanglier S, Van Dorsselaer A, Droogmans L, Dardel F, Tisné C. *J Mol Biol.* 2008 Mar 21;377(2):535-50.
 - o Acquisition of a bacterial RumA-type tRNA(uracil-54, C5)-methyltransferase by Archaea through an ancient horizontal gene transfer. Urbonavicius J, Auxilien S, Walbott H, Trachana K, **Golinelli-Pimpaneau B,** Brochier-Armanet C, Grosjean H. *Mol Microbiol.* 2008 Jan;67(2):323-35.
- 2007**
- o Conformational changes in ammonia-channeling glutamine amidotransferases. Mouilleron S, **Golinelli-Pimpaneau B.** *Curr Opin Struct Biol.* 2007 Dec;17(6):653-64.
 - o The carboxyl-terminal extension of yeast tRNA m5C methyltransferase enhances the catalytic efficiency of the amino-terminal domain. Walbott H, Auxilien S, Grosjean H, **Golinelli-Pimpaneau B.** *J Biol Chem.* 2007 Aug 10;282(32):23663-71.
 - o Cysteine of sequence motif VI is essential for nucleophilic catalysis by yeast tRNA m5C methyltransferase. Walbott H, Husson C, Auxilien S, **Golinelli-Pimpaneau B.** *RNA.* 2007 Jul;13(7):967-73.
 - o Domain motions of glucosamine-6P synthase: comparison of the anisotropic displacements in the crystals and the catalytic hinge-bending rotation. Mouilleron S, **Golinelli-Pimpaneau B.** *Protein Sci.* 2007 Mar;16(3):485-93.
- 2006**
- o Structural basis for D-amino acid transamination by the pyridoxal 5'-phosphate-dependent catalytic antibody 15A9. **Golinelli-Pimpaneau B,** Lüthi C, Christen P. *J Biol Chem.* 2006 Aug 18;281(33):23969-77.
 - o THUMP from archaeal tRNA:m22G10 methyltransferase, a genuine autonomously folding domain. Gabant G, Auxilien S, Tuszyńska I, Locard M, Gajda MJ, Chaussinand G, Fernandez B, Dedieu A, Grosjean H, **Golinelli-Pimpaneau B,** Bujnicki JM, Armengaud J. *Nucleic Acids Res.* 2006 May 10;34(9):2483-94.
 - o Glutamine binding opens the ammonia channel and activates glucosamine-6P synthase. Mouilleron S, Badet-Denisot MA, **Golinelli-Pimpaneau B.** *J Biol Chem.* 2006 Feb 17;281(7):4404-12.