

MEMBRANE PROTEIN BIOCHEMISTRY LAB
CNRS UMR 7099 & PARIS-CITÉ UNIVERSITY
INSTITUT DE BIOLOGIE PHYSICO-CHIMIQUE
13, RUE PIERRE ET MARIE CURIE
75005 PARIS, FRANCE
laurent.catoire@ibpc.fr
<https://bpm.ibpc.fr/>
<https://bpm.ibpc.fr/research-themes/molecular-signalisation-pathway-of-gpgrs/>

LAURENT J. CATOIRE
(Director of Research, CNRS)

SCIENTIFIC PUBLICATIONS & TALKS

PUBLICATIONS IN PEER-REVIEWED JOURNALS

- 30** Fourel C.,^{||} Gautier Y.,^{||} Pozza A., Giraud F., Point E., Le Bon C., Moncoq K., Stirnemann G.,* Hénin J.,* Lescop E.,* & **Catoire L. J.*** (2025) Allosteric coupling between a lipid bilayer and a membrane protein. *Biophysical Journal*, **124**, 2613–2626.

^{||}equally contribution

(Epub: 27th of June 2025)

[awarded as the Best of Biophysical Journal 2026:

<https://www.biophysics.org/2026meeting/program/Scientific-Sessions/best-of-biophysical-journal-symposium>]

[referred by Daniel Huster (2025): The membrane properties determine protein function: A new aspect of allosteric modulation. *Biophysical Journal*, **124**, 2569–2570.]

- 29** Fourel C.,^{||} Gautier Y.,^{||} Pozza A., Giraud F., Point E., Le Bon C., Moncoq K., Stirnemann G.,* Hénin J.,* Lescop E.,* & **Catoire L. J.*** (2025) Atomic scale description of the allosteric coupling between a lipid bilayer and a membrane protein. *bioRxiv*, doi: 10.1101/2025.01.24.634742.

^{||}equally contribution

(Epub: 27th of January 2025)

- 28** Banères J.-L., Botzanowski T., Boutin J. A.,* Calamini B., Castel J., **Catoire L. J.**, Cianféroni S., Demesmay C., Ferguson G., Ferry G., Kniazeff J., Krimm I., Langer T., Lebon G., Ley M., Nyerges M., Schwob M., Venien-Bryan C., Wagner R., Zeder-Lutz G. & Zilian-Stohrer C. (2023) Biophysical dissection of isolated GPCRs: the A2A adenosine receptor under the bistouries. *Receptors*, **2**, 47–92.

(Epub: 4th of February 2023)

- 27** Pozza A.,^{||} Giraud F.,^{||} Cece Q., Casiraghi M., Point E., Damian M., Le Bon C., Moncoq K., Banères J.-L., Lescop E.* & **Catoire L. J.*** (2022) Exploration of the dynamic interplay between lipids and membrane proteins by hydrostatic pressure. *Nature Communications*, **13**, 1780.

^{||}equally contribution

(Epub: 1st of April 2022)

- 26** Louet M., Casiraghi M., Damian M., Costa M., Renault P., Gomes A. A. S., Batista P. R., M’Kadmi C., Mary, S., Cantel S., Denoyelle S., Ben Haj Salah K., Perahia D., Bisch P. M., Fehrentz J.-A., **Catoire L. J.**, Floquet N. & Banères J.-L.* **(2021)** Concerted conformational dynamics and water movements in the ghrelin G protein-coupled receptor. *Elife*, **10**, e63201.
(Epub: 3rd of September 2021)
- 25** Damian M., Louet M., Gomes A., M’Kadmi C., Denoyelle S., Cantel S., Mary S., Bisch P. M. Fehrentz J.-A., **Catoire L. J.**, Floquet N. & Banères J.-L.* **(2021)** Allosteric modulation of ghrelin receptor signaling by lipids. *Nature Communications*, **12**, 3938.
(Epub: 24th of June 2021)
- 24** Souabni H., Batista dos Santos W., Cece Q., **Catoire L. J.**, Puvanendran D., Bavro V. N. & Picard M.* **(2021)** Quantitative real-time analysis of the efflux by the MacAB-TolC tripartite efflux pump clarifies the role of ATP hydrolysis within mechanotransmission mechanism. *Communications Biology*, **4**, 493.
(Epub: 22nd of April 2021)
- 23** Giusti F., Casiraghi M., Point E., Damian M., Rieger J., Le Bon C., Pozza A., Moncoq K., Banères J.-L. & **Catoire L. J.* (2020)** Structure of the agonist 12-HHT in its BLT2 receptor-bound state. *Scientific Reports*, **10**, 2630.
(Epub: 14th of February 2020)
- 22** Casiraghi M., Point E., Pozza A., Moncoq K., Banères J.-L. & **Catoire L. J.* (2019)** NMR analysis of GPCR conformational landscapes and dynamics. *Molecular and Cellular Endocrinology*, **484**, 69–77.
(Epub: 25th of January 2019)
- 21** Casiraghi M., Damian M., Lescop E., Banères J.-L.* & **Catoire L. J.* (2018)** Illuminating the energy landscape of GPCRs: the key contribution of solution-state NMR associated with Escherichia coli as an expression host. *Biochemistry*, **57**, 2297–2307.
(Epub: 12th of April 2018)
- 20** Chipot C., Dehez F., Schnell J. R., Zitzmann N., Pebay-Peyroula E., **Catoire L. J.**, Miroux M., Kunji E. R. S., Veglia G., Cross T. A. & Schanda P.* **(2018)** Perturbations of Native Membrane Protein Structure in Alkyl Phosphocholine Detergents: a Critical Assessment of NMR and Biophysical Studies. *Chemical Reviews*, **118**, 3559–3607.
(Epub: 28th of February 2018)
- 19** Casiraghi M., Damian M., Lescop E., Point E., Moncoq K., Morellet N., Levy D., Marie J., Guittet E., Banères J.-L.* & **Catoire L. J.* (2016)** Functional modulation of a GPCR conformational landscape in a lipid bilayer. *Journal of the American Chemical Society*, **138**, 10170–10175.
(Epub: 24th of August 2016)
- 18** Planchard N., Point E., Dahmane T., Giusti F., Renault M., Le Bon C., Durand G., Milon A., Guittet E., Zoonens M., Popot J.-L. & **Catoire L. J.* (2014)** The use of amphipols for solution NMR studies of membrane proteins: advantages and constraints as compared to other solubilizing media. *Journal of Membrane Biology*, **247**, 827–842.
(Epub: 28th of March 2014)
- 17** Etzkorn M., Zoonens M., **Catoire L. J.**, Popot J.-L. & Hiller S.* **(2014)** How amphipols embed membrane proteins: global solvent accessibility and interaction with a flexible protein terminus. *Journal of Membrane Biology*, **247**, 965–970.

(Epub: 26th of March 2014)

- 16 Giusti F., Rieger J., **Catoire L. J.**, Qian S., Calabrese A. N., Watkinson T. G., Casiraghi M., Radford S., Ashcroft A., Fradet A. & Popot J.-L.* (2014) Synthesis, characterization and applications of a perdeuterated amphipol. *Journal of Membrane Biology*, **247**, 909–924.

(Epub: 21st of March 2014)

- 15 Sharma K. S., Durand G.,* Gabel F., Bazzacco P., Le Bon C., Billon-Denis E., **Catoire L. J.**, Popot J.-L.,* Ebel C.* & Pucci B. (2012) Non-ionic amphiphilic homopolymers: synthesis, solution properties, and biochemical validation. *Langmuir*, **28**, 4625–4639.

(Epub: 29th of February 2012)

- 14 Bazzacco P., Billon-Denis E., Sharma K. S., **Catoire L. J.**, Mary S., Le Bon C., Point E., Banères J.-L., Durand G., Zito F., Pucci B. & Popot J.-L.* (2012) Non-ionic homopolymeric amphipols: application to membrane protein folding, cell-free synthesis, and solution NMR. *Biochemistry*, **51**, 1416–1430.

(Epub: 9th of February 2012)

- 13 **Catoire L. J.**,* Damian M., Baaden M., Guittet É. & Banères J.-L. (2011) Electrostatically-driven fast association and receptor perdeuteration allow detection of transferred cross-relaxation for G protein-coupled receptor ligands with equilibrium dissociation constants in the high-to-low nanomolar range. *Journal of Biomolecular NMR*, **50**, 191–195.

(Epub: 19th of June 2011)

- 12 Dahmane T.,^{||} Giusti F.,^{||} **Catoire L. J.** & Popot J.-L.* (2011) Sulfonated amphipols: synthesis, properties and applications. *Biopolymers*, **95**, 811–823.

^{||}equally contribution

(Epub: 2nd of June 2011)

- 11 Popot J.-L.,* Althoff T., Bagnard D., Banères J.-L., Bazzacco P., Billon-Denis E., **Catoire L. J.**, Champeil P., Charvolin D., Cocco M. J., Crémel G., Dahmane T., de la Maza L. M., Ebel C., Gabel F., Giusti F., Gohon Y., Goormaghtigh E., Guittet E., Kleinschmidt J. H., Kühlbrandt W., Le Bon C., Martinez K. L., Picard M., Pucci B., Sachs J. N., Tribet C., van Heijenoort C., Wien F., Zito F. & Zoonens M. (2011) Amphipols from A to Z. *Annual Review of Biophysics*, **40**, 379–408.

(Epub: 5th of May 2011)

- 10 **Catoire L. J.**,* Damian M., Giusti F., Martin A., van Heijenoort C., Popot J.-L., Guittet É. & Banères J.-L.* (2010) Structure of a GPCR ligand in its receptor-bound state: leukotriene B₄ adopts a highly constrained conformation when associated to human BLT₂. *Journal of the American Chemical Society*, **132**, 9049–9057.

(Epub: 16th of June 2010)

- 9 **Catoire L. J.**,* Zoonens M., van Heijenoort C., Giusti F., Guittet É. & Popot J.-L. (2010) Solution NMR mapping of water-accessible residues in the transmembrane β -barrel of OmpX. *European Biophysics Journal*, **39**, 623–630.

(Epub: 29th of July 2009)

- 8 **Catoire L. J.**,* Zoonens M., van Heijenoort C., Giusti F., Popot J.-L. & Guittet É. (2009) Inter- and intramolecular contacts in membrane protein/surfactant complex observed by heteronuclear dipole to dipole cross-relaxation. *Journal of Magnetic Resonance*, **197**, 91–95.

(Epub: 6th of December 2008)

- 7 Zoonens M.,^{||} **Catoire L. J.**,^{||} Giusti F. & Popot J.-L.* (2005) NMR study of a membrane protein in detergent-free aqueous solution. *Proceedings of the National Academy of Sciences of the U.S.A.*, **102**, 8893–8898.
- ^{||}equally contribution
(Epub: 14th of June 2005)
- 6 **Catoire L. J.** (2004) Phosphorus-31 transverse relaxation rate measurements by NMR spectroscopy. Insight into conformational exchange along the nucleic acid backbone. *Journal of Biomolecular NMR*, **28**, 179–184.
- 5 **Catoire L.**, Pierron M., Morvan C., Hervé du Penhoat C. & Goldberg R.* (1998) Investigation of the action patterns of PME isoforms through kinetic analyses and NMR spectroscopy. Implications in cell-wall expansion. *Journal of Biological Chemistry*, **273**, 33150–33156.
- 4 **Catoire L.**, Goldberg R., Pierron M., Morvan C. & Hervé du Penhoat C.* (1998) An efficient procedure for studying pectin structure which combines limited depolymerization and ¹³C NMR. *European Biophysics Journal*, **27**, 127–136.
- 3 **Catoire L.**, Michon V., Monville L., Hocquet A., Jullien L., Canceill J., Lehn J.-M., Piotto M. & Hervé du Penhoat C.* (1997) Dynamic behavior of a perfunctionalized β -cyclodextrine as probed by NMR and molecular modeling. *Carbohydrate Research*, **303**, 379–393.
- 2 **Catoire L.**, Derouet C., Goldberg R. & Hervé du Penhoat C.* (1997) An NMR study of dynamic single-stranded conformation of sodium pectate. *Carbohydrate Research*, **300**, 19–29.
- 1 **Catoire L.**, Braccini I., Bouchemal-Chibani N., Hervé du Penhoat C.* & Pérez S. (1997) NMR analysis of carbohydrate with model-free spectral densities: the dispersion range revisited. *Glycoconjugate Journal*, **14**, 935–943.

BOOK CHAPTERS & MONOGRAPHS

- Casiraghi, M., Banères, J.-L. & **Catoire, L. J.*** (2017) NMR spectroscopy for the characterization of GPCR energy landscapes. Dans *Topics in Medicinal Chemistry*. Ed. G. Lebon, I., Springer, Berlin, Heidelberg.
- **Catoire, L. J.*** Warnet, X. L. & Warschawski, D. E.* (2013) Micelles, bicelles, amphipols, nanodiscs, liposomes or intact cells: the hitchhiker's guide to the membrane protein study by NMR. Dans *Membrane Proteins Production for Structural Analysis*. Ed. Mus-Veteau, I., Springer, New York, Chapter 12, pp315-345
- **Catoire, L. J.** (2013) Études biophysiques par RMN : du mouvement des sucres à l'exploration de la transduction du signal. *Habilitation à Diriger des Recherches de l'Université Paris VII-Denis Diderot, UFR de Biologie*
- **Catoire, L. J.** (1999) Études de pectines par spectroscopie de Résonance Magnétique Nucléaire. *Thèse en Physique de l'Université Paris VII-Denis Diderot. Spécialité: Biophysique Moléculaire*

TALKS

2026

- Conference at the Biophysical Society Annual meeting, **21st–25th of February**, San Francisco, CA, USA. Best of Biophysical Journal 2026: *Allosteric coupling between a lipid bilayer and a membrane protein.*

2023

- Introduction to atoms and molecules, **21st of May**, Fagon Elementary School, Paris, France. *Le microcosmos moléculaire.*
- Conference at the Visualizing Membrane/Protein Interactions Workshop, **5–7th of June**, University of Chicago Center in Paris, Paris, France. *Exploration of the dynamic interplay between lipids and membrane proteins by hydrostatic pressure.*

2022

- Seminar at the Dynamics of Interacting Proteins day, **6th of December**, IBPC, Paris, France. *Exploration of the dynamic interplay between lipids and membrane proteins by hydrostatic pressure.*
- Seminar at the Membrane Club, **30th of September**, Pasteur Institute, Paris, France. *Exploration of the dynamic interplay between lipids and membrane proteins by hydrostatic pressure.*
- Conference at INSERM Workshop on the Membrane proteins in reconstituted systems: from the latest advances in fundamental research to therapeutic applications, **30th of March – 1st of April 2022**, Bordeaux, France. *Exploration of the dynamic interplay between lipids and membrane proteins by hydrostatic pressure.*

2021

- Conference at the 2^{ème} Congrès Français de Biologie Structurale Intégrative, **29th of Novembre – 3rd of December 2021**, Campus Paris-Saclay, France. *Study of the dynamic interplay between lipids and membrane proteins by hydrostatic pressure.*

2020

- Conference at the 5th FRISBI Users Meeting, **4th of february 2020**, Gif/Yvette, France. *Study of GPCR energy landscape in lipid discs by solution-state NMR.*

2019

- Plenary conference at the GPCR workshop, **1–5 of december 2019**, Sheraton Kona, Big Island of Hawaiï, Hawaiï, USA. *Illuminating the Energy Landscape of GPCRs: The Key Contribution of Solution-State NMR Associated with a Bacterial Expression Host.*
- Plenary conference at the 3rd DYNAMO (LabEx) Symposium 2019, **26–29 mars 2019**, Institut Océanographique, Paris: *Illuminating the energy landscape of GPCRs: the key contribution of solution-state NMR associated with Escherichia coli as an expression host.*

2018

- Seminar given in the framework of EquipEx CACSICE, **3rd of december 2018**, IPBC, Paris: *Structural study of agonist selectivity in leukotriene receptors.*

2017

- Seminar given in the framework of Module d'Enseignement Doctoral *Protéines membranaires – structures, fonctions, et implications en santé humaine*, **20th of june 2017**, Faculté de Pharmacie René Descartes, Paris: *Study of biomolecule energy landscapes by NMR : application to a G Protein-Coupled Receptor in a lipid bilayer.*

- Plenary conference at the Gordon Research Conference on Membrane Protein Folding, **4–9th of june 2017**, Stonehill College Easton, MA , USA: *Refolding of E. coli expressed GPCR into nanodiscs using amphipols : Application to the study of a GPCR conformational landscape in a lipid bilayer.*
- Seminar given in the framework of IMM talks, LISM, Marseille, France **28th of april 2017**, Paris: *Functional modulation of a GPCR landscape in a lipid bilayer.*
- Conference at the île de France NMR day, Paris, IBPC, France **25th of april 2017**, Paris: *Functional modulation of a GPCR landscape in a lipid bilayer.*
- Plenary conference at the International Workshop on Advanced Isotopic Labelling Methods for Integrated Structural Biology – AILM 2017 – Grenoble, France **6–9th march 2017**, Grenoble, France: *Functional modulation of a GPCR landscape in a lipid bilayer.*

2016

- Conference at the Pasteur Institute, Paris, **30th of june 2016**: *Functional modulation of a GPCR landscape in a lipid bilayer.*

2015

- Plenary conference at the Thematic day on Structural Biology of Membrane Complexes, Pasteur Institute, Paris, **1st of december 2015**: *Functional modulation of a GPCR conformational landscape in a lipid bilayer.*

2014

- Plenary conference at au GDR 3345 From physiology to drugs: RCPG-PHYSIO-MED (3rd meeting), Corum, Montpellier, **20–22 octobre 2014**: *Towards the detection of sparsely populated, transiently formed GPCR conformers by NMR spectroscopy.*

2013

- Seminar at the Institut de Biologie Physico-Chimique at the *Applications of Amphipols to Membrane Proteins Studies workshop*, Paris, **21–24th of october 2013**: *NMR studies of amphipol-trapped membrane proteins and their ligands.*
- Seminar at the GDR 3334 *Assemblages supramoléculaires et membranes biologiques*, 3^{eme} réunion plénière, Sainte-Mortaine, **6–9th of october 2013** *NMR studies of amphipol-trapped membrane proteins and their ligands.*
- Conference & *Chairman* of the *Membranes proteins* session at the 18th ISMAR (International Society of Magnetic Resonance) meeting, Rio de Janeiro, Brazil, **19–24th of may 2013**: *Study of the molecular basis of signal transduction by GPCRs as observed by NMR.*

2012

- Conference at the 1st Workshop CNRS–Oxford Membrane Proteins Network, IMPMC-UPMC, Paris, **17–18th of december 2012**: *Study of the molecular basis of signal transduction by GPCRs as observed by NMR*
- Conference at the 4th NMR user meeting of the Très Grandes Infrastructures de Recherche en RMN (TGIR–RMN), Lille, **8th of november 2012**: *Conformational selection of GPCR ligands upon binding to their receptors as observed by NMR*
- Conference at the École thématique du CNRS *Production and stabilization of membrane proteins for structural studies.*, Grasse, **1–4th of october 2012**: *Micelles, bicelles, amphipols, nanodiscs, liposomes or intact cells: What are the best conditions to study membrane proteins by NMR?*
- Conference at the br.BIO.fr meeting, 1st French–Brazilian Symposium on Biosciences, Pasteur Institute, Paris, **21th of march 2012**: *Conformational selection of agonists upon binding to their cognate receptors observed by NMR spectroscopy.*

- Seminar at the Journée IBPC, IBPC, Paris, **19th of march 2012**: *Study of the molecular basis of signal transduction by G protein coupled receptors.*

2010

- Seminar at the Institut de Biologie Physico-Chimique for the workshop on *Applications of Amphipols to Membrane Proteins Studies*, IBPC, Paris, **8–12th of march 2010**: *NMR studies of amphipol-trapped membrane proteins and their ligands.*

2009

- Seminar at the Laboratoire de RMN – ICSN – Gif/Yvette, **23rd of november 2009**: *Etude structurale par RMN du Leucotriène B₄ en interaction avec le récepteur BLT2 et vice-versa.*
- Seminar at the IBMM – Faculté de Pharmacie – Montpellier, **22nd of june 2009**: *Etude structurale par RMN du Leucotriène B₄ en interaction avec les récepteurs BLT1 et BLT2.*

2007

- Conference at the Institut de Biochimie Médicale (Instituto de Bioquímica Médica, IBqM), Université Fédérale de Rio de Janeiro (UFRJ), Rio de Janeiro, Brazil, **26th of october 2007**: *Heteronuclear dipole to dipole cross-relaxation applied to a porin.*
- Seminar at the Laboratoire de RMN – ICSN – Gif/Yvette, **June 2007**: *NMRPipe: petit tour d'horizon*

2005

- Seminar at the Dpt. of Molecular Biophysics and Biology, Yale University, New Haven, USA, **April 2005**: *Structural study of membrane proteins by NMR spectroscopy: whether or not PM/amphipol complexes are compatible with an NMR study?*

2004

- Seminar at the *Journée IBPC*, Paris, **6th of april 2004**: *Utilisation des amphipols pour l'étude des protéines membranaires par RMN des solutions.*
- Seminar at the réunion de l'UMR 7099 hors-les-murs, Chartres, **March 2004**: *Études de protéines membranaires par RMN en solution: nouveaux développements et perspectives.*

TALKS BY MARINA CASIRAGHI, EX-PH.D STUDENT AND POST-DOCTORAL FELLOW
(DECEMBER 2013 TO DECEMBER 2017)

2017

- Seminar at the Paris NMR – BNMRZ Workshop **7th of July 2017**, Institut Pasteur, Paris, France: *Solution-state NMR to map the conformational landscape of an unmodified GPCR in nanodiscs.*

2016

- Seminar at the 11^{eme} colloque des rencontres IBPC **13–16 avril 2016**, IBPC, Paris, France: *Functional modulation of a GPCR landscape in a lipid bilayer.*
- Seminar at the GDR sur les Protéines Membranaires: Aspects Cellulaires et Moléculaires (GDR 3696), La Londe Les Maures, France **2–7 avril 2016**: *Functional modulation of a GPCR landscape in a lipid bilayer.*
- Plenary conference at the Gordon Research Conference on Ligand Recognition & Molecular Gating, Lucca (Barga), Italy **31st of January–5th of February 2016**: *Functional modulation of a GPCR landscape in a lipid bilayer.*

2015

- Conference at the Colloque RMN du Grand Bassin Parisien/Ile-de-France, Gif/Yvette, France **28–29th of May 2015**: *Functional remodeling of the GPCR conformational landscape in a lipid bilayer.*
- Seminar at the GDR3696 – ProMemMoCe Protéines Membranaires : Aspects Moléculaires et Cellulaires, Réunion Plénière, Praz Sur Arly, France, **16–19th of March 2015**: *Towards the detection of sparsely populated, transiently formed GPCR conformers by NMR spectroscopy.*
- Conference at the International Workshop on *Advanced Isotopic Labelling Methods for Integrated Structural Biology* – AILM 2015 – Grenoble, France, **2–5th of February 2015**: *Towards the detection of sparsely populated, transiently formed GPCR conformers by NMR spectroscopy.*
best oral presentation award
