



*Unit Director, DRE INSERM*  
Ludger Johannes

The Curie Institute is a cancer research and care centre characterized by interdisciplinarity. The Cellular and Chemical Biology department cherishes this spirit by uniting within the same perimeter researchers from various backgrounds, notably organic chemistry and cell biology. It is our objective to address the timeliest challenges in life sciences and biomedicine from unique angles that become accessible due to a real integration between disciplines. Work in our teams covers fields of fundamental research that range from chemistry to biology, including endocytosis, signaling, intracellular trafficking, membrane mechanics and mechanotransduction, small molecule lead discovery, and chromatin biology. Well cited publications in highly visible journals, invitations to and the organization of prestigious international conferences, and excellent track record of fund raising are the hallmarks of a dynamic research environment. Our applied research efforts are geared at providing novel therapeutic solutions for the clinical management of cancer, notable in the fields of targeted delivery of therapeutic compounds to tumors (including lysosomotropic targeting), immunotherapy, chromatin-targeting, and targeting iron homeostasis. The past and present creation of start-up companies by unit members and ongoing contracts with industry and biotech testify for a vibrant technology transfer environment within the unit.

The unit is also cofounder and partner of the [Institut Curie chemical Library platform](#).

## Selected publications:

**Année de publication: 2018**

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**Visualizing biologically active small molecules in cells using click chemistry.** Tatiana Cañeque, Sebastian Müller, Raphaël Rodriguez\*. [Nature Rev. Chem. \(2018\) In Press](#). Cover Picture

**Targeting NAT10 enhances healthspan and lifespan in a mouse model of human accelerated aging syndrome.** Gabriel Balmus, Delphine Larrieu, Ana C. Barros, Casey Collins, Monica Abrudan, Mukerrem Demir, Nicola Geisler, Christopher J. Lelliott, Jacqui White, Natasha A. Karp, James Atkinson, Andrea Kirton, Matt Jacobsen, Dean Clift, Sanger Mouse Genetics Project,

Raphaël Rodriguez, David J. Adams, Stephen P. Jackson. [Nature Comm. 9 \(2018\)](#)

**Année de publication: 2017**

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**Salinomycin kills cancer stem cells by sequestering iron in lysosomes.** Trang Thi Mai, Ahmed Hamai, Antje Hienzsch, Tatiana Cañeque, Sebastian Müller, Julien Wicinski, Olivier Cabaud, Christine Leroy, Amandine David, Verónica Acevedo, Akihide Ryo, Christophe Ginestier, Daniel Birnbaum, Emmanuelle Charafe-Jauffret, Patrice Codogno, Maryam Mehrpour\*, Raphaël Rodriguez\*. [Nature Chem. DOI: 10.1038/NCHEM.2778](#), Highlighted in [chemical & engineering news](#)

**Mechanism of Shiga toxin clustering on membranes.** Weria Pezeshkian, Haifei Gao, Senthil Arumugam, Ulrike Becken, Patricia Bassereau, Jean-Claude Florent, John Hjort Ipsen, Ludger Johannes\*, Julian C Shillcock\*. [ACS Nano 11, 314-324 \(2017\)](#)

**Click chemistry enables preclinical evaluation of targeted epigenetic therapies.** Dean S. Tyler, Johanna Vappiani, Tatiana Cañeque, Enid Y. N. Lam, Aoife Ward, Omer Gilan, Yih-Chih Chan, Antje Hienzsch, Anna Rutkowska, Thilo Werner, Anne J. Wagner, Dave Lugo, Richard Gregory, Cesar Ramirez Molina, Neil Garton, Christopher R. Wellaway, Susan Jackson, Laura MacPherson, Margarida Figueiredo, Sabine Stolzenburg, Charles C. Bell, Colin House, Sarah-Jane Dawson, Edwin D. Hawkins, Gerard Drewes, Rab K. Prinjha, Raphaël Rodriguez, Paola Grandi, Mark A. Dawson. [Science DOI: 10.1126/science.aal2066](#)

**Chromatin regulates genome targeting with cisplatin.** Emmanouil Zacharioudakis, Poonam Agarwal, Alexandra Bartoli, Nathan Abell, Lavaniya Kunalingam, Valérie Bergoglio, Blerta Xhemalce, Kyle M. Miller\*, Raphaël Rodriguez\*. [Angew. Chem. Int. Ed. DOI: 10.1002/anie.201701144R1](#)

**Click quantitative mass spectrometry identifies PIWIL3 as a mechanistic target of RNA interference activator enoxacin in cancer cells.** Nathan S. Abell, Marvin Mercado, Tatiana Cañeque, Raphaël Rodriguez\*, Blerta Xhemalce\*. [J. Am. Chem. Soc. 139, 1400-1403 \(2017\)](#)

**Year of publication: 2016**

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**Glycosylation-Dependent IFN- $\gamma$ R Partitioning in Lipid and Actin Nanodomains Is Critical for JAK Activation.** Cédric M Blouin, Yannick Hamon, Pauline Gonnord, Cédric Boullaran, Jérémy Kagan, Christine Viaris de Lesegno, Richard Ruez, Sébastien Mailfert, Nicolas Bertaux, Damarys Loew, Christian Wunder, Ludger Johannes, Guillaume Vogt, Francesc-Xabier Contreras, Didier Marguet, Jean-Laurent Casanova, Céline Galès, Hai-Tao He, Christophe Lamaze. [Cell 166, 920-934 \(2016\)](#)

**Persistent cell migration and adhesion rely on retrograde transport of  $\beta$ 1 integrin.** Massiullah Shafaq-Zadah, Carina S. Gomes-Santos, Sabine Bardin, Paolo Maiuri, Mathieu Maurin,



## UMR3666/U1143 – Cellular and Chemical Biology Multiscale Physics-Biology-Chemistry and cancer

Julian Iranzo, Alexis Gautreau, Christophe Lamaze, Patrick Caswell, Bruno Goud, Ludger Johannes [Nat. Cell Biol. 18, 54-64 \(2016\)](#)

**Targeting cancer stem cells with small molecules.** Sebastian Müller, Tatiana Cañeque, Verónica Acevedo, Raphaël Rodriguez\* [Isr. J. Chem. DOI: 10.1002/ijch.201600109](#). Special Stuart L. Schreiber & Kyriacos C. Nicolaou Wolf Prize special issue

**Spatiotemporal control of interferon-induced JAK/STAT signalling and gene transcription by the retromer complex.** Daniela Chmiest, Nanaocha Sharma, Natacha Zanin, Christine Viaris de Lesegno, Massiullah Shafaq-Zadah, Vonick Sibut, Florent Dingli, Philippe Hupé, Stephan Wilmes, Jacob Piehler, Damarys Loew, Ludger Johannes, Gideon Schreiber, Christophe Lamaze. [Nature Comm. 7, 13476 \(2016\)](#)

**Year of publication: 2015**

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**Endophilin-A2 functions in membrane scission in clathrin-independent endocytosis.** Henri-François Renard, Mijo Simunovic, Joël Lemièrre, Emmanuel Boucrot, Maria Daniela Garcia-Castillo, Senthil Arumugam, Valérie Chambon, Christophe Lamaze, Christian Wunder, Anne K Kenworthy, Anne A Schmidt, Harvey T McMahon, Cécile Sykes, Patricia Bassereau, Ludger Johannes. [Nature 517, 493-496 \(2015\)](#)

**Synthesis of marmycin A and investigation into its cellular activity.** Tatiana Cañeque, Filipe Gomes, Trang Thi Mai, Giovanni Maestri, Max Malacria, Raphaël Rodriguez. [Nature Chem. 7, 744-751 \(2015\)](#)

## Key publications

**Year of publication 2019**

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G Gentric, Y Kieffer, V Mieulet, O Goundiam, C Bonneau, F Nemati, I Hurbain, G Raposo, T Popova, MH Stern, V Lallemand-Breitenbach, S Müller, T Cañeque, R Rodriguez, A Vincent-Salomon, H de Thé, R Rossignol, F Mechta-Grigoriou (2019 Jan 5)

**PML-Regulated Mitochondrial Metabolism Enhances Chemosensitivity in Human Ovarian Cancers**

*Cell Metabolism*

**Year of publication 2018**

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Tatiana Cañeque, Sebastian Müller, Raphaël Rodriguez (2018 Aug 15)

**Visualizing biologically active small molecules in cells using click chemistry***Nature Rev. Chem.*Year of publication 2017

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Trang Thi Mai, Ahmed Hamaï, Antje Hienzsch, Tatiana Cañeque, Sebastian Müller, Julien Wicinski, Olivier Cabaud, Christine Leroy, Amandine David, Verónica Acevedo, Akihide Ryo, Christophe Genestier, Daniel Birnbaum, Emmanuelle Charafe-Jauffret, Patrice Codogno, Maryam Mehrpour, Raphaël Rodriguez (2017 May 15)

**Salinomycin kills cancer stem cells by sequestering iron in lysosomes***Nature Chemistry* : [DOI : 10.1038/nchem.2778](https://doi.org/10.1038/nchem.2778)

Emmanouil Zacharioudakis, Poonam Agarwal, Alexandra Bartoli, Nathan Abell, Lavaniya Kunalingam, Valérie Bergoglio, Blerta Xhemalce, Kyle M. Miller, Raphaël Rodriguez (2017 May 5)

**Chromatin Regulates Genome Targeting with Cisplatin***Angewandte Chemie* : [DOI : 10.1002/anie.201701144](https://doi.org/10.1002/anie.201701144)

Weria Pezeshkian, Haifei Gao, Senthil Arumugam, Ulrike Becken, Patricia Bassereau, Jean-Claude Florent, John Hjort Ipsen, Ludger Johannes, Julian C Shillcock (2017 Jan 24)

**Mechanism of Shiga Toxin Clustering on Membranes***ACS Nano* : 11 : 314-324 : [DOI : DOI: 10.1021/acsnano.6b05706](https://doi.org/10.1021/acsnano.6b05706)

Nathan S Abell, Marvin Mercado, Tatiana Cañeque, Raphaël Rodriguez, Blerta Xhemalce (2017 Jan 18)

**Click Quantitative Mass Spectrometry Identifies PIWIL3 as a Mechanistic Target of RNA Interference Activator Enoxacin in Cancer Cells.***Journal of the American Chemical Society* : 1400-1403 : [DOI : 10.1021/jacs.6b11751](https://doi.org/10.1021/jacs.6b11751)