



Unit Director
Emmanuel Barillot

Teams in this computational unit study several aspects of the cancer pathology through observation of the underlying molecular and cellular mechanisms: initiation (etiology, through the modelling of gene and environment interaction), development and tumor progression (inferring and modelling the gene and protein networks involved, analysis of phenotypes through bioimaging), and improvement in therapeutic strategies (diagnosis, prognosis, design and analysis of clinical trials, identification of therapeutic targets, virtual selection of therapeutic molecules).

Research projects are conducted in close collaboration with biologists and clinicians and always involved a mix of experimental and theoretical approaches, in iterative cycles from the wet biology to the mathematical model and back, which ultimately lead to validated and thus predictive models. They take advantage of new high throughput biological technologies at both the molecular and cellular levels (spectrometry, microarrays, high-throughput cellular phenotyping, deep sequencing) and use state-of-the-art and innovative methods of data integration and systems biology, statistical analysis, high dimension statistical learning, study of complexity, network modeling, virtual screening and bioimaging.

Key publications

Year of publication 2019

PONS-TOSTIVINT Elvire, LATOUCHE Aurélien, VAFLARD Pauline, RICCI Francesco, LOIRAT Delphine, HESCOT Ségolène, SABLIN S Marie-Paule, ROUZIER Roman, KAMAL Maud, MOREL Claire, LECERF Charlotte, SERVOIS Vincent, PAOLETTI Xavier, LE TOURNEAU Christophe (2019 Feb 6)

Comparative Analysis of Durable Responses on Immune Checkpoint Inhibitors Versus Other Systemic Therapies: A Pooled Analysis of Phase III Trials

JCO Precision Oncology : [DOI : 10.1200/PO.18.00114](https://doi.org/10.1200/PO.18.00114)

Year of publication 2018

Tom Baladi, Jessy Aziz, Florent Dufour, Valentina Abet, Véronique Stoven, François Radvanyi, Florent Poyer, Ting-Di Wu, Jean-Luc Guerquin-Kern, Isabelle Bernard-Pierrot, Sergio Marco Garrido, Sandrine Piguel (2018 Nov 1)

Design, synthesis, biological evaluation and cellular imaging of imidazo[4,5-b]pyridine derivatives as potent and selective TAM inhibitors.

Bioorganic & medicinal chemistry : 26 : 5510-5530 : [DOI : 10.1016/j.bmc.2018.09.031](https://doi.org/10.1016/j.bmc.2018.09.031)

Forget Antoine, Martignetti Loredana, Puget Stéphanie, Calzone Laurence, Brabetz Sebastian, Picard Daniel, Montagud Arnau, Liva Stéphane, Sta Alexandre, Dingli Florent, Arras Guillaume, Rivera Jaime, Loew Damaris, Besnard Aurore, Lacombe Joëlle, Pagès Mélanie, Varlet Pascale, Dufour Christelle, Yu Hua, L. Mercier Audrey, Indersie Emilie, Chivet Anaïs, Leboucher Sophie, Sieber Laura, Beccaria Kevin, Gombert Michael, D. Meyer Frauke, Qin Nan, Bartl Jasmin, Chavez Lukas, Okonechnikov Konstantin, Sharma Tanvi, Thatikonda Venu, Bourdeaut Franck, Pouponnot Celio, Ramaswamy Vijay, Korshunov Andrey, Borkhardt Arndt, Reifenberger Guido, Pouillet Patrick, D. Taylor Michael, Kool Marcel, M. Pfister Stefan, Kawauchi Daisuke, Barillot Emmanuel, Remke Marc, Ayrault Olivier (2018 Sep 10)

Aberrant ERBB4-SRC Signaling as a Hallmark of Group 4 Medulloblastoma Revealed by Integrative Phosphoproteomic Profiling

Cancer Cell : 34 : 379-395 : [DOI : 10.1016/j.ccell.2018.08.002](https://doi.org/10.1016/j.ccell.2018.08.002)

Year of publication 2017

Manuela Portoso, Roberta Ragazzini, Živa Brenčič, Arianna Moiani, Audrey Michaud, Ivaylo Vassilev, Michel Wassef, Nicolas Servant, Bruno Sargueil, Raphaël Margueron (2017 Feb 8)

PRC2 is dispensable for HOTAIR-mediated transcriptional repression.

The EMBO journal : [DOI : e201695335](https://doi.org/10.1016/j.embo.2016.09.035)

Maud Borensztein, Laurène Syx, Katia Ancelin, Patricia Diabangouaya, Christel Picard, Tao Liu, Jun-Bin Liang, Ivaylo Vassilev, Rafael Galupa, Nicolas Servant, Emmanuel Barillot, Azim Surani,



U900 – Bioinformatics, Biostatistics, Epidemiology and
Computational Systems. Biology of Cancer
Integrative Tumour Biology, Immunology and Environment

Chong-Jian Chen, Edith Heard (2017 Jan 31)

Xist-dependent imprinted X inactivation and the early developmental consequences of its failure.

Nature structural & molecular biology : [DOI : 10.1038/nsmb.3365](https://doi.org/10.1038/nsmb.3365)

Year of publication 2016

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 (2016 Dec 6)

Spatiotemporal control of interferon-induced JAK/STAT signalling and gene transcription by the retromer complex.

Nature communications : 13476 : [DOI : 10.1038/ncomms13476](https://doi.org/10.1038/ncomms13476)