Our work focuses on two aspects of cellular dynamics, the Golgi apparatus in the secretory and retrograde trafficking pathways, and the regulation of microtubule dynamics. Our studies are carried out using a variety of approaches such as live cell imaging to follow and quantify intracellular trafficking or microtubule dynamics in the presence or absence of disrupting agents (e.g. siRNA, mutants, small molecules). We are also involved in the development of novel approaches and tools (e.g. High Content Screening, recombinant antibodies) in order to fully explore both the fundamental and applied aspects of our projects.

The Golgi apparatus – We are interested in the mechanisms that provide structural and functional homeostasis to the Golgi apparatus. We studied its role in cell organization, its mode of inheritance during cell division and we identified novel Golgi localised proteins. We have developed a method to specifically inactivate Golgi complexes in intact cells used it to study Golgi apparatus maintenance in interphase. We are now studying the multiple Golgi-intersecting
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pathways. To this end, we have developed a systematic transport assay, the RUSH assay, that enables to study and quantify the transport a large diversity of cargo in living cells (Figure 1). It is also usable for automated High Content Screening. We are using the RUSH assay in collaboration with the BioPhenics screening platform of the Institut Curie to characterize the many Golgi-dependent cellular routes and to identify specific inhibitors in chemical libraries that may be used for therapeutic applications.

Microtubule dynamics – We are also interested in the processes regulating microtubule dynamics. We studied for instance the role of certain types of CLIP (cytoplasmic linker proteins) proteins in the dynamic instability of microtubules. We originally showed that CLIP-170 is localized in a dynamic way to microtubule polymerizing plus ends and then studied CLIP-170-related protein involved in membrane trafficking. More recently, we selected an antibody sensitive to tubulin conformational changes when bound to GTP. This antibody allowed us to propose a new model for microtubule dynamic instability. We are now studying the role of microtubule in the control of the secretory pathway using the RUSH assay.

Recombinant antibodies (Figure 2)- In the past, we used a library of scFv fragments obtained form the MRC (obtained from G. Winter, UK) but we now developed our own synthetic library based on a humanized nanobody scaffold with a diversity of $3 \times 10^9$ clones. In addition, we have simplified and improved our antibody production methods and set-up new selection protocols. Organizing dedicated platforms, we now bring this expertise to collaborative projects aimed at addressing specific fundamental cell biology questions or at exploring novel cancer diagnosis and therapeutics options.
Key publications

Year of publication 2019

Lou Fourriere, Amal Kasri, Nelly Gareil, Sabine Bardin, Hugo Bousquet, David Pereira, Franck Perez, Bruno Goud, Gaëlle Boncompain, Stéphanie Miserey-Lenkei (2019 May 31)
**RAB6 and microtubules restrict protein secretion to focal adhesions.**
The Journal of cell biology : [DOI : 10.1083/jcb.201805002]

Year of publication 2014

**ESCRT machinery is required for plasma membrane repair.**
Science (New York, N.Y.) : 1247136 : [DOI : 10.1126/science.1247136]

Year of publication 2013

**A siRNA screen identifies RAD21, EIF3H, CHRAC1 and TANC2 as driver genes within the 8q23, 8q24.3 and 17q23 amplicons in breast cancer with effects on cell growth, survival and transformation.**

Year of publication 2011

**Synchronization of secretory protein traffic in populations of cells.**
Nature methods : 493-8 : [DOI : 10.1038/nmeth.1928]

Year of publication 2008

Ariane Dimitrov, Mélanie Quesnoit, Sandrine Moutel, Isabelle Cantaloube, Christian Poüs, Franck Perez (2008 Oct 16)
**Detection of GTP-tubulin conformation in vivo reveals a role for GTP remnants in microtubule rescues.**
Science (New York, N.Y.) : 1353-6 : [DOI : 10.1126/science.1165401]
Year of publication 2007

Florence Jollivet, Graça Raposo, Ariane Dimitrov, Rachid Sougrat, Bruno Goud, Franck Perez
(2007 Sep 12)

Analysis of de novo Golgi complex formation after enzyme-based inactivation.
Molecular biology of the cell : 4637-47