Teams in this unit investigate the mechanisms underlying the stability and the plasticity of genetic and epigenetic information in normal or pathological contexts such as cancer. Using complementarity approaches, we develop an integrated view of the functional organization of the genome at different scales: from the molecule to the cell to the organism.

Using several model organisms (Drosophila, Xenopus, mouse, yeast) and cell lines (human, rodents, insects ...) we study fundamental processes of chromosome biology: DNA replication, segregation and repair, regulation of gene expression during development, cell cycle and in response to environmental stress.

Together, these models are helping to decipher how DNA replication and repair, gene transcription and silencing are modulated during development, cell division and in response to environmental stress.

The main research themes of the unit include:
- The roles of factors involved in chromatin dynamics, genome stability and repair
- How functional domains of eukaryotic genomes are established and then maintained during development.
- How epigenetic plasticity plays a part in controlling the polarity of the embryo.
- How nuclear compartmentalisation and dynamics participate in regulating various functions of the genome.

**Key publications**

**Year of publication 2021**

Daniel Jeffery, Alberto Gatto, Katrina Podsypanina, Charlène Renaud-Pageot, Rebeca Ponce Landete, Lorraine Bonneville, Marie Dumont, Daniele Fachinetti, Geneviève Almouzni (2021 Mar 26)

**CENP-A overexpression promotes distinct fates in human cells, depending on p53 status**

*Communications Biology* : 4 : 1-18 : [DOI : 10.1038/s42003-021-01941-5](https://doi.org/10.1038/s42003-021-01941-5)

Myriam Ruault, Vittore F Scolari, Luciana Lazar-Stefanita, Antoine Hocher, Isabelle Loïodice, Romain Koszul, Angela Taddei (2021 Feb 13)

**Sir3 mediates long-range chromosome interactions in budding yeast.**

*Genome research* : 411-425 : [DOI : 10.1101/gr.267872.120](https://doi.org/10.1101/gr.267872.120)

Judith Miné-Hattab, Mathias Heltberg, Marie Villemeur, Chloé Guedj, Thierry Mora, Aleksandra M Walczak, Maxime Dahan, Angela Taddei (2021 Feb 5)

**Single molecule microscopy reveals key physical features of repair foci in living cells.**

*eLife* : [DOI : 10.7554/eLife.60577](https://doi.org/10.7554/eLife.60577)

**Year of publication 2020**

Aleksandra S Chikina, Francesca Nadalin, Mathieu Maurin, Mabel San-Roman, Thibault Thomas-Bonafos, Xin V Li, Sonia Lameiras, Sylvain Baulande, Sandrine Henri, Bernard Malissen, Livia Lacerda Mariano, Jorge Barbazan, J Magarian Blander, Iliyan D Iliev, Daniijela Matic Vignjevic, Ana-Maria Lennon-Duménil (2020 Sep 24)

**Macrophages Maintain Epithelium Integrity by Limiting Fungal Product Absorption.**

*Cell* : 411-428.e16 : [DOI : S0092-8674(20)31090-4](https://doi.org/S0092-8674(20)31090-4)

**LifeTime and improving European healthcare through cell-based interceptive medicine**

*Nature*: 587(7834):377-386 : [DOI: 10.1038/s41586-020-2715-9](https://doi.org/10.1038/s41586-020-2715-9)

Júlia Torné, Dominique Ray-Gallet, Ekaterina Boyarchuk, Mickaël Garnier, Antoine Coulon, Guillermo A. Orsi, Geneviève Almouzni (2020 Sep 7)

**Two distinct HIRA-dependent pathways handle H3.3 de novo deposition and recycling during transcription**

*Nature Structural & Molecular Biology*: 27 : 1057–1068 : [DOI: 10.1038/s41594-020-0492-7](https://doi.org/10.1038/s41594-020-0492-7)