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## 5 YEARS

OF ACHIEVEMENTS  
FOR UNDERSTANDING  
HOW ENVIRONMENT  
SHAPES BIOLOGICAL  
SYSTEMS



EPIGENETICS • ENVIRONMENT  
CELL PLASTICITY • CANCER

The Institute for Advanced Biosciences (IAB, <https://iab.univ-grenoble-alpes.fr>) is an institute of international standing in basic and translational biomedical research, from epigenetics and signalling through chromatin to cell biology, cell signalling, molecular pathology, host-parasite interactions and environmental epidemiology. IAB develops world-class programs in biomedical research. Its defining feature is the coverage of a range of scientific expertise encompassing the biological continuum from molecules to populations. Over the past 5 years, this approach has enabled IAB to make significant contributions in many areas, including chromatin structure and dynamics, cell adhesion and plasticity, molecular pathology and therapy of cancer, genetics of reproduction, natural history and molecular biology of parasitic diseases and early-life effects of environmental exposures.

IAB is a research center jointly supported by University Grenoble Alpes (UGA), Institut National de la Santé et de la Recherche Médicale (Inserm) and Centre National de la Recherche Scientifique (CNRS).

The scientific strategy is based on interdisciplinarity and the construction of a continuum of scientific expertise, covering genetics, epigenetics, cell biology, cell-matrix interactions, molecular pathology, host-parasite interactions, immunology, environmental epidemiology and oncology. This strategy aims to build a bridge from fundamental research to biomedical application and valorization, supported by partnerships with the European Molecular Biology Laboratory (EMBL), the Institute of structural biology (IBS), the Interdisciplinary Laboratory of Physics (LiPhy), the Department of Molecular Chemistry (DCM), the French Blood Transfusion Center (EFS) and Grenoble Alpes University Hospital.

## Key numbers

- **18** research teams
- **300** staff (61% women & 39% Men)
- **27** nationalities
- **118** Researchers & lecturers (59% Women & 41% Men)
- **52** PhD Students
- **39** Patents
- **7** Starts-up
- **6,6** M€ Grants per year

# MAJOR SCIENTIFIC CONTRIBUTIONS

## ● Solving the structure of H1-bound nucleosome

Roulland *et al.*, *Molecular Cell*, 2016  
Bednar *et al.*, *Molecular Cell*, 2017  
Garcia-Saez *et al.*, *Molecular Cell*, 2018

## ● Understanding genome programming by histone variants and histone modifications

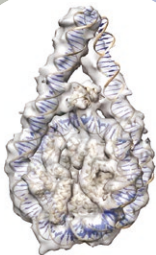
Goudarzi *et al.*, *Molecular Cell*, 2016  
Barral *et al.*, *Molecular Cell*, 2017  
Shiota *et al.*, *Cell Reports*, 2018

## ● Histone acetylation in rare human genetic diseases

Basilicata MF *et al.*, *Nature Genetics*, 2018  
Gaub A *et al.*, *Nature Communications*, 2020  
Sheikh BN *et al.*, *Nature Cell Biology*, 2020

## ● 17 new genes involved in human infertility

Kherraf *et al.*, *EMBO Molecular Medicine*, 2017  
Coutton *et al.*, *Nature Communications*, 2018  
Christou-Kent *et al.*, *EMBO Molecular Medicine*, 2018



FROM  
MOLECULES...



● **Unravelling chromatin signaling in gametogenesis and in cancer**

Mietton *et al.*, Nature Communications, 2017  
Emadali A *et al.*, Blood, 2016  
Garcia-Oliver *et al.*, PLoS Genetics, 2017

● **Deciphering the molecular complexity of neuroendocrine lung cancers**

George *et al.*, Nature Communications, 2018  
Alcala *et al.*, Nature Communications, 2019

● **New treatment strategies for Hepatocellular Carcinoma**

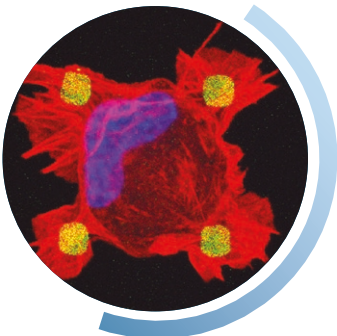
Jilkova *et al.*, Oncotarget, 2018  
Mroweh *et al.*, International Journal of Molecular Sciences, 2020  
Roth *et al.*, Molecular Cancer Therapeutics, 2017

● **Driving cell shape and functions through microenvironmental cues and acto-adhesive structures**

Court *et al.*, Molecular and Cellular Proteomics, 2017  
Bouin *et al.*, Journal of Cell Science, 2017  
Petropoulos *et al.*, Journal of Cell Biology, 2016

● **Cytoskeletal tension as driver of cell growth and differentiation**

Aureille *et al.*, EMBO Rep., 2019  
Court *et al.*, Biomaterials, 2019  
Lisowska *et al.*, Journal of Cell Science, 2018  
Fourel *et al.*, Journal of Cell Biology, 2016



● **Innovative plasmacytoid dendritic cell line-based cancer vaccine: first-in-human trial for melanoma**

Charles *et al.*, *Oncoimmunology*, 2020



● **Coordination of stress signals by lysine methyltransferases promotes pancreatic cancer**

Reynoird *et al.*, *Genes & Development*, 2016

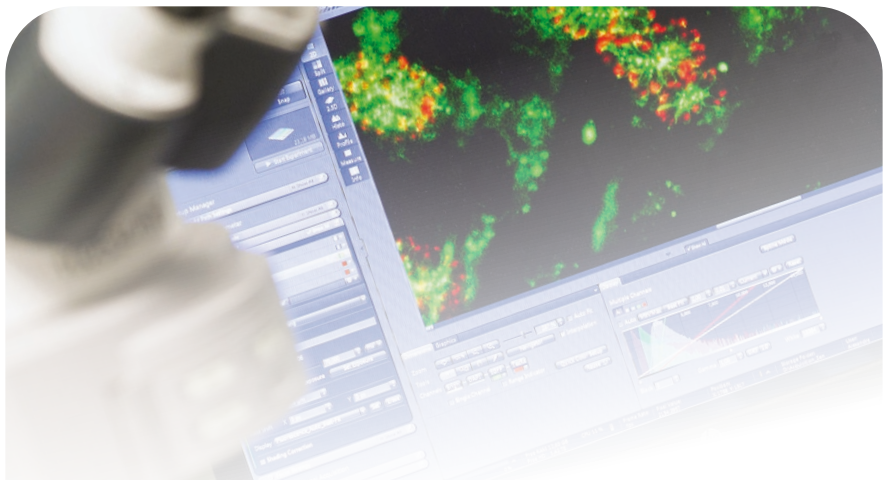
● **Innovative devices, nanotherapeutics and targeted treatments for tumor resistance**

Prunier *et al.*, *Cancer Research*, 2016  
Boudria *et al.*, *Oncogene*, 2019  
Broekgaarden M *et al.*, *Nanoscale*, 2020  
Pansieri J *et al.*, *Nature Photonics*, 2019

● **Unravelling the complexity of somatic and inherited TP53 mutations**

Hainaut & Pfeifer, *Cold Spring Harb Perspect Med*, 2016  
Andrade *et al.*, *Human Mutation*, 2018  
Leroy *et al.*, *Cancer Research*, 2017





● **Adaptation of apicomplexan parasites to host environment through lipid Metabolic plasticity**

Amiar *et al.*, Cell Reports, 2020  
Dubois *et al.*, Journal of Lipid Research, 2018

● **Epigenetic paths of in immune evasion, persistence and transmission of Toxoplasma parasites**

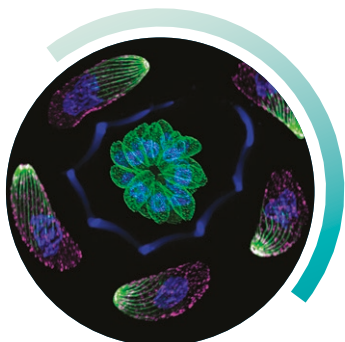
Braun *et al.*, Nature Microbiology, 2019  
Farhat *et al.*, Nature Microbiology, 2020

● **Shifting paradigms in understanding of Toxoplasma parasite mobility and invasiveness**

Pavlou G *et al.*, Cell Host & Microbe, 2018  
Pavlou G *et al.*, ACS Nano, 2020

● **Early-life origin of diseases: deciphering how mother-child exposome impacts on respiratory health and neurodevelopment**

Agier *et al.*, Environmental Health Perspectives, 2016  
Cadiou *et al.*, Environment International, 2020  
Abraham *et al.*, Environment International, 2018  
Agier *et al.*, Lancet Planet Health, 2019  
Agier *et al.*, International Journal of Epidemiology, 2020  
Agier *et al.*, Environmental Research, 2020  
Philippat *et al.*, Environmental Health Perspectives, 2017



...TO HEALTH

# Technological platforms

- **MicroCell:** Cell imaging and flow cytometry platforms offering a wide range of research instruments and know-how in biological photon imaging and fluorescence analysis (member of ISdV and IBISA).
- **EpiMed:** Translational and computational platform in epigenetics, supporting a dual translational activity with concept-driven omics analyses and bioinformatic.
- **Optimal:** Small animal optical imaging platform that promotes technological and methodological innovation in animal models and in vivo imaging (member of "France Life Imaging").
- **Gemeli:** Integrated metabolomics and lipidomics platform oriented towards the development of translational and clinical research projects (supported by AuRA region).
- **IngeProt:** Targeted modification of eukaryotic genomes and protein purification platform.

## Outreach

- **LabCom:** Industrial partnership with IMV Technologies for discovery of new drugs improving sperm physiology (C ARNOULT/P RAY).
- **LabEx Parafrap:** Alliance Française contre les Maladies Parasitaires (French national network for research on parasites), Scientific coordinator: MA HAKIMI.
- **SEPAGES:** a unique mother-child environmental cohort (484 families), 2017. Head: R SLAMA.
- **Report to the European Parliament** on "Impact of Endocrine Disruptors on Health" (Demeneix, MNHM and R SLAMA, Inserm, April 2019).



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