IMCBio

The Integrative Molecular & Cellular Biology

GRADUATE SCHOOL

- A high-level training programme
- Focused on Molecular & Cellular Biology
- For Master & Doctoral students
- English as a working language
- An exciting scientific environment

Université de Strasbourg

IMC Bio

Join the GRADUATE SCHOOL

What is IMCBio?

An unprecendeted training programme focused on **Integrative Molecular & Cellular Biology**, gathering:

- 3 laboratories of excellence
- Cutting-edge technological ressources of 4 national infrastructures in Health Biology
- The insectarium I2MC, an equipment of excellence
- 4 host institutes (IGBMC, IBMC, IBMP, GMGM)

RESEARCH

TECHHNOLOGY

TRAINING

INNOVATION

For whom?

Undergraduate or graduate students with a **strong motivation for research** & insterested in the different areas of biological sciences

What for?

- A **high-level training programme** for Masters & PhD students
- Add-on **training modules** at Master level
- Additional internships in laboratories
- Summer schools for undergraduates & Master students

With the joint support of the University of Strasbourg (Faculty of Life Sciences & Doctoral School of Life and Health), the CNRS & the Inserm, this programme has a triple ambition to strongly link training to research, to enhance the thematic strengths of the Strasbourg site, and to contribute to its international visibility.

What is a Laboratory of Excellence (LabEx)?

Allowing the recruitment or retention in France of scientists of a very high level or high potential, the significant funding granted to these LabExes makes it possible to increase scientific excellence and originality, the transfer of the knowledge produced and, by the same token, the international attractiveness of French research.

LabEx INRT

The «Laboratory of Excellence» Integrative biology: Nuclear dynamics, Regenerative and Translational medicine (INRT). The INRT is driven by the Institute of Genetic and molecular Biology (IGBMC).
This programme explores mechanisms of the regulation of gene expression in development, physiology, and disease by building upon the strengths of the IGBMC departments and on its emerging scientific research areas, by developing a cutting edge technology and support framework to tackle major questions of fundamental and clinical relevance.

LabEx Mitocross

The Labex MitoCross is constituted by seven teams from three Strasbourg Institutes, the Molecular Genetics, Genomics, Microbiology (GMGM), the Institute of Plant Molecular Biology (IBMP) and the Architecture and Reactivity of the RNA, working on various aspects of mitochondrial research. They are also implicated in aging, incurable neuromuscular diseases & common pathologies such as Alzheimer's disease or some cases of cancer and diabetes. The MitoCross aim is to deepen the knowledge of the molecular mechanisms governing mitochondrial biogenesis, genetics and cross-talk with the nucleus and to exploit this knowledge to understand biochemical mechanisms of mitochondrial dysfunctions, to envision agronomic applications and innovative therapies.

LabEx NetRNA

The LabEx NetRNA gathers 12 teams from 3 CNRS units located at the Institute of Molecular and Cellular Biology (IBMC) and the Institute of Plant Molecular Biology (IBMP). The general objective is to gain fundamental knowledge on regulatory RNAs and their machineries that play key roles in stress-related and adaptive responses, immune responses, host-pathogen interactions, and in human infectious diseases. The broad range of organisms (pathogens, plants, mammals, insects) allows to assess similarities and differences between regulatory RNA networks in various phyla or species. The consortium is based on shared conceptualization and broad collective expertise and on the use of sophisticated instrumentation.

labex-inrt.igbmc.fr
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LabEx INRT

INRT consortium

«The Integrative biology: Nuclear dynamics, Regenerative and Translational medicine (INRT) LabEx is based on the four departments of the IGBMC»
Bertrand Séraphin, Director of the IGBMC and coordinator of the INRT

IGBMC DEPARTMENT OF Translational Medecine & Neurogenetics Biology

«***Modelling human diseases*** to explain the main mechanisms implicated in the functioning of the nerve system and understand the molecular mechanisms responsible for the genetic diseases that affect the nerve system and the muscles»
Hélène Puccio, Director of the Department

RNA diseases

Headed by Nicolas Charlet-Berguerand
nicolas.charlet-berguerand@igbmc.fr

Study human genetic diseases due to expansions of tri-, tetra- or penta-nucleotide repetitions that are located in the so-called «non-coding» regions of the genome, mainly: myotonic dystrophy, tremor and ataxia syndrome associated with fragile X and amyotrophic lateral sclerosis.

Genetics & pathophysiology of neurodevelopmental & epileptogenic disorders

Headed by Jamel Chelly
jamel.chelly@igbmc.fr

Contribute to the advancement of scientific and medical knowledge in the field of neurodevelopmental disorders characterized by malformations of cortical development, epilepsies, intellectual disabilities and behavioral disorders, by combining large-scale genomic approaches and functional studies.

Regulation of cortical development in health & disease

Headed by Juliette Godin
juliette.godin@igbmc.fr

Interpret the pathological mechanisms involved in the development and progression of neurological disorders. Characterize the cellular and molecular mechanisms by which the cell center and the network of fibres called Microtubules and the centrosome, the organizing center, control the development of the cerebral cortex in both physiological and pathological conditions.

Study of copy number variants in autism spectrum disorders & their comorbidities

Headed by Christelle Golzio
christelle.golzio@igbmc.fr

Understand how genetic variation can impact the development and homeostasis of the nervous system thanks to developed animal models and assays to study the impact of gene dosage defects on basic neurodevelopmental processes to: Discover genes and alleles that contribute to disease; Capture and validate genetic interactions (cis- and trans-modulators) and Identify genes implicated in autism spectrum disorders-associated comorbidities.

Physiopathology of aneuploidy, gene dosage effect & Down syndrome

Headed by Yann Hérault
yann.herault@igbmc.fr

Better understand the physiopathology of aneuploidies and other genetic diseases with Intellectual Disabilities, using mouse and rat models. Explore behaviour and cognition in models of other intellectual disabilities of genetic origin.

Pathophysiology of neuromuscular diseases

Headed by Jocelyn Laporte
jocelyn.laporte@igbmc.fr

Identify the genetic basis, better understand and validate therapeutic proof-of-concepts for rare neuromuscular disease, especially for congenital myopathies.

Fundamental & physiopathological mechanisms involved in hereditary ataxias

Headed by Hélène Puccio
helene.puccio@igbmc.fr

Study hereditary ataxias, neurodegenerative pathologies affecting the cerebellum and/or spinal cord, and more particularly recessive ataxias linked to two essential pathways of mitochondria: the biosynthesis of iron-sulfur centres (Fe-S) and the biosynthesis of coenzyme Q10 (CoQ10) and the dominant ataxia SCA7 linked to PolyQ expansion.

Genetic basis of cognitive disorders

Headed by Binnaz Yalcin
binnaz.yalcin@igbmc.fr

Combine human and mouse genetics, large-scale genomic approaches and functional studies, with the ultimate goal of deciphering the genetic causes of cognitive diseases associated with brain malformations and thus improving clinical diagnosis and treatment of patients.

LabEX INRT

labex-inrt.igbmc.fr
Contact: directeur@igbmc.igbmc.fr

IGBMC DEPARTMENT OF Functional Genomics & Cancer

«Expression and preservation of genetic information: deciphering the fundamental mechanisms governing gene expression»
Irwin Davidson, Director of the Department

Structural & functional basis of chromatin remodelling

Headed by Elisa Bergamin
elisa.bergamin@igbmc.fr

Understand the mSWI/SNF complex at the molecular and atomic level through the combination of electron cryomicroscopy, X-ray crystallography, molecular biology and biochemistry.

Genome expression & repair

Headed by Frédéric Coin
frederic.coin@igbmc.fr

Study the mechanisms of aging and cancer in various cellular systems and animal models that are deficient in DNA repair and transcription, by using biochemistry, genetics and cell biology.

Regulation of gene expression in cancer

Headed by Irwin Davidson
irwin.davidson@igbmc.fr

Study how transcription factors and their co-factors such as chromatin remodeling complexes regulate gene expression during development, in physiological processes, oncogenic transformation and tumor progression, through high throughput genomics and at the single cell level.

Immune & neural development

Headed by Angela Giangrande
angela.giangrande@igbmc.fr

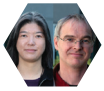
Understand how cell diversity is generated and how cells interact to build the highly complex architecture of pluricellular organisms. Study the molecular and the epigenetic events controlling cell differentiation and reprogramming.

Chromatin & epigenetic regulation

Headed by Ali Hamiche
ali.hamiche@igbmc.fr

Investigate the role of histone variants and their deposition mechanism in epigenetic control of human genome activity, including the role of histone variants in gene regulation and genome integrity.

Hematopoiesis & leukemogenesis in the mouse



Headed by Susan Chan & Philippe Kastner
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philippe.kastner@igbmc.fr

Investigate how transcription factors control the development of hematopoietic stem cells into pluripotent progenitor cells and then into mature blood cells, a process called hematopoiesis. Understand how altering the function of transcription factors contributes to malignant cell formation.

Pathogenesis of inflammatory diseases

Headed by Mei Li
mei.li@igbmc.fr

Decode the complex molecular and cellular networks driven by epithelium-derived cytokines such as thymic stromal lymphopoietin (TSLP) during inflammatory responses, determine the function of these networks in the pathogenesis of inflammatory diseases, notably atopic diseases and cancer, and translate the acquired knowledge into new biomarkers and therapeutic strategies.

Retinoic acid signaling pathways driving stem spermatogonia differentiation

Headed by Norbert Ghyselinck & Manuel Mark
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manuel.mark@igbmc.fr

Combine innovative genetic, pharmacological and molecular approaches in mouse to study the cellular and molecular mechanisms underlying the ability of retinoic acid, the active metabolite of vitamin A, to promote the differentiation of spermatogonia and, more generally, stem cells *in vivo*.

Pathophysiological function of nuclear receptor signaling

Headed by Daniel Metzger
daniel.metzger@igbmc.fr

Study, under physiological and pathophysiological conditions, the functions and interdependence of signaling pathways that are regulated by various nuclear receptors in different organs.

Stochastic systems biology of gene regulation

Headed by Nacho Molina
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Measure protein-DNA interactions, post-transcriptional modifications of named histone proteins and the 3D structure of chromatin in the entire genome in populations and individual cells.

Protein networks and complexes regulating eukaryotic mRNA decay

Headed by Bertrand Séraphin
bertrand.seraphin@igbmc.fr

Understand how mRNA decay contributes to regulated gene expression and how these mechanisms are upset in some pathologies including cancer and specific genetic diseases.

Spatial organization of the genome

Headed by Thomas Sexton
thomas.sexton@igbmc.fr

Determine if and how chromosome folding can influence transcription. To show how gene programs can be co-ordinately regulated or lead to diseases such as cancer, and also provide tools for gene therapy.

Molecular & cellular biology of breast cancer

Headed by Catherine-Laure Tomasetto
catherine-laure.tomasetto@igbmc.fr

Understand at the molecular level the role of the mesenchymal factor, MMP11, in the progression of breast cancers. Characterize the function of genes amplified in breast cancer cells.

labex-inrt.igbmc.fr
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LabEx INRT

IGBMC DEPARTMENT OF Integrated Structural Biology

*«**Mechanisms of gene expression, drug structure:** understanding the fundamental mechanisms regulating the expression of genetic information in messenger RNA and protein»*
Patrick Schultz, Director of the Department

Structural biology of epigenetic targets

Headed by Jean Cavarelli
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Understand the structure/function relationships of selected epigenetic targets at the atomic level. To decipher at the molecular level the mechanisms governing selected epigenetic processes by biophysical and structural means. Structure-driven developments of chemical tools to modulate the activity of our molecular targets.

Chemical biophysics of transcriptional signaling

Headed by Annick Dejaegere
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Combine biophysical experiments (x-ray crystallography, cryo-EM, SAXS, mass spectrometry, ITC) and numerical simulations (molecular dynamics simulations) to understand how chemical signals (ligands, post-translational modifications) affect the structure and dynamics of protein and protein-DNA complexes and how these changes are implicated in their regulation.

Nuclear magnetic resonance, molecular complexity & dynamics

Headed by Bruno Kieffer
bruno.kieffer@igbmc.fr

Characterize and study the relevant molecular properties which achieve a given biological function by combining multi-scale experimental and modeling approaches (from the atom to the cell). Develop numerical methods adapted to massive data analysis . Apply these approaches to developing new therapeutic strategies for prostate cancer.

Viral oncoproteins & domain-motif networks

Headed by Gilles Travé
gilles.trave@igbmc.fr

Study viral oncoproteins (cancer-causing proteins) to describe the subversion of cellular functions by oncogenic viruses by generating quantitative and exhaustive information at two levels of analysis: atomic and interactomic.

Molecular basis of chromatin & transcription regulation

Headed by Christophe Romier
christophe.romier@igbmc.fr

Determine, at the molecular and structural level, epigenetic mechanisms, to discover how they regulate the organization of chromatin and nuclear mechanisms, and to understand their involvement in many diseases.

Chromatin stability & DNA mobility

Headed by Valérie Lamour & Marc Ruff
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marc.ruff@igbmc.fr

Decipher the molecular mechanisms governing the transport, processing and topological changes of nucleic acids. Our present targets are nucleoprotein complexes involved in retroviral DNA integration and eukaryotic DNA topoisomerases. We integrate structural data from high resolution (X-ray crystallography, NMR), medium resolution (CryoEM) with in vitro and in cellulo functional data.

Structural biology of molecular machines

Headed by Helgo Schmidt
helgo.schmidt@igbmc.fr

Combine cryoelectron microscopy and x-ray crystallography to elucidate how the dynein motor produces force to generate movement and how it connects to and transports nuclei.

Architecture of nucleoprotein systems by 3D electron microscopy

Headed by Patrick Schultz
patrick.schultz@igbmc.fr

Decipher the three-dimensional organization and understand the functioning of molecular nanomachines involved in gene expression regulation and chromatin structure using electron cryomicroscopy to visualize isolated molecules in their native state.

Large complexes involved in gene expression

Headed by Bruno Klaholz
bruno.klaholz@igbmc.fr

Analyze the molecular mechanism of action of the bacterial and human ribosome in different structural and functional states during the formation of complexes with regulatory molecules (proteins, messenger RNAs) or inhibitors having important implications for human health, through an integrative structural biology approach, including biochemistry, crystallography and high-resolution cryomicroscopy.

Regulation of transcription

Headed by Albert Weixlbaumer
albert.weixlbaumer@igbmc.fr

Combine molecular biology and biochemistry with X-ray crystallography and single particle Cryo-EM to study the universally-conserved multisubunit protein enzyme RNA polymerase. RNA polymerase performs transcription, the first step in the expression of genetic information.

Ribosomes

Headed by Marat Yusupov
marat.yusupov@igbmc.fr

Study X-ray and cryo-EM structures and mechanism of protein biosynthesis in bacteria, yeasts and humans, a process carried out by a large ribonucleoprotein complex: the ribosome.

Molecular basis for protein synthesis by the ribosome

Headed by Gulnara Yusupova
gulnara.yusupova@igbmc.fr

Acquire new structural knowledge on the mechanism of ribosome protein synthesis and the mode of action of ribosome inhibitors.

LabEx INRT

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IGBMC DEPARTMENT OF Developmental & Stem Cell Biology

«From cellular plasticity to regenerative medicine: *we study the fate and reprogramming of embryonic and adult cells as well as the signals and mechanisms that allow an organ to take its shape and function»*

Gilles Charvin, Director of the Department

Single cell biophysics of growth & proliferation

Headed by Gilles Charvin

gilles.charvin@igbmc.fr

Combine yeast genetics and physical modeling with innovative biophysical assays to revisit the way a cell maintains its inner equilibrium.

Brain development & physiology

Headed by Pascal Dollé

pascal.dolle@igbmc.fr

Understanding the role of certain signals including those mediated by Vitamin A (retinoic acid) and its receivers during development and brain neurogenesis, and for the efficient functioning of neuron populations.

Differentiation & physiopathology of endocrine cells in the pancreas & intestine

Headed by Gérard Gradwohl

gerard.gradwohl@igbmc.fr

Study the mechanisms that control cellular destiny, maturation and the maintenance of pancreatic and intestinal endocrine cells identity in normal and pathological situations.

Cellular plasticity & direct reprogramming in *C. elegans*

Headed by Sophie Jarriault

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Exploring the mechanisms that make a specific cell capable of changing its identity whereas its seemingly identical neighbours are incapable.

Common mechanisms of development, cancer & aging

Headed by Bill Keyes

bill.keyes@igbmc.fr

Investigating the cellular program of senescence, a process that can contribute to tissue development, regeneration and protection from cancer, but when misrelated causes raging and disease.

Nuclear organization & division

Headed by Manuel Mendoza

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Study cell division and differentiation, with a focus on how nuclear structures are reorganised in time and space during cell proliferation.

Stochastic systems of biology of gene regulation

Headed by Nacho Molina

nacho.molina@igbmc.fr

Measure protein-DNA interactions, post-transcriptional modifications of named histone proteins and the 3D structure of chromatin in the entire genome in populations and individual cells.

Molecular biology of B cells

Headed by Bernardo Reina San Martin

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Study molecular mechanisms driving antibody diversification, with a specific focus on the protein complexes involved in mediating AID targeting and in repairing AID-induced DNA damage *in vivo*.

Actin dynamics & biomechanics of the early embryo

Headed by Anne-Cécile Reymann

anne-cecile.reymann@igbmc.fr

Study the assembly dynamics of the cell cortex (thin layer of actin filaments and molecular motors allowing cell shape control) in early C. elegans development, we aim to reveal how these properties are regulated and change over time to control early morphogenesis processes during the first few divisions of the C. elegans embryo.

Signal transduction in metabolism & inflammation

Headed by Roméo Ricci

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Discover and understand the signaling axes of inflammation involving protein kinases and likely to have an important role in the mechanism of inflammation.

Cell physics

Headed by Daniel Riveline

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Understand cellular motility and division as well as the shape of cells in tissues, by studying the dynamics of the cytoskeleton and the associated Rho signalling pathways.

Cell biology of genome integrity

Headed by Evi Soutoglou

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Investigate the most deleterious DNA breaks, named double strand breaks, in relation to the surrounding chromatin structure and nuclear architecture and test how this is related to their repair and their involvement in the formation of chromosomal translocations.

Cell cycle & ubiquitin signaling

Headed by Izabela Sumara

izabela.sumara@igbmc.fr

Ubiquitin-mediated control of cell division in health and disease.

Dynamics of chromatin structure & transcription regulation

Headed by Làszlò Tora

laszlo.tora@igbmc.fr

Identify and characterize transcription regulatory mechanisms, carried out by chromatin remodeling complexes, transcriptional coactivators, general transcrirption initiation factors and RNA polymerase II. Understand how deregulation of these highly controlled processes can lead to different pathologies.

Mechano-genetic interplays & embryonic morphogenesis

Headed by Julien Vermot

julien.vermot@igbmc.fr

Understand the relationship between mechanical stimuli and tissue organization during embryogenesis, especially during the development of the cardiovascular system.

LabEx MITOCROSS

mitocross.unistra.fr

Contact: i.tarassov@unistra.fr

MITOCROSS consortium

«Mitochondria are essential intracellular organelles responsible for respiration, ATP-generation, ionic homeostasis, regulation of reactive oxygen species or apoptosis. *Exploiting this knowledge and understand biochemical mechanisms of mitochondrial dysfunctions will allow us to envision agronomic applications and innovative therapies.»*
Ivan Tarassov, Coordinator of MITOCROSS

Dynamics & plasticity of the synthetases

Headed by Hubert Becker
UMR 7156 GMGM
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Explore the nontranslational roles of aminoacyl-tRNA synthetases and other essential tRNA-binding proteins. In yeast, study organellar and membrane-bound pools of these proteins that participate in metabolic sensing and respiration. In pathogenic filamentous fungi, their cell-wall remodeling activity is studied to identify anti-microbial resistance strategies. In human, mutants responsible for severe diseases by loss- or gain-of-function are studied in yeast models and from patients' samples.

Intracellular traffic of RNA & mitochondrial diseases

Headed by Nina Entelis & Ivan Tarassov
UMR 7156 GMGM
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I.tarassov@unistra.fr

Focus on RNA-protein interactions in mitochondria and on different aspects of the phenomenon of targeting macromolecules (essentially RNAs) into this organelle. Understand these mechanisms to exploite development of new gene therapy approaches of human mitochondrial diseases. Human and murine and yeast cells are used as models and structural, imaging, genetic, biochemical and functional approaches are used.

Mitochondrial translation and pathologies

Headed by Marie-Anne Sissler
UPR 9002 ARN
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Decipher the structure/function relationships of macromolecules forming the translation machinery in healthy as well as under pathological contexts. Focuses are made on mitochondrial aminoacylation systems [tRNAs and aminoacyl-tRNA synthetases (aaRSs)], using approaches combining mainly biochemistry, molecular and cellular biology, and bioinformatics.

Maintenance & expression of the plant mitochondrial genome

Headed by Jose-Manuel Gualberto
UPR 2357 IBMP
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Study the recombination pathways and factors that modulate the structural plasticity and transmission of the plant mitochondrial genome, to better understand mitochondrial genome replication and segregation; to investigate the effects of genetic instability induced by recombination mutants on mitochondrial gene expression and plant development; to develop tools to promote mitochondrial genetic variability and segregation of valuable traits in crop plants.

Metabolism and traffic of RNA in plant cell

Headed by Laurence Drouard & Anne-Marie Duchène-Louarn
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Understand better the molecular mechanisms linked to translation and involving mRNA trafficking and metabolism. First, study the mitochondrial translation machinery and the mitochondrial gene expression in the green alga Chlamydomonas reinhardtii. Second, elucidate the molecular mechanisms allowing cytosolic mRNA targeting and localized translation at the surface of plant and mammals mitochondria.

Intraspecific variation and genome evolution

Headed by Joseph Schacherer
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Elucidate the genetic basis of the awesome phenotypic diversity observed in natural populations, a remaining major challenge in biology. In this context, we marry classical but high-throughput genetic methods with new approaches based on population genomics to connect the phenotypic and allelic landscape by taking advantage of the powerful budding yeast model system.

Functions of PPR proteins

Headed by Philippe Giege
UPR 2357 IBMP
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Study gene expression mechanisms in plant mitochondria, more specifically on PPR proteins, a major class of RNA binding proteins. The team identified PPR proteins carrying the 5 'rRNA RNase P activity as well as ribosome-associated PPR proteins for mitochondrial translation. The results obtained open up a wide range of applications from plant breeding to human health.

LabEx NetRNA

labex-ibmc.u-strasbg.fr/NetRNA

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NetRNA consortium

«***Networks of Regulatory RNAs across kingdoms and dynamical responses to biotic and abiotic stresses***»

Pascale Romby, Coordinator of NetRNA since 2016 & Eric Westhof from 2011 to 2016

tRNA Biology and pathogenesis

Headed by Magali Frugier

UPR 9002-ARN, IBMC

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Investigate the influence of host/pathogen interactions on the synthesis and co-translational folding of Plasmodium (parasite responsible for malaria) proteins, with emphasis on the molecular mechanisms involved in the import and role of host tRNAs in the development and virulence of parasites.

Non-coding RNAs and viral infections

Headed by Sébastien Pfeffer

UPR 9002-ARN, IBMC

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Explore the importance and regulation of RNA silencing mediated by microRNAs and other small RNAs during viral infection in cultured cells, mice and patient samples with a specific focus on how microRNAs themselves are regulated and the interplay with other innate immunity signaling pathways.

Bacterial messenger RNAs & regulatory RNAs

Headed by Pascale Romby

UPR 9002-ARN, IBMC

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Investigate the role of non-coding RNAs and multifunctional RNAs in gene expression in Staphylococcus aureus, elucidate regulatory mechanisms at the molecular level, and their involvement in establishing S. aureus pathogenicity, generate regulatory networks involving RNAs and proteins from the data, and study the dynamic properties of these networks.

Digital biology of RNA

Headed by Michael Ryckelynck

UPR 9002-ARN, IBMC

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Set-up and use ultrahigh-throughput analytical pipelines exploiting droplet-based microfluidics in tandem with next generation sequencing to: i) develop new RNA-based fluorescence imaging tools, ii) finely characterize RNA-based regulatory mechanisms and iii) perform single-cell resolution gene expression monitoring (especially non-coding RNAs).

RNA-based antiviral immunity in drosophila and vector insects

Headed by Jean-Luc Imler

UPR 9022-M3I, IBMC

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Explore the interactome of Dicer-2, R2D2 and AGO2 in drosophila cells infected by different types of viruses, investigate the post-translational modifications in the regulation of the molecular complexes assembled around these molecules, and monitor antiviral RNA interference using live imaging. Responsible of a novel Equipment of Excellence Insectarium (EquipEx I2MC).

Antiviral immunity in *Aedes* Mosquitoes

Headed by Joao T. Marques

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Dissect the biology of virus-host interactions in Aedes aegypti mosquitoes to: (i) characterize mechanisms such as RNA interference that contribute to resistance or susceptibility to arbovirus infection in mosquitoes, (ii) identify the natural virome of Aedes mosquitoes and determine its impact on vector competence, and (iii) manipulate antiviral mechanisms to generate mosquitoes that are resistant to arboviruses.

The role of RNAs in the selectivity of the *Drosophila* innate immune response

Headed by Nicolas Matt

UPR 9022-M3I, IBMC

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Decipher the complex regulatory network underlying the innate immune response in Drosophila, analyze the epigenetic mechanisms involved in the control of the transcriptional selectivity of NF-kB induced target genes focusing on the roles of non-coding RNAs in transcriptional regulation and selectivity of the innate immune response in Drosophila.

RNAi and receptors

Headed by Carine Meignin

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Investigate how RNA viruses in Drosophila are recognized by the endonuclease Dicer-2, identify the antiviral complexes in opposite to RNAi pathway, and monitor the dynamics of the antiviral innate immunity using live imaging.

Mechanisms of small RNA biogenesis and action

Headed by Todd Blevins

UPR 2357, IBMP

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Investigate how multisubunit RNA polymerases distinguish genetic parasites (e.g., retrotransposons and endogenous retroviruses) from essential host genes in plant chromosomes, allowing the synthesis of small-interfering RNAs and the targeted silencing of repetitive DNA by repressive chromatin modifications and DNA methylation.

Role of ubiquitin in cellular regulation

Headed by Pascal Genschik

UPR 2357, IBMP

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Investigate post-translational regulations that control RNA silencing machinery in the model plant Arabidopsis thaliana in normal and stress conditions. The work focuses on Argonaute proteins post-translational modifications, and aims to define the molecular components and machineries triggering AGO1 degradation and to determine their physiological functions.

RNA degradation in plants

Headed by Dominique Gagliardi

UPR 2357, IBMP

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Investigate mechanisms of RNA substrate recognition by the degradation machinery in the plant model Arabidopsis thaliana, and determine the impact of non-canonical polyadenylation and uridylation in controlling activity and stability of mRNAs, non-coding RNAs, and viral RNAs.

RNA degradation pathways and RNA viruses

Headed by Damien Garcia

UPR 2357, IBMP

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Explore the influence of plant RNA decay factors on infections by RNA viruses, focusing on the role of the Non-sense Mediated Decay pathway (NMD) and other factors associated to plant Processing-bodies, to discover novel modulators of viral compatibility and restriction in plants.

AN EXCITING SCIENTIFIC ENVIRONMENT

4 national infrastructures in biology and health

phenomin

www.phenomin.fr

Celphedia

www.celphedia.eu

The CELPHEDIA PHENOMINICS (Clinical Mouse Institute) infrastructure provides a complete range of specific services to the scientific community for using mouse models to progress in the functional diagnosis of the human genome and to better understand human diseases, their physiological and pathological bases.

FRISBI Integrated Structural Biology

frisbi.eu

FRISBI is an infrastructure for integrative structural biology approaches, from the molecular to the cellular level, integrating multi-resolution data from X-ray crystallography, small angle X-ray scattering, NMR, Cryo-EM and functional data including development for protein expression and crystallization.

INGE STEM

www.ingestem.fr

INGESTEM is an infrastructure in biology and health for therapeutic innovations based on induced pluripotent stem cells (iPS) and human tissue engineering. Their ambition is to use the major potential of cell reprogramming techniques to generate human pathology and regenerative medicine models.

FRANCE GÉNOMIQUE

www.france-genomique.org

FRANCE GENOMIQUE is a national infrastructure that shares the resources of the main French platforms in genomic data production and analysis, which are strategic technologies in all areas of life sciences research. It offers the scientific community cutting-edge expertise in genomics and associated bioinformatics.

Equipment of excellence

the insectarium I2mc

The Insectarium for Molecular and Cellular Infectiology (I2MC) is an equipment of excellence that includes a high biosecurity insectarium to study the interactions between pathogens such as the Plasmodium falciparum parasite (malaria agent), the Dengue virus and the mosquitoes transmitting them to humans.

REGISTRATION PROCESS

At Master level

- *1st stage*: Online registration in the Master course of your choice in the Faculty of Life Sciences, *via* E-Candidate: **sciencesvie.unistra.fr/scolarite/admissions-2018-2019**

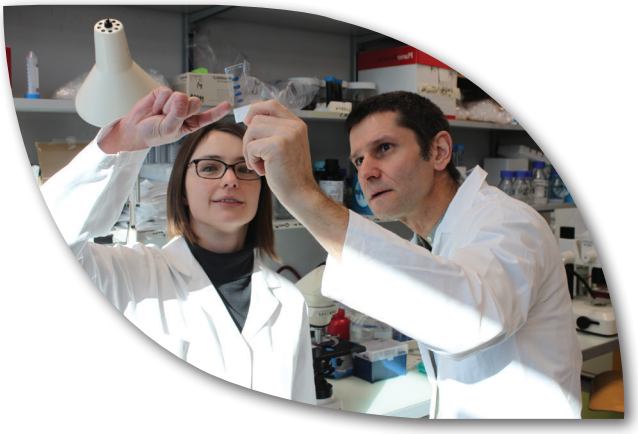
- *2nd stage*: Check your wish to include the IMCBio Graduate School in your wish list when applying online

- *3rd stage*: End of June, selection of candidates for admission to the Master's degree

- *4th stage*: Audition of candidates admitted to Master's degree & pre-selected for admission to the programme

- *5th stage*: Mid-July, selection of candidates for promotion 2018-2019
  September 2018, first promotion of the IMCBIO 2018-2019

At Doctoral level: Starts in 2019



Credits: IGBMC
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