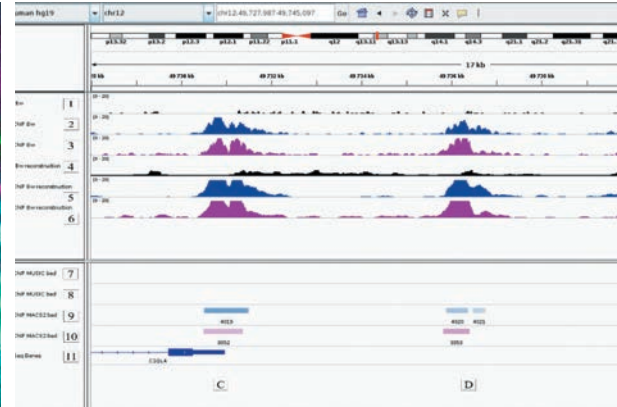
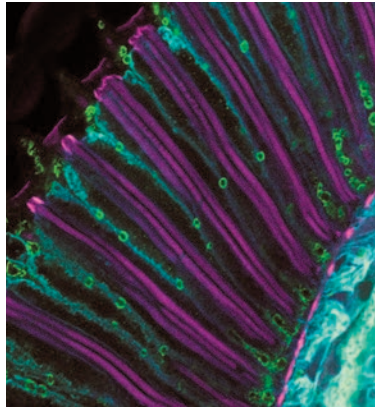
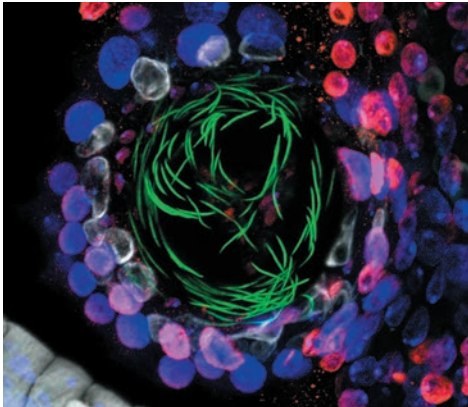


# LABORATORY OF BIOLOGY AND MODELLING OF THE CELL – LBMC



## BASIC INTERDISCIPLINARY RESEARCH LABORATORY

<http://www.ens-lyon.fr/LBMC>



### RESEARCH TOPICS

- GENOME ORGANIZATION AND RNA METABOLISM
- CELLULAR PROCESSES DURING DEVELOPMENT AND PATHOLOGIES
- DYNAMIC CELLULAR PROCESSES OVER TIME AND DIFFERENT STAGES OF DEVELOPMENT

### CROSS-CUTTING THEMES

- MODELLING THE MOLECULAR BASIS OF NORMAL AND PATHOLOGICAL FUNCTIONING OF CELLS
- METHODOLOGICAL DEVELOPMENTS IN MODELLING, MOLECULAR AND CELLULAR BIOLOGY

### RESEARCH EQUIPMENT AND TOOLS

#### Instrumentation and expertise in the production of transgenic models

- Micro-injection station
- Vectors and vector delivery system for transgenesis
- Optogenetics
- Cellular sorting
- Confocal and bi-phonic microscopy

#### Diversity of experimental models

- Several models of yeasts, nematodes, insects (flies and crickets), rodents, chickens, and human cells in culture

#### Bio-computing platform

- Algorithmic development and Open-Source software (genomics, imaging, modelling...)

### KEY FIGURES

**110** staff including **36** researchers, **50** PhD students and post-doctoral fellows, **24** research support staff

#### Over the last 5 years:

**113** publications

**10** prizes and distinctions including **3** CNRS medals and **2** IUF

**86** public funding including **83** national and **3** European projects (ERC)

**10** private financing

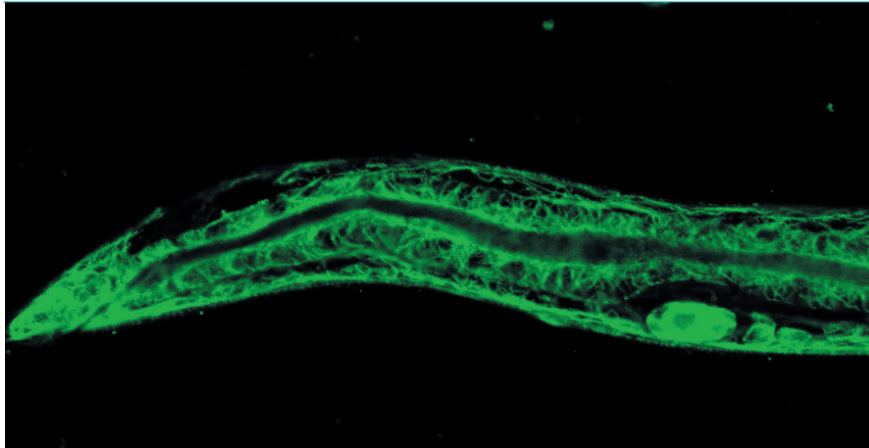
#### Intellectual property:

**3** active patent families, **30** open access software or databases

**1** start-up: Vidium

TRL scale between **1** and **5**

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```
def generate_sequence(self):
    """generate dict of sequences position"""
    sequences = dict()
    for start in range(0, self.data.shape[0], self.stride):
        stop = start + self.dim
        if stop >= self.data.shape[0]:
            stop = self.data.shape[0]
        sequences[start] = [start, stop]
    return sequences

def on_epoch_end(self):
    """Updates indexes after each epoch"""
    self.indexes = np.arange(len(self.list_IDs))
    if self.shuffle:
        np.random.shuffle(self.indexes)

def _data_generation(self, list_ids_temp):
    """Generates data containing batch_size samples""" # x : (n_samples,
    @ Initialization
    x = np.zeros((self.batch_size, self.dim, self.data.shape[1]))
    y = np.zeros((self.batch_size, self.dim, 1))

    @ Generate data
    for i, id_tmp in enumerate(list_ids_temp):
        sequence = self.sequences[id_tmp]
```

## FROM THE LABORATORY TO THE SOCIO-ECONOMIC WORLD

- Collaborations and experimental services for manufacturers (pharmaceutical, cosmetology, biotechnology or agri-food).
- Services for large-scale data analysis, software or database development for manufacturers.
- Financial support from national agencies and charities on research against cancer (e.g., INCa), neuromuscular and neurodegenerative diseases (e.g., AFM-Téléthon), or infectious diseases (e.g., ANRS | Emerging Infectious Diseases).

## FOCUS ON

### Institutional partnership research

- **Funding agreements between national institutes** (e.g., ANR), **patient associations** (BPAN France, Autour du BPAN, France Parkinson), and **charitable associations** (the Foundation de France, the Foundation for Medical Research) and the “Regulated Cell Death and Genetics of Neurodegeneration” team on the development and use of experimental models of *Drosophila* to understand the development of the central nervous system and neurodegenerative diseases such as Parkinson’s disease and BPAN.

### Private partnership research

- **CIFRE contract between COSMOTEC** and the “Systems Biology of Decision-Making” team for the development of computer tools to automate the inference of a probabilistic dynamic molecular network. This CIFRE thesis led to the creation of VIDUUM, a spin-off of LBMC.
- **CIFRE contract between VIDUUM** and the “Systems Biology of Decision-Making” team to identify gene networks through the generation and analysis of single-cell data.

### Services provided

- **Provision of services for ERYTECH** by the “REGARDS” team for large-scale data analysis.
- **Consulting services for the company LESAFFRE** by the “Genetic complexity of living systems” team. Advice and assistance on the bioinformatics analysis of genomic data.
- **Consultancy with Treefrog Therapeutics** (Bordeaux, France) by the “RMI2” team for the genetic modification of human stem cells with therapeutic potential.
- **Molsid hosting agreement** for cellular tests of innovative fluorogenic probes.

## CONTACT

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