# Master Physique fondamentale et applications
## Basic molecular cell biology

### Informations

Composante : Faculté des Sciences

### Responsables

Julien SAVATIER
Emmanouil MAVRAKIS
Loic LE GOFF

### Langue(s) d'enseignement

Anglais

### Contenu

The course will provide basic knowledge in molecular and cell biology, and describe the molecular tools that biologists use in order to study and label molecules and structures of interest, in particular using fluorescence microscopy.

I Introduction (4h)

- What is life ?
- Biomolecules (carbohydrates, lipids, proteins, nucleic acids)
- Cell organization, types and structures (organelles, sizes, functions)
- DNA, RNA and proteins, genetic code
- Cell division (mitosis and meiosis)

II – Experimental model systems and methodology(3h)

- Cell and animal model systems in biology
- Experimental approaches for studying biology
- Molecular cloning, Polymerase chain reaction (PCR, RT-PCR)

III – Fluorescent labeling (3h)

- Chemical labeling of proteins, immunofluorescence
- Green Fluorescent Protein (GFP), genetic fusions

IV – Cells in organs (3h)

- Cell types
- Cell differentiation
- Stem cells

V – Gene regulation (3h)

- The central Dogma of molecular Biology
- The basic mechanisms of genetic regulation: enhancers, promoters, transcription factors
- Gene regulatory networks

### Compétences à acquérir

- Know the different families of biomolecules and their role
- Recognize different organelles and cytoskeletal filaments of a cell, and differentiate cell types
- Know the link and mechanisms between DNA, RNA and proteins
- Summarize stages of mitosis and know what dividing cells look like
- Being able to choose the proper model system and experimental approach for addressing a biological question
- Being able to use PCR for molecular cloning and detection of viral infection
- Being able to fluorescently label specific proteins of interest in fixed and living cells and tissues
- Understand the basics of gene regulation, its importance in the context of animal development, and know about the techniques associated

### Modalités d'organisation

2 sessions of 2 hours of course with J. Savatier, 3 with M. Mavrakis and 3 with L. Le Goff

### Bibliographie, lectures recommandées

Molecular Biology of the Cell, Bruce Alberts et al

### Pré-requis obligatoires

None

### VOLUME HORAIRE

- Volume total: 16 heures
- Cours magistraux: 16 heures

### Codes Apogée

- SPFBU32J [ELP]

### Pour plus d'informations

Aller sur le site de l'offre de formation...

Dernière modification le 18/06/2024