

NEUROBIOLOGIE  
 MEDICAMENTS  
 LONGEVITEHYGIENE NUTRIGENOMIQUE  
 VARIABILITE  
 MARINES  
 RESPIRATOIRES FIBROSES  
 GENETIQUE ENERGETIQUE  
 INFLAMMATIONSYSTEMIQUE  
 PATHOLOGIESMOLECULAIRE  
 HOMEOSTASIE COMPORTEMENTS  
 QUALITE  
**BIOLOGIE**  
 OBESITE  
 MARINESANTE  
 BALANCE DIABETE MEDICALE  
 RELATION  
 FONCTIONNELLE  
 SECURITE ORGANISMES  
 METABOLISME HUMAIN  
 ALIMENTATION NORMAUX  
 PHYSIOLOGIE  
 PATHOLOGIQUES  
 ELECTROPHYSIOLOGIE  
**BIORESSOURCES**  
**VIEILLISSEMENT**  
**NUTRITION**  
**BIOLOGIE**  
**SYSTEMES**

**Academic year 2019 – 2020**



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## Directors of the International Master's Programs (PIM)

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### **- Dual Master's Program in Brain and Mind Science**

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### **- International Master's Program in Neurodegenerative Diseases**

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### **- Physiology and Pathophysiology - currently being reorganized**

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## Heads of the M2 Specialties

### **Systems Biology (opening in 2019)**

Prof. Hédi Soula

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### **- Aeging and Longevity**

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### **- Marine Biology and Bioresources**

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### **- Neurosciences**

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### **- Nutrition, Quality and Health**

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### **- Human Physiology and Pathophysiology**

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# Secretarial services

## Administrative manager

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- **Administrative and educational managers for M1**

Laurence Bonnet Lericque  
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- **M2**

- **Systems biology**

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- **Ageing and longevity**

- [sciences-master-bip-bvl@sorbonne-universite.fr](mailto:sciences-master-bip-bvl@sorbonne-universite.fr)

- **Marine biology and bioresources**

- [sciences-master-bip-bbma@sorbonne-universite.fr](mailto:sciences-master-bip-bbma@sorbonne-universite.fr)

- **Human physiology and pathophysiology**

- [sciences-master-bip-pmph@sorbonne-universite.fr](mailto:sciences-master-bip-pmph@sorbonne-universite.fr)

- **Neurosciences**

- [sciences-master-bip-neurosciences@sorbonne-universite.fr](mailto:sciences-master-bip-neurosciences@sorbonne-universite.fr)

- **Nutrition, quality and health**

- [sciences-master-bip-nutrition@sorbonne-universite.fr](mailto:sciences-master-bip-nutrition@sorbonne-universite.fr)

## PRESENTATION OF THE BIP MASTER'S PROGRAM

The scientific objective of this master's course is to train students in the emerging concepts of integrative biology and physiology and to provide them with an understanding of molecular, cellular and integrated physiological and pathological mechanisms in animals and humans. Beyond this scientific knowledge, this master's course also enables students to acquire the transverse, conceptual and methodological skills required for professional integration and for the pursuit of doctoral studies.

The BIP master's program covers a broad disciplinary field, with six M2 specialties and five international programs.

The six M2 specialties:

- Systems biology (SB)
- Ageing and longevity (AL)
- Marine biology and bioresources (MBB)
- Neurosciences
- Nutrition, quality and health (NQH)
- Human physiology and pathophysiology (HPP)

The five international masters programs:

- Biology of marine organisms, in partnership with the University of Santiago in Chile, as part of the MBB specialty (currently being restructured)
- Dual master in brain and mind science, in partnership with the ENS and UCL, as part of the Neurosciences specialty
- International master in neurodegenerative diseases, in partnership with KU Leuven, the University of Vienna and the Technical University of Munich (TUM), as part of the Neurosciences specialty
- Physiology and pathophysiology, as part of the HPP (Human Physiology and Pathophysiology) specialty (currently being restructured)
- Vision sciences, in partnership with the UNAM, as part of the Neurosciences specialty

The professional objectives of the BIP master's program favor the progressive orientation of students, guiding them towards integration into the workplace at the end of M2, or towards further doctoral studies or complementary studies to qualify in two different areas.

- This master's course has existed since 2004, providing us with 10 years of data concerning the careers and posts held by the recipients of this diploma, revealing numerous professional possibilities.
- The principal sectors recruiting our graduates are: biotech, pharmaceutical and agrofood companies, commerce, regulatory agencies for human health and social action, specialist scientific and technical activities, service activities, local and regional government, research and teaching.
- 98% of the 2014/2015 BIP master's graduates have found employment, according to a ministerial survey of master's students 30 months after their graduation performed by the BVA polling agency, with a response rate of 46%. These figures have remained relatively stable from year to year, indicating the effective integration of our graduates into the workplace.
- The rate of access to a first job is 98%, with a median duration of one month to obtaining this first job. After 20 months, 46% of the students were pursuing doctoral studies, 45% were working (permanent, short-term and other contracts), 5% were pursuing complementary studies and 4% were seeking employment.
- 80% of the graduates became executives and senior managers, consistent with the objectives of the training. Finally, 70% agreed that their employment corresponded to the content of their training. The careers of the graduates were highly diverse, although almost all were covered by the "study, research and development" and "cultural, health, social, sport" BVA categories. This adaptability of the diplomas obtained appears to be chosen and not imposed, because 94% of those questioned were entirely or rather satisfied with the missions conferred on them.

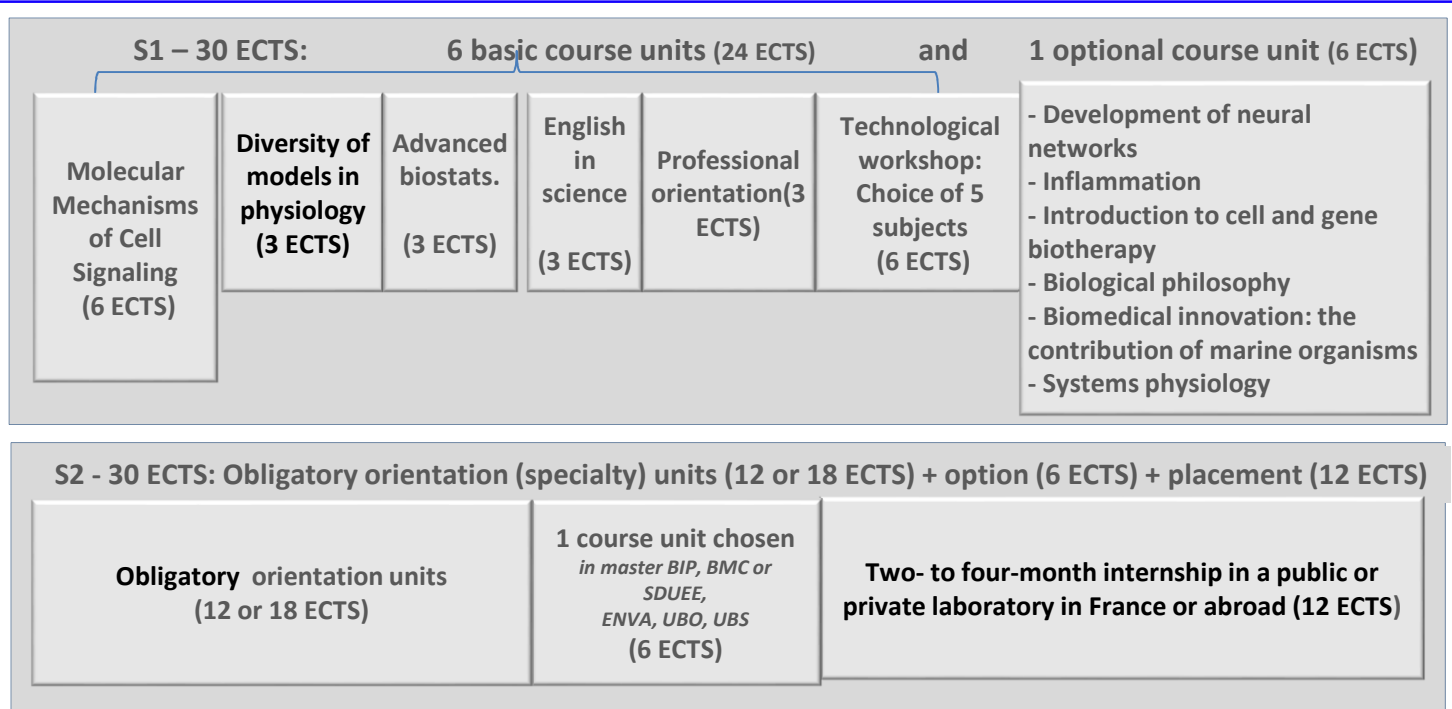
### Conditions of admission

• Students holding a bachelor's degree in life sciences, life and earth sciences or science for health from French university, foreign universities via the *Etudes en France* program, engineering school students or students from the Erasmus exchange program.

• Applications are made through an online procedure, as described on the home page of the Sorbonne University website [www.master.bip.sorbonne-universite.fr](http://www.master.bip.sorbonne-universite.fr). Admission to this masters course is selective and depends on the type of bachelor's degree obtained. The examination of the application dossier may, in some cases, be followed by an interview.

# M1 YEAR: Course organization for the 1<sup>st</sup> and 2<sup>nd</sup> semesters

## 1<sup>st</sup> semester of M1



## 2<sup>nd</sup> semester M1

### • Choice of course units according to educational orientation (specialty)

**Systems biology:** Python for physiological modeling, Tutored project for systems biology, *1 optional unit from the following:* Exploration of physiological functions in small animals, Tools for biology and applied molecular analyses, Physiology of integrated systems, Integrated neurophysiology.

**Ageing and longevity:** Ageing: from biology to societal issue – Brain ageing, *1 optional unit from the following:* Physiology of integrated systems, Exploration of physiological functions in small animals, Integrated regulation of energy balance, Python for physiological modeling.

**Marine biology and bioresources:** “Marine organisms and biological models” workshop, “Marine genomic projects” workshop, *1 optional unit from the following:* Schmid training course, “Methodologies in ecophysiology” workshop.

**Neurosciences:** Principal methodological approaches in neurosciences, Integrative neurophysiology, *1 optional unit from the following:* Brain aging, Python for physiological modeling.

**Nutrition, quality, health:** *3 units from the following:* Exploration of physiological functions in small animals, Conservation and valorization of agrosources, Integrated regulation of energy balance, Digestive physiology, Knowledge of industrial sectors.

**Human physiology and pathophysiology:** *3 units from the following:* Exploration of the physiological functions of small animals, Aging: from biology to societal issue, Digestive physiology, Tools for biology and applied molecular analyses, Physiology of integrated systems, Integrated regulation of energy balance.

*Of note: for all specialties, It is possible to take either Business passport*

### • Obligatory internship

The placement takes place in a research laboratory in France or abroad (2 to 4 months). The student must then present their internship results as a poster, in front of a jury.

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Academic Director for M1 :  
Dr. Stephane Lourdel

Academic manager for M1: Laurence Bonnet-Lericque e-mail: [sciences-master-bip-m1@sorbonne-universite.fr](mailto:sciences-master-bip-m1@sorbonne-universite.fr)

## M2 Specialty: Systems Biology

Systems biology is a priority axis of research in many international and national institutions, including Sorbonne University.

This specialty responds to the need for training in the rapidly growing domain of systems biology.

### Objective of the training

This specialty consists of a series of specific course units enabling students to develop skills and knowledge in computing (programming, development, simulation) and mathematics (modeling, formalism, prediction) applied to contexts in integrative biology and physiology.

This specialty also includes physiology units, providing the student with dual skills in biology and systems biology. This specialty trains students to be autonomous in modeling/data integration in the biomedical domain, equipping them for integration into companies and research laboratories.

The skills acquired enable the students to be immediately operational and to deal with a large range of systems biology problems.

### Conditions for admission

- Open to M1 students in biology from Sorbonne University or other universities, medical students, students from engineering schools, veterinary students and students from outside the European Union via Campus France.
- Selection by dossier and an interview.

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sciences-master-bip-bs@sorbonne-universite.fr

Specialty Director:  
Prof. Hédi Soula

## Course organization

All taught courses take place in the third trimester.

The fourth semester is devoted to a six-month internship, either in one of the host teams (EA) from the list of laboratories supporting this specialty, or in a company. The student must then write a dissertation relating to the internship, which is defended in front of a jury. This internship can take place in France or abroad (subject to validation by the directors of the specialty and the head of Mobility).

M2 course units	ECTS
3 obligatory course units 15 ECTS	
Advanced systems physiology	6
Statistics for data classification and mining in genomics	6
Biological networks and systems biology	3
4 optional course units (from the list below) 15 ECTS	
Introduction to human physiology and pathophysiology 1 (unit from the Human physiology and pathophysiology specialty)	3
Introduction to human physiology and pathophysiology 2 (unit from the Human physiology and pathophysiology specialty)	3
Neuronal networks (unit from the Neurosciences specialty)	6
Nutrigenomics (unit from the Human physiology and pathophysiology specialty)	6
Vision: from the retina to the primary visual cortex (unit from the Neurosciences specialty)	6

### Examples of topics for internship projects

#### Biomathematics

- Systems physiology
- Dynamic systems for physiology
- Modeling of nervous systems

#### Data science

- Analysis of medical and tissue imaging data
- Reconstruction of metabolic networks
- Biomedical machine learning

#### Computer simulation

- Tissue modeling
- Cell modeling



### Possible careers after M2 BIP specialty Systems biology

- Study/research officer
- Data scientist (medical, biomedical)
- Researcher or researcher/lecturer
- Development engineer (BioTech)
- Head of R&D



## M2 specialty: Ageing and Longevity

With the increasing life expectancy of the population, the maintenance of quality of life has become a major issue for our society. Ageing is, thus, a major field encompassing crucial issues in terms of both basic science (understanding the biological processes of aging) and multiple applications (particularly in the domain of health). An understanding of these issues and the optimization of quality of life in the elderly require improvements in our comprehension of the mechanisms underlying aging and the increasing vulnerability of major physiological functions during the course of life.

### Objectives of the training

This course has two main objectives.

First, to impart a knowledge of the physiological mechanisms, from the scale of the molecule to that of the whole body, underlying ageing and longevity.

Second, it aims to help students develop an understanding of the relationships between normal and pathological ageing of the major organs and changes in the functions of these organs

In various models and in humans, the students will analyze the physiology of the body, the genes involved in its regulation and its changes over time, as a function of environmental factors.

The course will also shed light on the consequences of increasing life expectancy for public health and society.

An introduction to gerontechnologies and geriatrics will also be provided.

### Conditions of admission

- Open to M1 students in biology from Sorbonne University or other universities, medical, pharmacy and veterinary students, students from engineering schools and students from outside the European Union, via Campus France
- Selection by dossier



Parcours en collaboration avec le  
groupe hospitalier  
La Pitié-Salpêtrière - Charles Foix

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9, quai Saint-Bernard 75252 Paris Cedex 05

Specialty Directors:  
Prof. Bertrand Friguet and Prof. Rachel Sherrard

University postbox :118 ☎ : 01 44 27 23 88  
sciences-master-bip-bvl@sorbonne-universite.fr



## Course organization

All the taught courses will take place in the third semester.

The fourth semester is dedicated to a six-month internship in a research laboratory. The student will then write a dissertation on the internship, which will be defended in front of a jury. The internship may take place in France or abroad (subject to validation by the course directors and the Head of Mobility).

M2 course units	ECTS
<b>3 compulsory course units</b>	<b>24 ECTS</b>
Mechanisms and models for studies of aging	12
Ageing and regeneration of muscle tissues	6
Design and management of a research project	6
<b>1 optional course unit from another specialty</b>	<b>6 ECTS</b>
Science and society (course unit from the Human physiology and pathophysiology specialty)	6
Cancer and environment (course unit from the Human physiology and pathophysiology specialty)	6
Inflammatory and disabling diseases (course unit from the Human physiology and pathophysiology specialty)	6
Deafness and blindness: pathophysiological mechanisms (course unit from the Human physiology and pathophysiology specialty)	6

### Examples of topics for internship projects

Endothelial dysfunction and Alzheimer's disease.  
Genomic changes associated with age and implicated in tumor initiation.  
Changes to the secretome of human myoblasts induced by replicative senescence.  
Molecular basis of age-related memory loss.  
Can rTMS prevent age-related cognitive decline?  
Detection *in vivo*, by MRI, of Alzheimer's disease lesions in a primate model.  
Effects of acute stress on the immune system in the elderly.  
Gerontechnology and accessibility.



### Possible careers after the BIP M2 specialty Ageing and longevity

Study/research officer  
Executive or senior manager in bioindustries or in the cosmetic or pharmaceutical industry  
Academic/bioindustry researcher or researcher-lecturer (master's + PhD)  
Clinical research assistant  
Technical and commercial executive  
Scientific communication



## M2 specialty: Marine Biology and Bioresources

The term “marine biotechnologies” encompasses both studies and the use of marine bioresources (microorganisms, macroalgae and metazoans), together with the use of biotechnological and industrial tools arising from marine biology. This high-level specialty aims to train the scientific leaders of tomorrow in the domain of marine biology and biotechnology, to meet the challenges of research and innovation.

### Objective of the training

This specialty aims to provide students with fundamental and applied training in the integrative biology of marine organisms. It accords considerable importance to research, the learning of concepts and the development of methods and techniques widely used in laboratories.

This specialty also includes a specific professionalization option in the domain of marine biotechnologies.

Training is dispensed at multiple sites: the Pierre and Marie Curie Campus, the three marine stations of Sorbonne University (the biological station at Roscoff and the oceanological observatories at Villefranche-sur-Mer and Banyuls-sur-Mer) and the partner universities in Brittany (West Brittany University and South Brittany University).

The professionalization option relies on support from employers in the Brittany region, including companies with sea-related activities.

### Conditions for admission

- Open to M1 students in biology from Sorbonne University or other universities who have taken options in cell or molecular biology, organism biology, or chemistry/biology and students from outside the European Union, via Campus France .
- Selection by dossier.

### International master's program:

#### Biology of marine organisms

In partnership with the *Pontificia Universidad Catolica de Chile* (Santiago, Chile)

Directors: Laurence Besseau & Yves Desdevises

[laurence.besseau@sorbonne-universite.fr](mailto:laurence.besseau@sorbonne-universite.fr)

[yves.desdevises@sorbonne-universite.fr](mailto:yves.desdevises@sorbonne-universite.fr)

Additional Spanish courses (not included in the educational contract) are available for students going to study in Spanish-speaking countries as part of their international masters program.

Contact: the language department

Marie-Laure Refort [marie-laure.refort@sorbonne-universite.fr](mailto:marie-laure.refort@sorbonne-universite.fr)



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Specialty Directors:  
Prof. Eric Quéinnec and Prof. Patrick Cormier

## Course organization

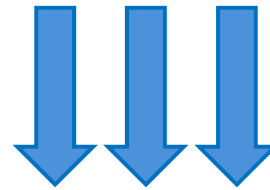
All the taught courses take place in the third semester.

The fourth semester is devoted to a six-month internship in a research laboratory or company, depending on the student's professional plans. At the end of the internship, the student must write a dissertation, which is defended in front of a jury. The internship may take place in France or abroad (subject to validation by the course directors and the Head of Mobility).

M2 course units	ECTS
<b>18 obligatory ECTS</b>	
Marine models in development and evolution	6
Biotechnology of the macromolecules of marine organisms	6
Biotechnology of marine algae	6
<b>12 exploratory ECTS from the following</b>	
Bioteests and bioresources in the marine environment	6
Translational regulation (course unit common to the BMC masters)	6
Creating a start-up company	6
Biofilms	6
Biorythms	6
Biology and adaptation in extreme environments	6
Molecular phylogeny	6
Adaptation in the marine environment	6

### Examples of topics for internship projects

Integrative biology of marine organisms.  
 -omics: from genes to the organism in its environment.  
 Evolutionary scenarios for the molecular mechanisms governing cellular life or the development of organisms.  
 Genome evolution.  
 Valorization of marine resources.  
 Innovations in the biomedical and biotechnological domains originating from marine organisms.



### Possible careers after the BIP M2 specialty Marine biology and bioresources

Study/research officer  
 Quality assurance manager  
 Academic/industrial researcher or lecturer-researcher (master's + PhD)  
 R&D manager  
 Commercial representative



Thanks to their teaching infrastructures and accomodation and their immediate proximity to the sea, the marine stations of Sorbonne University at **Roscoff**, **Villefranche-sur-Mer** and **Banyuls-sur-Mer** provide a perfect framework for these studies and ideal working conditions. The partnership established with the Brittany region and the Breton partner universities provides students with access to the employment market linked to the sea.



CNRS UPMC INSU  
**Station Biologique  
 Roscoff**



## M2 specialty: Neurosciences

Neurosciences constitute an extremely vast disciplinary field encompassing crucial issues in terms of fundamental research (understanding the brain) and multiple applications (e.g. in the domain of health). Due to the considerable economic impact of nervous system diseases on health budgets alone, neurosciences are the focus of considerable national and international support.

### Objective of the training

This specialty aims to offer broad, high-quality training in neurosciences, extending from molecular and cellular aspects to behavior and cognition, in both normal and pathological contexts. Given the tremendous breadth of the disciplinary field concerned, two options are proposed:

- *Integrated and cellular neurosciences (NCI)* - Director of Integrated and Cellular Neurosciences: Ann Lohof [ann.lohof@sorbonne-universite.fr](mailto:ann.lohof@sorbonne-universite.fr)

This option covers all the mechanisms of development, organization and adult functioning of the nervous system, at all levels of organization (molecules, cells, networks, neurophysiological functions), together with the resulting behaviors, in both normal and neuropathological situations.

- *Cognitive and behavioral neurosciences (NCC)* - Director of Cognitive and Behavioral Neurosciences: Philippe Fossati [philippe.fossati@aphp.fr](mailto:philippe.fossati@aphp.fr)

This option is based on studies of the neural basis of psychological phenomena and cognitive functions, and it extends to the most integrated aspects of these phenomena. It aims to train studies in approaches to normal and pathological human behavior based on principles, methods and results. It also focuses on the contribution of information technologies to the exploration and treatment of these problems.

### Conditions for admission

- Open to M1 biology students from Sorbonne University or other universities, medical students (interns, medicine and science, INSERM school), students from engineering schools and *grandes écoles*, students from outside the European Union, via Campus France.
- Selection by dossier.

### International master's programs:

#### Dual master's program in brain and mind science

In partnership with University College London

Director: Ann Lohof : [ann.lohof@sorbonne-universite.fr](mailto:ann.lohof@sorbonne-universite.fr)

#### Vision Sciences

In partnership with *Universidad Nacional Autónoma de México* - UNAM

Director: Grégory Gouvain

[gregory.gouvain@sorbonne-universite.fr](mailto:gregory.gouvain@sorbonne-universite.fr)

#### International master's program in neurodegenerative diseases

In partnership with KU Leuven, University of Vienna and the Technical University of Munich (TUM).

Director: Hélène Cheval [helene.cheval@sorbonne-universite.fr](mailto:helene.cheval@sorbonne-universite.fr)



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Specialty Director: Prof. Régis Lambert

## Course organization

All the taught courses take place in the third semester.

The fourth semester is dedicated to a six-month internship in a research laboratory. At the end of this internship, the student must write a dissertation that is defended in front of a jury. The internship may take place in France or abroad (subject to validation by the course directors and the Head of Mobility).

<b>Integrated and Cellular Neurosciences (NCI)</b>	<b>ECTS</b>
<b>1 obligatory course unit 6 ECTS</b>	
Design of a research project	6
<b>Core course units, total of 18 ECTS to be selected from the following list</b>	
Pasteur Course *	12
ENS – UPMC of neurophysiology *	12
Brain to market summer school *	6
Development of the nervous system	6
Neuronal networks: information processing and representation	6
Cellular communication	6
Sensory and motor physiology and pathophysiology	6
Glial and neurodegenerative diseases	6
Physiological and pathological neurotransmission and signaling	6
Vision: from retina to primary visual cortex	6
Physiology of perception	6
Physiopathology of sensory diseases and translational research	6
Novel technologies applied to human neuropathologies	6

<b>Cognitive and Behavioral Neurosciences (NCC)</b>	<b>ECTS</b>
<b>1 obligatory course unit 6 ECTS</b>	
Design of a research project	6
<b>Core course units, total of 18 ECTS</b>	
The social brain and emotions	6
Neurobiology and psychiatric problems	6
Cerebral basis of cognitive functions	6
Brain to market summer school *	6

**For both these options, two exploratory course units (3 ECTS each) must be selected: 2 modules must therefore be chosen from the following list common to the two options.**

Hormonal brain and behavior  
Molecular neuropharmacology  
Neuron-glia interactions  
Memory and spatial navigation  
Hippocampus: from cells to physiology and human disease  
Brain imaging  
Deafness: pathophysiological mechanisms  
Cerebellum  
Neural basis of olfactory perception  
Pharmacological approaches in neuroscience  
Neuropsychiatry genetics  
Thalamocortical rhythms  
Modeling in biophysical and computational neuroscience  
Animal models in behavioral neurosciences

### Examples of topics for internship projects

Genetics and pathophysiology of familial epilepsy  
Processing of sensory information and neurovascular imaging  
Role of axon guidance molecules  
Cellular interactions in neurodegenerative diseases  
Development of neural networks



### Possible careers after the BIP M2 specialty Neurosciences

Study/research officer  
Academic/industrial researcher or lecturer-research (master's + PhD)  
Technical manager in neurosciences  
Clinical research associate at a clinical investigation center or in the private sector.



\*: Selective course units

## M2 specialty: Nutrition Quality and Health

In this specialty, we approach human nutrition from fundamental and public health standpoints. The increasing frequency of diseases linked to nutrition, such as obesity and diabetes, and the complications associated with them, must be seen in relation to changes in eating habits. Indeed, in developed countries, we are seeing not only a marked increase in calorie intake, but also a dangerous drift in terms of the quality of the foods ingested. In addition, problems of undernutrition are observed in developing countries, but also in certain deprived populations and the elderly in Western countries. In this context, access to high-quality food has become a major societal demand. Recent sanitary crises have revealed that fears (which may or may not be justified) remain concerning the origin and quality of foods.

In this master's specialty, we propose training in the domains of food hygiene, quality and safety, nutrition/health communication, and research and development in the domain of nutrition. The relationships between diet and human health are at the heart of this training.

### Objective of the training

The objective of this specialty is to provide students with the skills required to evaluate future strategic, economic, industrial and societal issues relating to nutrition.

The students are sensitized to the impact of nutrition on health, through molecular, cellular and integrated aspects of nutrition research.

This specialty facilitates the professionalization of students in the theoretical and practical domains of food quality and safety for health, nutritional communication, health/nutrition communication or nutritional innovation and R&D, with support from companies (more than 80 companies, institutions and start-ups). In this way, the students acquire the knowledge and skills required for:

- Analyses of relationships between food, quality and health, the preventive role of diet, an understanding of the pathophysiological mechanisms underlying nutritional diseases
- Evaluation and expert advice, regulatory issues, analyses of dietary dangers and risks and their management
- Project management, teamwork, nutritional innovation and written and oral communication, in French and English.

### Conditions for admission

- Open to M1 students in biology from Sorbonne University or other universities, medical and veterinary students, students from engineering schools and students from outside the European Union, through Campus France
- Selection by dossier and interview



Parcours en partenariat avec  
l'Ecole Nationale Vétérinaire d'Alfort (ENVA)

Secretary: Building B, 3<sup>rd</sup> floor, door 314  
9, quai Saint-Bernard 75252 Paris Cedex 05

Specialty Directors:  
Prof. Khadija El Hadri and Dr. Véronique Béréziat

University postbox : 118 ☎ : 01 44 27 32 06  
sciences-master-bip-nutrition@sorbonne-universite.fr

## Course organization

All the taught courses take place in the third semester.

The fourth semester is dedicated to a six-month internship in a company. At the end of the internship, the student must write a dissertation, which is defended in front of a jury. The internship may be in France or abroad (subject to validation by the directors of the specialty and the Head of Mobility).

M2 course units	ECTS
<b>2 obligatory units 12 ECTS</b>	
Scientific and technical project	6
Business knowledge	6
<b>3 units from the list below, 18 ECTS</b>	
Food and health	6
The hygiene component of quality and risk management	6
Initiation in bioengineering	6
Innovation and communication	6
Quality management in a company (UE from the QUESS masters)	6
Nutrigenomics (course unit from the specialty Human physiology and pathophysiology)	6
Introductory unit PPH1: choice of a course unit from the following list: cardiovascular pathophysiology or hepatic pathophysiology	3
Introductory unit PPH2: choice of a course unit from the following list: renal pathophysiology, pulmonary pathophysiology, metabolic pathophysiology	3
Science and society (course unit from the specialty Human physiology and pathophysiology)	6

### Examples of topics for internship projects

Organization of nutrition trade fairs  
 Scientific advice and support – nutritional audits  
 Product control during and after production  
 Ensuring the setting up and/or application of sanitary management plans  
 Performance of sanitary audits  
 Updating of food hygiene control procedures  
 Contribution to the obtainment of ISO certification  
 Product development  
 Development of sanitary accreditation dossiers  
 Development of accreditation requests for tools in accordance with national health and nutrition plans  
 Scouting, commercial strategy and marketing in nutrition



### Possible careers after the BIP MP specialty Nutrition, quality and health

Project manager in health education  
 Scientific assistant in a communication agency  
 Controller in the domains of competition, consumption and fraud prevention  
 Project leader in nutritional communication  
 Product manager  
 Food hygiene, quality and safety manager  
 Project manager (communication, innovation, new products)  
 R&D manager in industry  
 Health Safety and Quality Manager (Health, Safety, Quality and Environment) in IAA  
 Regulatory affairs manager



**Nutrition, Quality and Health is also a network of former students:**

<https://nutribip.wordpress.com>

## Diapositive 15

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**JS3** spécifiquement dans une entreprise ou peut cela se passe également dans un labo de recherche ? A vérifier

Julie Sappa; 25/03/2019

**MOU3** Dans un laboratoire de recherche public ou privé

Microsoft Office User; 01/04/2019



## M2 specialty: Human Physiology and Pathophysiology

In this specialty, we learn about the major functions required to maintain metabolism and homeostasis of the internal environment. The students address the molecular and cellular origin of a large range of organ-specific and multi-system diseases through studies of the mammalian body, focusing on humans in particular. Current and future therapies in development for these diseases will also be presented.

### Objective of the training

This specialty aims to provide students with a precise vision of modern animal physiology and the pathophysiological mechanisms leading to disease.

At the end of this training, the students will have the skills required:

- To perform research in the domain of pathophysiology, to elucidate the physical, cellular or biochemical mechanisms leading to the appearance of a disease and its consequences.
- To analyze the biological signs of a disease, to perform experiments and to identify the mechanisms by which a possible treatment could re-establish the normal functioning of the affected organ or tissue.
- To develop and organize theoretical interpretations of experiments and analyses, to communicate and valorize the results in the form of scientific publications and oral presentations in French and/or English.

### Conditions for admission

- Open to M1 students in biology from Sorbonne University or other universities, medical, pharmacy and veterinary students, students from engineering schools, students from outside the European Union via Campus France.
- Selection by dossier.



COLLÈGE  
DE FRANCE  
— 1530 —



Secretary: Building B, 3<sup>rd</sup> floor, door 314  
9 quai Saint-Bernard 75252 Paris Cedex 05  
University postbox : 118 ☎ : 01 44 27 23 88  
[sciences-master-bip-pmph@sorbonne-universite.fr](mailto:sciences-master-bip-pmph@sorbonne-universite.fr)

Specialty Director: Prof. Philippe Le Rouzic

## Course organization

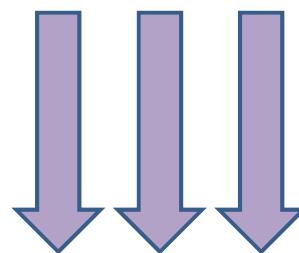
All the taught courses take place in the third semester.

The fourth semester is dedicated to a six-month internship in a research laboratory or company, according to the option chosen by the student. At the end of the internship, the student must write a dissertation, which is defended in front of a jury. The internship may take place in France or abroad (subject to validation by the directors of the specialty and the Head of Mobility).

M2 course units	ECTS
<b>2 compulsory course units (12 ECTS)</b>	
Design of a scientific project	6
Introductory unit PPH1: choice from the following units: cardiovascular pathophysiology or hepatic pathophysiology	3
Introductory unit PPH2: choice from the following units: renal pathophysiology, pulmonary pathophysiology, metabolic pathophysiology	3
<b>3 units from the following list (18 ECTS)</b>	
Cancer and environment	6
Drug Odyssey	6
Endocrinology: from cell to organism	6
Initiation in bioengineering	6
Inflammatory diseases: from pathophysiology to new treatments	6
Nutrigenomics	6
Science and Society	6
Deafness and blindness: pathophysiological mechanisms	6

### Examples of topics for internship projects

Inflammation and joint diseases linked to aging  
 Genetics of hereditary diseases  
 Cell signaling and cardiac remodeling  
 The mineralocorticoid receptor: pathophysiology and therapeutic innovations



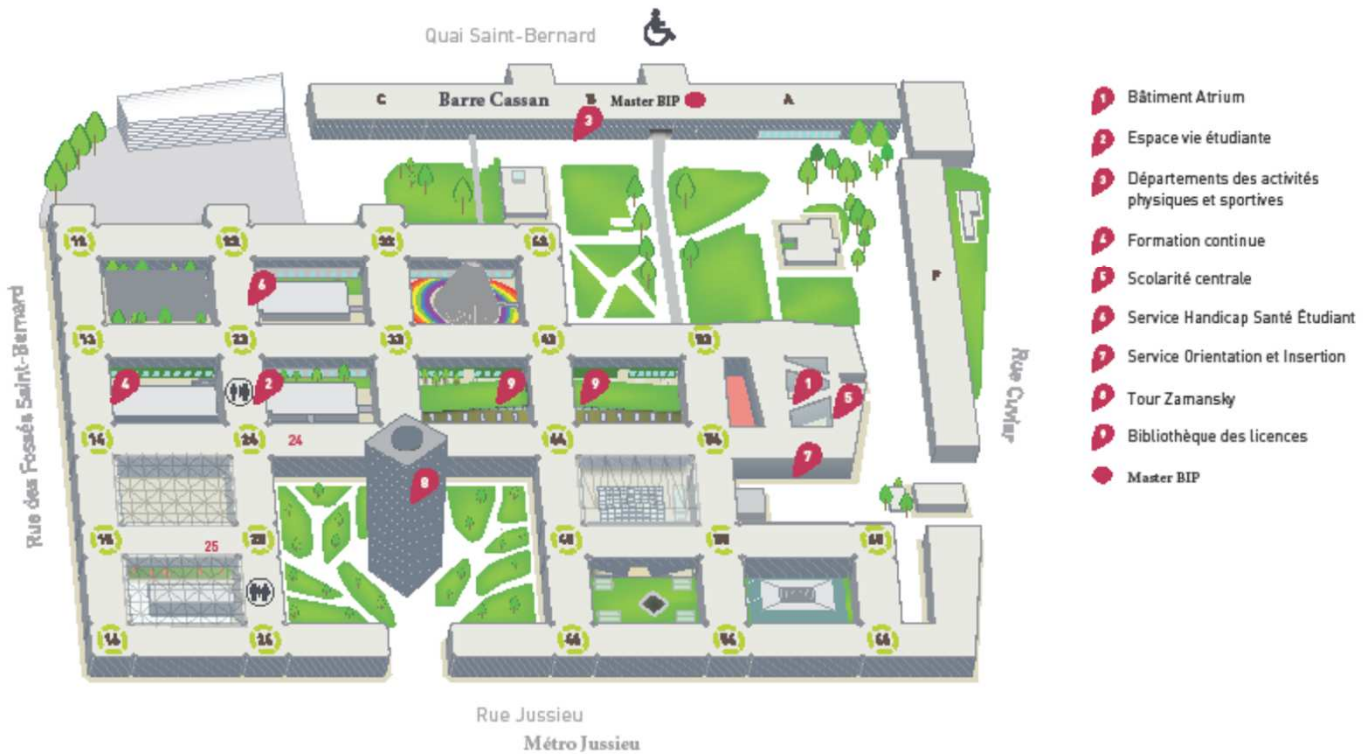
### Possible careers after BIP M2 Human physiology and pathophysiology

Clinical research assistant  
 Academic/industrial research or researcher-lecturer (master's + PhD)  
 Biomedical engineer  
 Study/research officer  
 Technical/commercial assistant



# Practical information

JS5



## Address

Campus Pierre et Marie Curie  
Building B, 3rd floor, door 314  
9, quai Saint Bernard – University postbox  
118  
75252 Paris Cedex 05

## Open to the public

Monday to Friday, from 8.45 a.m. to 5:30  
p.m.

## Diapositive 18

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**JS5** Atrium Building, Student social area, Physical and sporting activity departments, Continuing education, Central school office, Student disability and health service, Zamansky Tower, Undergraduate library, BIP masters

Julie Sappa; 25/03/2019

# Principal partners

## Higher education establishments

- National level
  - Alfort National Veterinary School
  - La Pitié Salpêtrière - Charles Foix Hospital Group
  - South Brittany University
  - The Ecole Normale Supérieure – ULM
  - The Pasteur Institute
- International level
  - The National Autonomic University of Mexico (Mexico City, Mexico)
  - Miguel Hernandez de Echa University (Alicante Spain)
  - The Pontifical Catholic University of Chile (Santiago, Chile)
  - University College London (London, United Kingdom)
  - Complutense University (Madrid, Spain)
  - Catholic University of Leuven (Leuven, Belgium)
  - University of Vienna
  - Technical University of Munich (TUM)

- Laboratories and PhD schools
  - Sorbonne University institutions
  - Institute of Brain and Spinal Cord
  - Institute of Complex Systems
  - The Vision Institute
  - Institute of Cardiometabolism and Nutrition
  - Intelligent Systems and Robotics Institutes
- Institutions outside Sorbonne University
  - ENS, ENVA, Collège de France, the Pasteur Institute, ESPCI, INRA, IRD, IBPC
- PhD schools
  - Brain, cognition, behavior
  - Physiology, pathophysiology and therapeutics
  - Complexity of living organisms

## Sorbonne University marine stations

- Roscoff biological station
- Oceanological observatory at Villefranche-sur-Mer
- Oceanological observatory at Banyuls-sur-Mer

## Companies

- |                         |                     |
|-------------------------|---------------------|
| - Activ International   | - Lesieur           |
| - Agence Protéines      | - Orly Distribution |
| - Alma Consulting Group | - Ozymes            |
| - Cabinet Vidon         | - Proméga           |
| - Daco France           | - Sup'Biotech Paris |
| - Danone                | - Universal Medica, |
| - Innovation SAS        | ....                |

Marine biology  
Medical systems biology  
Neurobiology  
Functional biology of organisms  
Metabolism  
Health and safety  
Obesity and diabetes  
Relationship between diet and health  
Molecular biology  
Human aging  
Longevity  
Electrophoresis  
Electrophysiology  
Drugs  
Genetic variability  
Pathophysiology  
Inflammation  
Marine biology  
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Pathophysiology  
Inflammation  
Pathological behavior  
Obesity and diabetes  
Relationship between diet and health

[www.master.bip.sorbonne-universite.fr](http://www.master.bip.sorbonne-universite.fr)

**bip**

**MASTER**

biologie intégrative et physiologie