

Course directory 2014.2015

school of biology (FBM-BIO)
master

* your selection

> Biology > Master of Science in Medical Biology

SUMMARY

| | |
|-----------------|----|
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| List of courses | 1 |

NOTICE

This course catalogue was produced using data from the *SylviaAcad* information system of the University of Lausanne. Its database contains all information about courses proposed by the different faculties and their times. This data can also be consulted online at the address :

<https://applicationspub.unil.ch/interpub/noauth/php/Ud/index.php>.

Web site of the faculty : **<http://www.unil.ch/ecoledibiologie/>**

Generated on : 03.03.2016

LEGEND

NAME OF THE COURSE

Teacher

| Type of course | Status | Hours per week | Teaching language | Hours per year |
|----------------|---------|----------------|-------------------|----------------|
| Semester | Credits | | | |

N: Levels

P: Programme requirements

O: Objective

C: Content

B: Bibliography

I: Additional information

DISCIPLINE

ABBREVIATIONS

TYPE OF COURSE

| | |
|---------|------------------|
| Attest. | Attestation |
| C | Course |
| C/S | Course - seminar |
| Cp | Camp |
| E | Exercises |
| Exc | Excursion |
| Lg | Guided lecture |
| S | Seminar |
| T | Fieldwork |
| TP | Practical work |

STATUS

| | |
|--------------|---|
| Fac | Facultative |
| Obl | Compulsory |
| Opt | Optional |
| Fac/Comp/Opt | Facultative, compulsory or optional (according to the study programme) |

SEMESTER

| | |
|----|--------|
| Sp | Spring |
| A | Autumn |

LIST OF COURSES

METABOLIC ADAPTATION TO FASTING : ROLE OF METABOLIC SENSORS

Bernard Thorens

| | | | |
|---|-----|---------|---|
| C | Obl | english | 4 |
| S | | | |

N: Master

BIOLOGICAL SECURITY

Patrick Michaux

| | | | |
|---|-----|--------|---|
| C | Obl | french | 3 |
| A | | | |

N: Master

P: A basic knowledge of microbiology and vegetal science

O: To familiarise future researchers with legislation concerning genetic engineering. In addition, possible biological risks associated to different applications of this technology will be discussed with the help of examples.

C: * Legislation: article 24 of the Federal Constitution; law concerning environmental protection; law concerning epidemics; ordinance on protection against major accidents; Swiss commissions on biological security: notification and registration of projects.
* Biological security in the laboratory: containment; security equipment; technical measures: laboratory construction; standard laboratory (microbiological) practice; classification of biological material: plasmids, microorganisms, cell lines, primary cells; security levels 1-4.
* Release of genetically modified bacteria in the environment: monitoring, survival and dissemination, ecological impact, transfer of genes, containment systems.
* Potential biological risks associated with the use of transgenic plants: dissemination, cross-pollination, gene transfer.
* The problem of recombinant vaccines: vectors, DNA vaccines.
* Somatic genetic therapy I: Illnesses accessible to treatment by somatic genetic therapy, gene transfer methods.
* Somatic genetic therapy II: Evaluation of the biological risk for the patient and his environment.

CELLULAR BIOLOGY

Olivier Staub

| | | | |
|---|---------|---------|----|
| C | Obl/Opt | english | 12 |
| A | 1.50 | | |
| S | Obl/Opt | english | 4 |
| A | | | |

N: Master

FROM MEMORY TO MEMORY LOSS: ALZHEIMER'S DISEASE

Andrea Volterra

| | | | |
|---|---------|---------|----|
| C | Obl/Opt | english | 18 |
| A | 1.50 | | |
| S | Obl/Opt | english | 4 |
| A | | | |

N: Master

IMMUNOLOGY AND CANCER

Sanjiv Luther

| | | | |
|---|---------|---------|----|
| C | Obl/Opt | english | 20 |
| A | 2.00 | | |
| S | Obl/Opt | english | 12 |
| A | | | |

N: Master

CARDIOVASCULAR DISEASES

Dario Diviani

| | | | |
|---|---------|---------|----|
| C | Obl/Opt | english | 20 |
| A | 2.00 | | |
| S | Obl/Opt | english | 4 |
| A | | | |

N: Master

O: Integrated overview of the respiratory and cardio-vascular systems
Introduction to cardiac and respiratory pathophysiology, pathology, and pharmacology
Cellular mechanisms of selected cardiovascular and respiratory diseases

C: respiratory and cardiovascular physiology
respiratory and cardiovascular pathophysiology and pharmacology
cellular basis of arterial hypertension
cellular basis of heart failure
heart conduction defects (problem-based learning)

B: Medical Physiology. W F Boron & E L Boulpaep; Saunders 2003

METABOLIC DISEASES

Christian Widmann

| | | | |
|---|---------|---------|----|
| C | Obl/Opt | english | 16 |
| A | 1.50 | | |
| S | Obl/Opt | english | 4 |
| A | | | |

N: Master

P: The following metabolic pathway should be known beforehand:

- Glycolysis
- Neoglucogenesis
- Glycogen synthesis
- Fatty acids and triglyceride synthesis
- Krebs cycle

The basic regulation of receptor tyrosine kinases, G protein-coupled receptors, small GTP-binding proteins should also be known.

O: The objectives of this course is to understand the complex aetiology of diabetes by studying the environmental, genetic, and molecular factors underlying the development of the disease

- C:
1. Physiopathology, genetic and environmental factors in diabetes.
 2. Epidemiology of and complications in diabetes.
 3. Diabetes: a pancreatic beta cell disease.
 4. Diabetes: an insulin-resistance disease.
 5. Genetics of diabetes

MICROBIOLOGY

Stefan Kunz

| | | | |
|---|---------|---------|----|
| C | Obl/Opt | english | 18 |
| A | 2.00 | | |
| S | Obl/Opt | english | 4 |
| A | | | |

N: Master

P: Course Virology B.Sc. 5th semester (Kunz) or equivalent

O: This course will provide an overview over medical microbiology at an advanced level. Introductory parts will cover the basic concepts of bacterial, viral, and fungal infections in humans. Selected pathogens will be used to highlight the principles underlying human infectious diseases from the standpoint of the pathogen and the host defense.

-
- C: Outline course Medical Microbiology
 Part I Medical Bacteriology (Gilbert Greub, 6 hours total)
 This part of the course will first present the concepts of bacterial colonization, of infection and of barriers against invading micro-organisms. The importance of clinical bacteriology for the etiological diagnosis of infectious diseases will be presented, as well as the main diagnosis approaches used. Then, the most important virulence factors implicated in bacterial pathogenesis and in the transmission of pathogenic agents will be presented. These fundamental principles will be illustrated using relevant human pathogens as examples. First, we will present the pathogenesis of some pyogenic bacteria (*Escherichia coli*, *Staphylococcus* spp., *Streptococcus* spp.), highlighting the importance of bacterial toxins and of bacteriophages. Then, we will present some specific aspects of the mode of transmission and pathogenesis of infections due to intracellular bacteria, using as examples the atypical pneumonia and the zoonotic infections. Finally, we will illustrate using mycobacteria some key principles in bacterial pathogenesis including the importance of pathogens evolution and of immune defense.
- Colonisation, infection and barriers against invading pathogens (1hour)
 Colonisation, physiological flora
 Infection and inflammation
 Chemical, mechanical, physical and biological barriers
 Diagnostic bacteriology (1 hour)
 Gram and direct examination
 Cultures approaches
 Bacterial identification
 Molecular diagnosis/serology
 Pyogenic bacterial infections and toxins (1hour)
Escherichia coli: commensal and pathogen: (ETEC/EPEC/EIEC)
Staphylococcus aureus: virulence factors
Streptococcus, superantigens and bacteriophages
 Pneumonia (1hour)
 Etiological diagnosis of pneumonia
 Pneumococques and other encapsulated pyogenic bacteria
Legionella pneumophila, water and amoebae
 Other agents of atypical pneumonia (*Chlamydia* spp., *Coxiella burnetii*)
 Zoonotic infections (1hour)
 Ticks/fleas/lice: role in the transmission
Rickettsia: pathogenesis and reductive evolution
Bartonella: red blood cells and endothelial cells
 Mycobacteria (1hour)
 Importance of immune defense mechanisms
 Pathogenomic with an evolutionary perspective
- Part II Medical Virology
 This part of the course will cover fundamental aspects of medical virology and viral diseases in humans. A short introduction will provide a survey of the landscape and outline basic principles of human viral infection and viral pathogenesis. These fundamental principles will then be illustrated using relevant human pathogens as examples. The most important families of human pathogenic viruses will be presented in a general way. From each family, we will select specific viruses that will serve as examples to illustrate fundamental aspects of virus-host interaction and viral pathogenesis in a more detailed manner. A final block will cover virus infections in the central nervous system (CNS) and re-visit the basic principles outlined before to give a synthesis of the highly complex virus-host interaction underlying viral CNS disorders.
- Introduction to medical virology (1 hour) Stefan Kunz
 Basic principles of human viral infection
 Basic principles of innate and adaptive anti-viral defense
 Virus infection of the central nervous system (1 hour) Stefan Kunz
 Mechanisms of CNS invasion by viruses
 Anti-viral immune defense in the CNS
 Acute viral infection of the CNS: meningitis and encephalitis
 Persistent viral infection in the CNS
 Infection of the developing CNS: virus infection in pediatric medicine
 Human pathogenic DNA viruses (2 hours) Stefan Kunz
 Overview human pathogenic DNA viruses
 Poxviruses
 Overview poxviruses
 Pathogenesis of smallpox
 Subversion of innate host cell immunity by poxviruses
 Adenoviruses
 Adenoviruses as human pathogens
 Herpesviruses
 Overview human pathogenic herpesviruses
 Herpes simplex virus and viral latency
 Epstein-Barr Virus: viral latency and cancer
 Human pathogenic RNA viruses I (1 hour) Stefan Kunz
 Overview human pathogenic DNA viruses
 Enteroviruses
 Overview human pathogenic enteroviruses
 Rhinoviruses and cosackievirus: viral tropism and pathogenesis
 Herpesviruses

B: Will be provided for each block.

LTK1 MODULE : TRAINING IN ANIMAL EXPERIMENTATION

Corinne Berthonneche

| | | | |
|----|------|---------|----|
| C | Opt | english | 20 |
| A | 3.00 | | |
| TP | Opt | english | 20 |
| A | | | |

N: Master

INTRODUCTION TO CLINICAL RESEARCH MODULE (EH)

Luc Tappy

| | | | |
|----|------|---------|----|
| C | Opt | english | 20 |
| A | 3.00 | | |
| TP | Opt | english | 20 |
| A | | | |

N: Master

- O: To get acquainted with basic methods in clinical research
- o study design
 - o statistical analysis
 - o ethical considerations
 - o legal aspects
- To know the basic skills for the realization of research protocols on human beings
- o Techniques of asepsis, iv drips
 - o how to react in case of acute adverse effects
 - o basic life support
- To understand the relationships between clinical practice and research
- o cancer
 - o metabolic disorders
 - o neuro-psychiatric disorders

SCIENTIFIC WRITING - HOW TO INCREASE THE IMPACT OF YOUR RESEARCH

Marie-Christine Broillet, Stefan Kohler

| | | | |
|---|------|---------|---|
| C | Obl | english | 8 |
| A | 0.50 | | |

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|---|-----|---------|---|
| S | Obl | english | 2 |
| A | | | |

N: Master

INTRACELLULAR SIGNALLING

Dario Diviani

| | | | |
|---|---------|---------|----|
| C | Obl/Opt | english | 12 |
| A | 1.00 | | |

| | | | |
|---|-----|---------|---|
| S | Obl | english | 3 |
| A | | | |

N: Master

P: Bachelor in Biology

O: Introduction to the hormonal system. Physiological, pathophysiological and pharmacological aspects

C: 1) Signal transduction by peptide hormones (G protein-coupled receptors, second messengers, protein kinases, genetic pathologies, pharmacological targets).
2) Receptor-mediated endocytosis (transferrin, LDL, toxins, virus, ligand-targeted therapeutics)
3) Signal transduction by steroid hormones (mechanism of action, pathologies, pharmacological targets)

B: - Endocrinology: An Integrated Approach.
Nussey, S.S.; Whitehead, S.A. London: Taylor & Francis; c2001
- Molecular Biology of the Cell 4th ed.
Alberts, Bruce; Johnson, Alexander; Lewis, Julian; Raff, Martin; Roberts, Keith; Walter, Peter, New York and London: Garland Science; c2002

FIRST STEP PROJECT

Christian Fankhauser, Olivier Staub, Claus Wedekind

| | | | |
|----|-------|---------|-----|
| TP | Obl | english | 224 |
| A | 15.00 | | |

| | | | |
|----|-------|---------|-----|
| TP | Obl | english | 230 |
| A | 15.00 | | |

| | | | |
|----|-------|---------|-----|
| TP | Obl | english | 250 |
| A | 14.00 | | |

N: Master

P: Practicals performed during the bachelor (molecular biology, genetics, biochemistry, bioinformatics)

-
- O: - An initiation to the work of a scientist
 - Conduct experimental work in research lab (wet bench or in silico)
 - Interpretation of research results
 - Implement basic principles in experimental design (e.g. include the appropriate controls, statistical significance of the results etc...)
 - Present your experimental work in a written report which will be organized like a typical research article (introduction, results, discussion, materials and methods)
 - present your work orally (seminar style)
-

- C: Perform laboratory work for about 12 weeks during the time when the student does not follow theoretical classes. This research project will typically be performed under the guidance of a PhD student or a post-doc from the host laboratory.
-

INTRODUCTION TO CLINICAL MEDICINE

Olivier Bonny

| | | | |
|----|-----|---------|----|
| C | Obl | english | 22 |
| S | | | |
| TP | Obl | english | 28 |
| S | | | |

N: Master

P: Bachelor of Science

- O: The main goals of this course is to have the students able to:
 1) describe the basic principles underlying human clinical medicine;
 2) explain the concepts and language used in clinical medicine and research

C: -

B: /

I: -

BIOSTATISTICS AND BIOINFORMATICS

Dario Diviani

| | | | |
|---|-----|---------|---|
| S | Obl | english | 4 |
| S | | | |

N: Master

P: Basics of biostatistics and bioinformatics

O: Methodology in biostatistics and bioinformatics

- C: At the end of this module, the students will have used and developed the needed biostatistics or bioinformatics tools to analyze the data obtained during their Master thesis work.

B: /

I: /

CANCER II

Nicolas Fasel

| | | | |
|---|-----|---------|----|
| C | Obl | english | 10 |
| S | | | |
| S | Obl | english | 2 |
| S | | | |

N: Master

CANCER III

Monika Hegi

| | | | |
|---|-----|---------|---|
| C | Obl | english | 8 |
| S | | | |
| S | Obl | english | 2 |
| S | | | |

N: Master

E-LEARNING EXERCISES

Sanjiv Luther

| | | | |
|---|-----|---------|---|
| C | Obl | english | 1 |
| S | | | |
| E | Obl | english | 6 |
| S | | | |

N: Master

IMMUNOLOGY II

Sanjiv Luther

| | | | |
|---|-----|---------|----|
| C | Obl | english | 25 |
| S | | | |

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|---|-----|---------|---|
| S | Obl | english | 4 |
| S | | | |

N: Master

P: The key concepts of immunology which are summarized in chapter 1 of 'Janeways Immunobiology' by Kenneth Murphy (Garland Science) 2011

O: Know dendritic cells and lymphocytes
 Know lymphoid organ structure and function
 Know the cellular migration and interaction
 Know the molecular basis of cellular interactions
 Know how antigen is recognized, sampled, processed and presented to lymphocytes
 Know how lymphocytes get activated, proliferate and differentiate into effector cells
 Know the effector function
 Know what memory cells are and do
 Know the phases of adaptive immunity
 Know the pros and cons of adaptive immune responses

C: See under goals

IMMUNOLOGY III

Hans Acha-Orbea

| | | | |
|---|-----|---------|----|
| C | Obl | english | 15 |
| S | | | |

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|---|-----|---------|---|
| S | Obl | english | 3 |
| S | | | |

N: Master

PROTEOMICS AND 3D MODELING

Olivier Michielin, Manfredo Riccardo Quadroni, Ekaterini Servi

| | | | |
|---|-----|---------|----|
| C | Obl | english | 16 |
| S | | | |

| | | | |
|----|-----|---------|----|
| TP | Obl | english | 56 |
| S | | | |

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|----|-----|---------|---|
| TP | Obl | english | 8 |
| S | | | |

N: Master

PW IMMUNOLOGY / CANCER

Sanjiv Luther, Anne Wilson

| | | | |
|----|-----|---------|----|
| C | Obl | english | 10 |
| S | | | |
| TP | Obl | english | 31 |
| S | | | |
| S | Obl | english | 3 |
| S | | | |

N: Master

CANCER IMMUNOTHERAPY

Pedro Romero

| | | | |
|---|-----|---------|----|
| C | Obl | english | 10 |
| S | | | |
| S | Obl | english | 2 |
| S | | | |

N: Master

P: Have a basic knowledge of the principles of humoral and cellular immunology. Innate and adaptive immune responses. Basic mechanisms of cell transformation and cancer development.

O: Provide an overview of the principles of tumor immunology and the applications to cancer immunotherapy

C: Immunosurveillance of tumors
Tumor antigens
Approches to cancer immunotherapy
Immunosuppression in the tumor microenvironment
Immune checkpoint blockade with monoclonal antibodies

B: - Mellman I, Coukos G, Dranoff G. Cancer immunotherapy comes of age. *Nature*. 2011 480(7378):480-9. doi:10.1038/nature10673.
- Schreiber RD, Old LJ, Smyth MJ. Cancer immunoediting: integrating immunity's roles in cancer suppression and promotion. *Science*. 2011 331(6024):1565-70. doi:10.1126/science.1203486.

NO-CODING RNA IN METABOLISM

Romano Regazzi

| | | | |
|---|-----|---------|---|
| C | Obl | english | 4 |
| S | | | |

| | | | |
|---|-----|---------|---|
| S | Obl | english | 2 |
| S | | | |

N: Master

HYPOTHALAMUS AND THE INTERACTION BETWEEN METABOLISM AND REPRODUCTION

François Pralong

| | | | |
|---|-----|---------|---|
| S | Obl | english | 2 |
| S | | | |

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|---|-----|---------|---|
| C | Obl | english | 4 |
| S | | | |

N: Master

GLUCOSE AS SIGNAL IN METABOLISM REGULATION

Bernard Thorens

| | | | |
|---|-----|---------|---|
| S | Obl | english | 2 |
| S | | | |

| | | | |
|---|-----|---------|---|
| C | Obl | english | 4 |
| S | | | |

N: Master

BRAIN METABOLISM

Luc Pellerin

| | | | |
|---|-----|---------|---|
| S | Obl | english | 2 |
| S | | | |

| | | | |
|---|-----|---------|---|
| C | Obl | english | 4 |
| S | | | |

N: Master

METABOLISM AND CANCER

Lluís Fajas Coll

| | | | |
|---|-----|---------|---|
| C | Obl | english | 4 |
| S | | | |
| S | Obl | english | 2 |
| S | | | |

N: Master

WHAT IS A CALORIE ?

Luc Tappy

| | | | |
|---|-----|---------|---|
| S | Obl | english | 4 |
| S | | | |

N: Master

CIRCADIAN RHYTHM AND METABOLISM

David Gatfield

| | | | |
|---|-----|---------|---|
| C | Obl | english | 2 |
| S | | | |
| S | Obl | english | 2 |
| S | | | |

N: Master

G-COUPLE RECEPTORS AND AUTONOMIC NERVOUS SYSTEM

Dario Diviani

| | | | |
|---|-----|---------|---|
| S | Obl | english | 2 |
| S | | | |
| C | Obl | english | 4 |
| S | | | |

N: Master

METABOLIC SYNDROME : EPIDEMIOLOGY AND (PRE-)CLINICAL IMPLICATIONS

Jardena Puder

| | | | |
|---|-----|---------|---|
| C | Obl | english | 4 |
| S | | | |
| S | Obl | english | 2 |
| S | | | |

N: Master

- B: Kahn R et al. The metabolic syndrome: time for a critical appraisal. Joint statement from the American Diabetes Association and the European Association for the study of Diabetes. (2005) Diabetologia:48:1684-1699
Expert panel on the detection, evaluation and treatment of high blood cholesterol in adults. ATP III (2001). JAMA 285-2486-2497

EXPERIMENTAL TECHNIQUES : TRANSGENESIS AND GENE KNOCKOUT

Edith Hummler Beermann

| | | | |
|---|-----|---------|---|
| C | Obl | english | 4 |
| S | | | |
| S | Obl | english | 2 |
| S | | | |

N: Master

THE GOOD (CHOLESTEROL), THE BAD (CHOLESTEROL) AND THE LIPOPROTEINS

David Nanchen, Christian Widmann

| | | | |
|---|-----|---------|---|
| S | Obl | english | 4 |
| S | | | |
| C | Obl | english | 4 |
| S | | | |

N: Master

- O: Understand how cholesterol is taken up and produced, how it is transported from one organ to another, and what are its functions in our organism.

- C: - Cholesterol (function, origin, and synthesis)
- Lipoprotéines (chylomicrons, VLDL, LDL et HDL)

- B: Endocrinol.Metab Clin.North Am. (1998) vol 27 pp. 503-519

NUTRITIONAL PHYSIOLOGY

François Pralong

| | | | |
|---|-----|---------|---|
| C | Obl | english | 4 |
| S | | | |

N: Master

DIET AND EVOLUTIONARY ADAPTATION

Henrik Kaessmann

| | | | |
|---|-----|---------|---|
| C | Obl | english | 2 |
| S | | | |

N: Master

BIOINFORMATICS TOOLS FOR THE STUDY OF METABOLISM

Ioannis Xenarios

| | | | |
|---|-----|---------|---|
| C | Obl | english | 2 |
| S | | | |

N: Master

APPLICATION OF THE "OMICS" TOOLS

Martin Kussmann

| | | | |
|---|-----|---------|---|
| C | Obl | english | 2 |
| S | | | |

N: Master

METABOLIC PHENOTYPING

Frédéric Preitner

| | | | |
|---|-----|---------|---|
| C | Obl | english | 2 |
| S | | | |

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|---|-----|---------|---|
| S | Obl | english | 6 |
| S | | | |

N: Master

NUTRITIONAL SYSTEMS BIOLOGY

Guy Vergères

| | | | |
|---|-----|---------|---|
| C | Obl | english | 2 |
| S | | | |

N: Master

NEURON-GLIA BIOLOGY

Andrea Volterra

| | | | |
|---|-----|---------|----|
| C | Obl | english | 18 |
| S | | | |
| S | Obl | english | 2 |
| S | | | |

N: Master

BRAIN DEVELOPMENT

Jean-Pierre Hornung

| | | | |
|----|-----|---------|----|
| C | Obl | english | 15 |
| S | | | |
| S | Obl | english | 3 |
| S | | | |
| TP | Obl | english | 2 |
| S | | | |

N: Master

SENSORY FUNCTIONS

Egbert Welker

| | | | |
|---|-----|---------|----|
| C | Obl | english | 24 |
| S | | | |

N: Master

INTRODUCTION TO PSYCHIATRIC NEUROSCIENCE

Kim Quang Do Cuenod

| | | | |
|---|-----|--------|----|
| C | Obl | french | 20 |
| S | | | |

N: Master

B: Quelques références :

- Kandel, EJ et al (last edition) Principles of Neural Science. Elsevier
 - Schenk F, Leuba G, Büla C (2004). Du vieillissement cérébral à la maladie d'Alzheimer, De Boeck.
 - Charney DS & Nestler EJ (last edition) Neurobiology of Mental Illness, Oxford University Press
 - Jeannerod M, Le Cerveau volontaire, Odile Jacob, 2009
- une bibliographie spécifique sera distribuée pour chaque volet du cours.

MODULATION OF SYNAPTIC TRANSMISSION

Dirk Fasshauer

| | | | |
|---|-----|---------|----|
| C | Obl | english | 14 |
| S | | | |
| S | Obl | english | 2 |
| S | | | |

N: Master

NEURONAL DEATH AND REPAIR IN THE CENTRAL NERVOUS SYSTEM

Nicolas Toni

| | | | |
|---|-----|---------|----|
| C | Obl | english | 16 |
| S | | | |

N: Master

P: Basic knowledge of neurobiology and of cell biology.

O: Understand the roles of neuronal death occurring in normal development and the factors which determine it. Understand the various cellular mechanisms of neuronal death, active in both normal and pathological situations. Understand the roles of neuronal death in various pathological situations including cerebral ischemia, Parkinson's disease and motoneuron diseases.

C: Cell death: introduction, history and typology
 Pathways of apoptosis
 Trophic influences and neuronal death
 Neuronal death in development and its regulation
 Excitotoxicity, its signalling pathways and neuroprotection against it
 Cerebral ischemia and its treatment
 Alzheimer's disease
 Parkinson's disease

B: Les six enseignants impliqués dans ce module proposeront des matières de lecture.

DRUG DESIGN

Leonardo Scapozza

| | | | |
|---|-----|---------|---|
| C | Obl | english | 4 |
| S | | | |

N: Master

P: - Basics of Biochemistry and Chemistry

O: - To give an introduction and a general overview on Drug Design.

C: - Definitions and basic principles of Drug Design (what is a drug?; Which are the protein-ligand interactions; What is drug design?
 - Which are the fundamental questions in drug design?
 - Ligand-based drug design: principles and examples
 - Target-based drug design: principles and examples
 - The whole process will be exemplified by means of case study namely the development of Glivec, a molecularly targeted anti-cancer drug.

B: - Hölting, Hans-Dieter; Sippl, Wolfgang; Rognan, Didier; Folkers, Gerd "Molecular Modeling: Basic Principles and Applications" 3., revised and expanded Edition - January 2008, Wiley-VCH, Weinheim
 - Capdeville R., Buchdunger E., Zimmermann J. and Matter A. GLIVEC (STI571,IMATINIB), A RATIONALLY DEVELOPED, TARGETED ANTICANCER DRUG Nature Review Drug Discovery (2002) 1:| 493

DEVELOPMENT OF THERAPEUTICS

Marie-Christine Broillet

| | | | |
|---|-----|---------|----|
| C | Obl | english | 10 |
| S | | | |

N: Master

DEVELOPMENT OF DRUGS : PRACTICAL ASPECTS

Jean-Maurice Dumont

| | | | |
|---|-----|---------|---|
| C | Obl | english | 4 |
| S | | | |

N: Master

INFLAMMATION AND CANCER : ROLE OF REACTIVE OXYGEN SPECIES

Emanuela Felley-Bosco

| | | | |
|---|-----|---------|----|
| C | Opt | english | 10 |
| S | | | |

N: Master

PHARMACEUTICALS AS DOPING DRUGS

Norbert Baume

| | | | |
|---|-----|---------|---|
| C | Obl | english | 4 |
| S | | | |

N: Master

TRANSGENIC MICE AND THEIR APPLICATION IN BIOMEDICAL RESEARCH

Edith Hummler Beermann

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|---|-----|---------|----|
| C | Opt | english | 10 |
| S | | | |

N: Master

OPTIMIZATION OF DRUG TREATMENT

Laurent Décosterd

| | | | |
|---|-----|---------|---|
| C | Obl | english | 6 |
| S | | | |

N: Master

SYSTEM PHARMACOLOGY : NEUROPHARMACOLOGY

Susanna Cotecchia, Stephan Kellenberger

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|---|-----|---------|----|
| C | Obl | english | 20 |
| S | | | |
| S | Obl | english | 2 |
| S | | | |

N: Master

P: Bachelor in Biology

O: Introduction to Neuropharmacology

C: - Pharmacology of the central and peripheral nervous system
 - Pharmacology of ion channels: Introduction, principles; pain pharmacology; targeting GABAA receptors; antiepileptic drugs; local anesthetic drugs.
 - Pharmacogenetics in Psychiatry

B: - Principles of Pharmacology, by D.E. Golan et al., 3rd edition, Lippincott-Williams & Wilkins, 2011
 - Pharmacology, by Rang, Dale et al., 7th edition, Elsevier Churchill Livingstone, 2012

SYSTEM PHARMACOLOGY : CARDIOVASCULAR PHARMACOLOGY

Susanna Cotecchia, Stephan Kellenberger

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|---|-----|---------|---|
| C | Obl | english | 6 |
| S | | | |
| S | Obl | english | 2 |
| S | | | |

N: Master

P: B. Sc.

O: Introduction to pharmacology of the cardiovascular system

C: - G Protein-coupled receptors
 - Pharmacology of blood hemostasis and thrombosis
 - Hyperlipidemia and lipid-lowering agents
 - Pharmacology of heart failure

B: - Principles of Pharmacology, by D.E. Golan et al., 3rd edition, Lippincott-Williams & Wilkins, 2011
 - Pharmacology, by Rang, Dale et al., 7th edition, Elsevier Churchill Livingstone, 2012

I: -

SYSTEM PHARMACOLOGY : ENDOCRINE PHARMACOLOGY

Edith Hummler Beermann

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|---|-----|---------|---|
| C | Obl | english | 8 |
| S | | | |
| S | Obl | english | 2 |
| S | | | |

N: Master

SOME TOXIC PLANT AND POISONOUS MUSHROOMS IN BIOMEDICAL RESEARCH

Christian Giroud

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|---|-----|---------|----|
| C | Opt | english | 12 |
| S | | | |

N: Master

PRINCIPLES OF CHEMOTHERAPY : CANCER

Vladimir Katanaev

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|---|-----|---------|---|
| C | Obl | english | 6 |
| S | | | |
| S | Obl | english | 2 |
| S | | | |

N: Master

PRINCIPLES OF CHEMOTHERAPY : INFECTIOUS DISEASES

Olivier Staub

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|---|-----|---------|---|
| C | Obl | english | 6 |
| S | | | |
| S | Obl | english | 2 |
| S | | | |

N: Master

FUNDAMENTAL PRINCIPLES : PHARMACOKINETICS / PHARMACOGENOMICS

Dmitri Firsov

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|---|-----|---------|----|
| C | Obl | english | 10 |
| S | | | |
| S | Obl | english | 2 |
| S | | | |

N: Master

P: good knowledge of physiology, human anatomy and genetics

O: to provide a description of factors that influence drug action in human population

C: Pharmacokinetics: principal models and parameters
 Drug Absorbtion, Distribution, Metabolism and Excretion (ADME)
 Chronopharmacology: effect of circadian time on drug action
 Pharmacogenetics: candidate genes for variable drug response

REGULATIONS AND REGULATORY AGENCIES

Laurent Schild

| | | | |
|---|-----|---------|---|
| C | Obl | english | 2 |
| S | | | |

N: Master

SEMINARS ON DRUG DISCOVERY & DEVELOPMENT

Marie-Christine Broillet, Olivier Staub

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|---|-----|---------|----|
| S | Obl | english | 12 |
| S | | | |

N: Master

TOXICOLOGY

Marie-Christine Broillet

| | | | |
|---|-----|---------|---|
| C | Obl | english | 8 |
| S | | | |

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|---|-----|---------|---|
| S | Obl | english | 2 |
| S | | | |

N: Master

TOXICOLOGY : E-LEARNING

Marie-Christine Broillet

| | | | |
|----|-----|---------|---|
| TP | Obl | english | 4 |
| S | | | |

N: Master

PHARMACOLOGICAL TREATMENT OF METABOLIC DISORDERS

Frédéric Gachon

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|---|-----|---------|---|
| C | Obl | english | 2 |
| S | | | |

N: Master

VISIT OF AN INDUSTRIAL PHARMACEUTICAL RESEARCH CENTER

Marie-Christine Broillet, Olivier Staub

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|-----|-----|---------|---|
| EXC | Obl | english | 5 |
| S | | | |

N: Master

TRAVAIL DE RECHERCHE PERSONNEL - SEMESTRE 8

| | | | |
|----|---------|--------|-----|
| TP | Obl/Opt | french | 520 |
| S | | | |

N: Master

