HISTOLOGY (MBM1)
2 ECTS

Dates: from September 13 to October 10, 2018

Contact: Dre Marie-Luce BOCHATON-PIALLAT Dpt of Pathology and Immunology

Prof. M. Foti Dpt of Cellular Physiology and Metabolism; Dre P. Soulié Dpt of Cellular Physiology and Metabolism; Dre J. Perrin-Simonnot Dpt of Cellular Physiology and Metabolism; Dre. S. Clément Dpt of Clinical Pathology; Dr J-C Tille Dpt of Clinical Pathology.

NB: this module is not opened to MD-PhD students. PhD students are required to attend all sessions.
Number of students : 12 max

- INTRODUCTION (1 session): September 13, 2018 from 10:00 to 12:00
- HISTOLOGY (2 sessions): September 17 and 19, 2018 from 13:00 to 17:00
  Study of primary tissues (epithelium, connective tissue, muscles, vessels, nervous tissue, lymphoid tissue) and some representive organs.
- HISTOPATHOLOGY (2 sessions):September 24 and October 1, 2018 from 9:00 to 13:00
  Study of the main concepts of general pathology (cell death: necrosis and apoptosis, inflammation, tissue repair, tumor) and some representive organs with typical pathological alterations.
- HISTOLOGY AND RESEARCH (2 sessions): September 25, 2018 from 13:00 to 17:00 and October 3, 2018 from 9:00 and to 13:00
  Study of different microscopic approaches (optical, immuno-fluorescence, confocal and electron microscopy) and their applications in research (autoradiography, in situ hybridization, immunohisto/cytochemistry, live imaging).
- ORAL EXAM (2 parts): description of slides at the microscope & discussion on research application, from October 8 to 10, 2018 depending on the number of students.

The ELN & Data Management module for the new PhD students (MBM2)
1.5 ECTS

Dates: 2nd and 3rd week of October (Oct 8-12 and 15-19) over a course of 4 days. The tentative framework for the module is as follows:

Day 1 and/or 2

- Lectures and introductory sessions highlighting the importance of data management, scientific integrity, etc.
- Overview on different available ELN and data management interfaces, focusing on RSpace and SLIMS.

Day 2/3 and 4

- 2-3 hours/day hands-on sessions with the students utilising RSpace interface (option to utilise SLIMS will be considered as well according to feasibility)

Module in metabolism 2018 (MBM3)
2 ECTS

Tuesday 02.10 – 2-5pm	Mirko Trajkovski + lab
Thursday 04.10 – 2-5pm	Mirko Trajkovski + lab
Thursday 11.10 – 9-10am	Valerie Schwitzgebel Luscher
Thursday 11.10 – 10-11.30am	Overview on the metabolic facilities
Tuesday 16.10 – 9-12am	Pierre Maechler and Thierry Brun
Friday 19.10 – 2-4pm	Michelangelo Foti
Tuesday 23.10 – 3-5pm	Roberto Coppari
Wednesday 31.10 – 1-5pm	Discussion/Exam with Mirko Trajkovski and Pierre Maechler

Organizers: Mirko Trajkovski and Pierre Maechler

The module will have six sessions and will include lectures given by the PIs; practical (hands on) work by the students; overview on the most important literature in this area; and overview on the clinical aspects in diagnosis and treatment of several metabolic diseases. The main goal is to familiarise the students with the basic principles governing the regulation of the energy homeostasis and metabolism in health and disease, and will be accomplished by addressing the following specific subjects:

- Human and mouse anatomy in context of metabolism; emphasis on the main metabolic organs;
- Importance of gut microbiota in regulation of energy homeostasis;
- Fat metabolism – different shades of fat, characteristics and importance;
- Function of the pancreas with emphasis on the insulin secretion;
- Importance of liver and muscle in the overall glucose homeostasis;
- Importance of the brain in regulating the energy homeostasis;
- Clinical overview on the metabolic diseases

Scientific writing in the context of cancer biology (MBM4)
1.5 ECTS

Dates: 1.11, 8.11, 16.11, 22.11, 27.11 (Exam), 4.12 (feedback session) from 2-6pm.

Organizers: Patrick Meraldi and Intidhar Labidi-Galy

The course will be limited to 8 students.

In the first half of the course the students will study the structure and different styles of cancer biology papers; from fundamental research to clinical trials

In the second half we will perform scientific writing exercises based on cancer biology papers.

Communicating your science: how to make the message stick! (MBM5)
1.5 ECTS

Dates: November 7th and 15th, 9.00 am to 5.30 pm (1 hour lunch break).

Participation is limited to 8 people

Goals of the course:

- Communicate persuasively your work in an oral presentation.
- Create slides that respect fundamental design and principles and present data appropriately.
- Experiment strategies to continue improving your presentation skills.
- Write a title and a concise abstract that tells your scientific story.
- The participants will bring a 5 minute presentation of their research project to the first day of the course.

IMMUNITY (MBM6)
1.5 ECTS

Monday November 19, 2018 at 2 - 5.30 pm

- Paul WALKER : Introduction to the Immune system – from early innate immune responses to long term immunological memory provided by adaptive immunity.

Thursday November 22, 2018 at 2 - 5.30 pm

- Jörg SEEBACH : NK cell biology, transplantation immunology, immune deficiency, inflammation, immunosuppression/biologicals

Thursday November 29, 2018 at 2 – 5.30 pm

- Stéphanie HUGUES : Antigen presentation, autoimmune diseases, peripheral tolerance.

Thursday December 6, 2018 at 1.30 – 5.00 pm

- Carole BOURQUIN : Cancer and the Immune System; Immunotherapies including therapeutic antibodies

Wednesday December 12, 2018 at 2 - 5.30 pm

- Examination

The course will take place with a minimum of 6 and a maximum of 18 participants. Exact times are subject to confirmation. The aim of the course will be to present selected areas of basic and applied immunology over 4 themed sessions. The interdependence of innate and adaptive immune interactions will be stressed, and a selection of protective and pathologic immune processes will be discussed. Students are expected to attend all sessions and to actively participate. Assessment will be made both during the courses (some reading will be required beforehand) and in a final exam.

PROJECT DEVELOPMENT in GENE EXPRESSION REGULATION (MBM7)
1,5 ECTS

LIFE SCIENCES PhD SCHOOL GENEVA

- The introductory meeting will be held on Thursday 13 December 2018 from 14h30 to 16h.
- The sessions will take place on Thursdays 17 january from 13h30-17h, 24, 31 January and 7 February 2019 from 14h30 to 18h.
- Monitors: Prof. Martine Collart (Department of Microbiology and Molecular Medicine, Prof. Emmanouil Dermitzakis & Prof. Rabih Murr (Department of Genetic Medicine and Development).
- ATTENDANCE AT ALL SESSIONS IS MANDATORY
- The course will only take place with a minimum of 5 participants and a maximum of 15
- The module comprises four 3,5 hour sessions, including a break. The "philosophy" of the course will be briefly presented at an introductory meeting.
- Before each session: A research problem related to gene expression regulation is proposed to the students, at least one week before each session. The problem is divided into several objectives and each group of students will be assigned to address one objective. To help the students in this process, a few articles will be suggested for reading.
- During the session: Each group will be given 20 minutes to present their part of the proposal (in English), which should include: 1) a clear mention of the steps needed to reach the objective, 2) the experimental approach(es) used and the reasons behind choosing these approaches, and 3) expected results. The presentations will be interactively discussed in a critical and detailed manner.
- This module aims at helping the students in developing the ability to design and interpret research projects adressing important questions in the field of gene expression regulation. The process will provide the students with a general knowledge of the mechanisms underlying the extraordinary diversity in gene expression. However, the module is not meant to be exhaustive but rather focuses on a few key questions in the field.

BACTERIOLOGY from classical bacterial genetics to modern medicine (MBM8)
1.5 ECTS

- The course will be held on Monday 28 January 2019, 04 February 2019, 11 February 2019, 18 February 2019, from 14h to 16h. Room A09.2525
- 25 February 2019, from 14h to 17h / EXAM / Room E07.3347 .
- Profs. Patrick LINDER & Patrick Viollier, Dept of Microbiology & Molecular Medicine
- Teachers are : Patrick VIOLLIER(PV), Thilo KOEHLER(TK), William KELLEY(WK), Patrick LINDER(PL), Adriana Renzoni (AR), Martina Valentini (MV) and proposed subjects are (subjects may change, according to speakers we will be able to attract for the seminars) :

Content of the course:

- CRISPR/Cas in biotecnology(AR)
- Secretion (WK, PL)
- Cell division cycle (PV)
- Quorum sensing/ antibiotic reisistance (TK)
- Discussion of a recent paper and a review on the topic
- The 4 courses may be combined with a Monday seminar from 11:30-12:30 that should be attended

Medical Genetic (MBM9)
1.5 ECTS

From 14pm to 4pm room E09.2753.A

Prof. E. Zdobnov (Département de Médecine Génétique et Développement)

- Monday 4 march 2019: Introduction **by Prof. E. Zdobnov**
- Thursday 7 march 2019 : Genetic Variation **by Prof. E. Dermitzakis**
- Monday11 march 2019 : Mendelian Disorders **by Prof. S.E. Antonarakis**
- Thursday 14 march 2019 : Cytogenetics **by Dre F. Bena**
- Monday 18 march 2019 : Technology **by Dre E. Kriventseva**
- Wednesday 20 march 2019 : Comparative Genomics **by Prof. E. Zdobnov**
- Friday 22 march 2019 : Complex Disorders /Traits **by Prof. E. Dermitzakis**
- Monday 25 march 2019 : Epigenetics by **Prof. R. Murr**
- Thursday 28 march 2019 : Exam by **Prof. E. Zdobnov**

CELL INTERACTION (MBM10)
1.5 ECTS

Dates: Friday, March 29th, Wednesday, April 3rd, Friday, April 5th, Wednesday, April 10th, Friday, April 12th, Wednesday, April 17th from 14pm to 16pm CMU/Room 5000

ORAL EXAM : 30th of April 2019

- « *Adhesion, Integrins and Signaling* », Dr. B. Wehrle-Haller
- « *Tight Junctions : a Dynamic Fence* », Dr. S. Garrido-Urbani
- « *Epithelium-Substrate Adhesion* », Dr. Lionel Fontao
- « *Direct Communication : Gap Junctions* », Prof. Filippo Molica
- « *From Cells to Tissues* », Dr. P. Soulie
- « *Bacterial Interactions* », Prof. W. Kelley

The course aims to introduce students to the biology of cell interaction, from pathogen-host to cell-cell communication, and from molecular and genetic factors to tissue function and disease. The course involves attending 6 sessions held in a three –week period, guided by experts in their respective fields.

Each session lasts no more than 2 hours and is focused on discussing current knowledge and techniques used in studying cell interactions, using as reference pre-assigned research articles relevant to the chosen topics (see below). It is essential for students to read the material before class and to actively engage in the discussions. Student evaluation is achieved through a 30 minutes oral examination and the format will be explained during the first session.

Statistics course (MBM11)
1,5 ECTS

Sessions (classroom B00.0612, from 2:15 to 5:15 pm, weekday: Thursday except 1st session Wednesday):

- Descriptive statistics and introduction to GraphPad (13.03.2019)
- Statistical inference and confidence intervals (21.03.2019)
- Basic principles of statistical hypothesis testing (04.04.2019)
- Common statistical tests (11.04.2019)
- Statistical power and sample size (02.05.2019)
- Correlation and regression models (09.05.2019)
- Reporting statistical analyses / **Exam** (16.05.2019)

PD Christophe COMBESCURE, Service d'épidémiologie clinique, Direction médicale et qualité, HUG

Prof. Thomas V. PERNEGER, Service d'épidémiologie clinique, Direction médicale et qualité, HUG

Contact : Christophe COMBESCURE

The number of course participants is limited to 14.

The aim of this course is to provide to the students a general knowledge of statistical inference, methods to describe data, to test hypotheses and to characterize associations between two variables. In addition to the theory, students will put into practice statistical methods with a statistical software and will conduct a critical appraisal of the statistical methodology in a selection of published articles.

Bioimaging Course 2019: Light microscopy course and advanced fluorescence imaging techniques for life sciences (MBM12) 1.5 ECTs

Dates: 13h to 17h Friday 5 april, Friday 12 april, Thursday 18 april and Friday 26 april, 4 courses of 4 hours each.

F. Prodon, O. Brun, N. Liaudet, S. Startchik. Maximum students 9, minimum 4.

This course will provide underlying principles and advanced concepts in light microscopy. The focus will be on state-of-the-art techniques in light microscopy based on fluorescence approaches. An essential part will be spent on the demonstration/explanation how challenging questions in the field of Life Sciences and Biology can be addressed by using light microscopy. It will include advanced concepts as multi-dimensional imaging (x, y, z, t and more ?), F-techniques (Fluorescence Recovery After Photobleaching/FRAP, Fluorescence Resonance Energy Transfer/ FRET) and super resolution techniques (such as structured illumination, STED and localization techniques). The aim is to understand the basics in fluorescence microscopy by a practical work with the help of the equipment available at the Bioimaging Core Facility, Faculty of Medicine. Emphasis will be placed on the methods to be used to evaluate and improve the quality of the images produced.

The course is open to PhD students (9 maximum). This course will take place in four sessions of four hours each. Each session will occur once a week (total duration of this course: 4 weeks). Hand-on sessions will be organized in order to recess the theoretically taught content.

- Basic optical principles
- Light microscopy, fluorescence microscopy
- confocal microscopy
- Fluorescence Resonance Energy Transfer (FRET)
- Photobleaching, photoactivation techniques, Fluorescence Recovery after Photobleaching (FRAP)
- Total Internal Reflection Fluorescence microscopy (TIRF)
- Structured Illumination microscopy (SIM)
- Localization techniques (PALM, STORM)
- Stimulated Emission depletion (STED) microscopy
- Data analysis: basic in image treatment
- Image manipulation and digital image ethics

VIROLOGY (MBM13)
1.5 ECTS

The course will be held on:

- Monday May 6 2019 : Introduction virology–introduction viral cycle.
- Monday May 13 2019: Viral cycle (presentation 3 publications) – Introduction quasi-species
- Monday May 20 2019: Quasi-species (presentation 3 publications)– Introduction innate immunity
- Monday May 27 2019 : Innate immunity (presentation 3 publications)
- Monday JUNE 3 2019 :EXAM
- Location : will be specified later

Pr. D. Garcin, Dépt de Microbiologie et Médecine Moléculaire

- Virus cycle (entry, replication, budding…)
- RNA viruses : genetic variability, quasi-species, adaptation and evolution..
- Anti-viral innate immunity, detection, interferon system and viral counter measures.
- An introductory course in each topic, articles to read and present, discussions, critical analysis (sort of «battle» over the article ☺).
- 4 sessions of 3 to 4 hours plus one session for the exam.

Developmental Biology (MBM14)
1.5 ECTS

Every Wednesday of _May (29.05.19) & June (05/12/19.06.2019); room E09.2753.a, from 2pm to 5pm. (4 sessions) EXAM DATE TO BE CONFIRMED

Prof. P. Herrera, Dr. F. Thorel (dépt. de médecine génétique & développement CMU).

M.O. Fazio, Service de Transgénèse (cours pratique sur la production de souris transgéniques).

- The course will only take place with a minimum of 4 and a maximum of 12 students.
- Attendance at all sessions is mandatory
- Transgenics and mouse molecular genetics
- Sex determination
- Regenerative medicine : ES and IPS cells; cell reprogramming
- Pancreas development and regeneration