

The Master program has a normal duration of 3 semesters and comprises 90 ECTS :

Module 1 : 15 ECTS : Compulsory Courses

Module 2 : 15 ECTS : Practical Project

Module 3 : 15 ECTS : Compulsory and Optional Courses

Module 4 : 45 ECTS : Personal Research Project

Training objectives are available in its programme regulations.

Specific training objectives are described at the top of each track in the module 3.

Autumn Semester (semester 1)

	Courses / Enseignements	Hours per semester				Teaching Staff	ECTS Credits
		C	E	S	PW		
MODULE 1	Common courses 1 / Cours communs 1						
	Cellular Biology <i>Biologie cellulaire</i>	10	-	2	-	Staub O.	
	Immunology <i>Immunologie</i>	10	-	2	-	Luther S.	
	Intracellular Signalling <i>Signalisation intracellulaire</i>	8	-	2	-	Diviani D.	
	Medical Microbiology <i>Microbiologie médicale</i>	10	-	2	-	Opota O.	
	Mouse Models Genetics <i>Modèles génétiques murins</i>	4	-	2	-	Hummler E.	
	MB Poster Day					Luther S.	
	Common courses 2 / Cours communs 2						
	Cancer <i>Cancer</i>	10	-	3	-	Rufer N.	
	Cardiovascular Diseases <i>Maladies cardiovasculaires</i>	10	-	3	-	Diviani D.	
	Metabolic Diseases <i>Maladies métaboliques</i>	10	-	3	-	Knobloch M.	
	Neuroscience and Brain Diseases <i>Neurosciences et maladies du cerveau</i>	10	-	3	-	Murray M.	
	Pharmacology <i>Pharmacologie</i>	10	-	3	-	Broillet M.-C.	
	Common courses 1 and 2 / Cours communs 1 et 2						
	Scientific Method and Communication <i>Méthode et communication scientifiques</i>	6	-	-	-	Broillet M.-C.	
	Biostatistics <i>Biostatistiques</i>	4	8	-	-	Schütz F.	
	Total		102	8	25	0	
MODULE 2	Practical Project / Travail pratique						
	First Step Research Project <i>Travail d'initiation à la recherche</i>	-	-	-	280	Luther S., Broillet M.-C.	15

Abbreviations

C = Course

E/S = Exercise/Seminar

PW = Practical Work

The pandemic has shown us that circumstances beyond our control may require us to make the following adjustments / adaptations to study plans during the semester:

- possibility to switch from one mode of teaching to another (face-to-face <-> distance, synchronous <-> asynchronous, switch to co-modal teaching where it was not initially planned).
- change / modification of evaluation modalities, without inducing derogations from the Study Regulations (oral <-> written, exam <-> validation, individual work <-> group work, practical work <-> theoretical work, face-to-face evaluation <-> online evaluation, etc.)
- alternative or time-shifted modalities for teachings, internships, practical work, fieldworks and camps that could not take place or teachings that could no longer take place in the form initially planned.

Students are invited to consult this document regularly (Study Plan & Evaluation Procedure)

Spring Semester (semester 2)

One track among the below proposals / Une filière au choix parmi les propositions ci-dessous :

Immunity and Cancer <i>Immunité et Cancer</i>						Responsible: Esser-von Bieren J.		
	Courses / Enseignements	Hours per semester				Teaching Staff	ECTS Credits	
		C	E	S	PW			
MODULE 3	Introduction to Clinical Medicine <i>Introduction à la médecine clinique</i>	20	-	-	-	Wuerzner G., Gonzalez Rodriguez E.	15	
	Immunology II. Advanced Concepts in Immunology : from Antigen Recognition and Signalling to Leukocyte Responses <i>Immunologie II. Concepts avancés en immunologie : de la présentation et reconnaissance d'antigène à la signalisation et aux réponses des leucocytes</i>	23	-	3	-	Esser-von Bieren J., Luther S., Held W., Rebsman M., Thome M., Ho P.-C.		
	Immunology III. Immunity and Disease : Microbiome, Infections and Autoimmunity <i>Immunologie III. Immunité et maladie : Microbiome, Infections et Autoimmunité</i>	22	-	3	-	Esser-von Bieren J., Broz P., Velin D., Perreau M., Roger T., Pot C., Verdeil G., Ubags N.		
	Cancer II. Advanced Concepts in Cancer Biology : from Genetics and Epigenetics to Metabolism <i>Cancer II. Concepts avancés en biologie du cancer : De la génétique et épigénétique au métabolisme</i>	8	-	1	-	Petrova T., Missiaglia E., Hanahan D., Ciriello G.		
	Cancer III. Advanced Concepts in Cancer Biology : from Angiogenesis to Tumor Invasion and Metastasis <i>Cancer III. Concepts avancés en biologie du cancer : de l'angiogenèse à l'invasion tumorale et aux métastases</i>	12	-	2	-	Petrova T., Joyce J., Gfeller D.		
	Treatments. Treatments and Prevention of Disease : Drug Development, Vaccines, Anti-Tumor Immunity, Immunotherapy, Leukemia, Transplantation, Allergy <i>Traitements. Traitements et prévention de maladies : Développement de médicaments, vaccins, immunité contre tumeurs, immunothérapie, leucémie, transplantation, allergie</i>	17	-	1	-	Petrova T., Harari A. Kandalaf L., Herrera F., Arber C., Perez L., Golshayan D., Comte D.		
	Molecular and Cellular Techniques. Applications to the Study of Lymphocytes and Tumor Cells. Techniques moléculaires et cellulaires. Applications à l'étude des lymphocytes et cellules tumorales. - Lectures on protein analysis (proteomics) - Cours ex-cathédra sur l'analyse des protéines (protéomique) - PW Molecular and cellular techniques : proteomics, antigen discovery, 3D-modeling, immunological assays based on peptides - TP Techniques moléculaires et cellulaires: protéomique, découverte d'antigènes, modélisation en 3D, tests immunologiques basés sur peptides	14	-	-	35	Quadroni M., Bassani M., Zoete V., Baumgartner P., Verdeil G., Derré L.		
	PW Ex Vivo and In Situ Techniques TP techniques ex vivo et in situ - Histological Analysis of Lymph Nodes or Cancer Tissues - Analyse histologique des ganglions et tissus cancéreux - Multicolor Flow Cytometric Analysis of Lymphoid Organs - Cytométrie de flux en multiples couleurs pour analyser des tissus lymphoïdes - Discussion and Feedback Session <i>Discussion et session 'feedback'</i>	8	-	4	28	Bénéchet A., Mayol J.-F., Arber C., Bernier-Latmani J.		
	E-Learning Exercises. Article- and Case-based Learning in Proteomics / Immunology / Cancer <i>Exercices de type 'e-learning'. Apprentissage par article ou problème en protéomiques / immunologie / cancer</i>	1	2	-	-	Luther S., Esser-von Bieren J., Naveiras O., Costanza M., Perreau M., Perez L.		
	Write and Defend Grant Proposal, prepare Journal Club <i>Rédaction et défense d'une demande de subside, préparation d'un journal Club</i>	-	2	-	-	Petrova T.		
	Bioinformatics: lecture and PW <i>Bioinformatique: cours et TP</i>	2	-	-	4	Gfeller D.		
	Biostatistics <i>Biostatistiques</i>	2	-	-	13	Schütz F.		
	Elective course 1 / Enseignement à choix							
	Training in Animal Experimentation (RESAL Module 1) * <i>Expérimentation animale (RESAL module 1)</i>	-	20	-	20	Broillet M.-C., Cadilhac C.		
	Clinical Research Module <i>Module de recherche clinique</i>	-	20	-	-	Wuerzner G.		
Elective course 2 / Enseignement à choix								
Regenerative Medicine <i>Médecine régénérative</i>	20	-	-	-	Habib S.			
Data Sciences <i>Sciences des données</i>	20	-	-	-	Luther S.			
	158	4	14	80		256		

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Metabolism and Human Health
Responsible: Opota O.
Métabolisme et santé humaine

At the end of the course the students will be able to:

- Mobilise knowledge from a physiological point of view on metabolism, endocrinology, nutrition and health.
- Acquire a current vision of the issues of medical microbiology, host-microbe interactions in health and metabolic diseases, microbiota and health.
- Critically analyse and present case studies on metabolic diseases and the influence of the microbiome on human health.
- Interact with scientists and professionals from different backgrounds to learn and practice the various steps involved in the research, diagnostics and treatments of metabolic diseases.

Courses / Enseignements	Hours per semester				Teaching Staff	ECTS Credits	
	C	E	S	PW			
Introduction to Clinical Medicine <i>Introduction à la médecine clinique</i>	20	-	-	-	Wuerzner G., Gonzalez Rodriguez E.	15	
Human Nutrition and Metabolism <i>Nutrition humaine et métabolisme</i>	8	2	-	-	Mansuy-Aubert V., Puder J., Vonaesch P.		
Metabolic Syndrome and its Consequences (Diabetes, Obesity, Cancer, Cardiac Diseases) <i>Syndrôme métabolique et ses conséquences (diabète, obésité, cancer, maladies cardiaques)</i>	10	-	-	-	Rosenblatt N., Puder J.		
Peripheral/Brain Communication <i>Interaction périphérie-système nerveux</i>	10	6	-	-	Mansuy-Aubert V., Boutrel B., Pot C., Langlet F.		
Developmental and Genetic Origin of Health and Diseases <i>Origine développementale et génétique de la santé et des maladies</i>	8	-	-	-	Crozier S., Fischer-Fumeaux C., Vonaesch P., Zyzdorczyk C., Messina		
Cellular Metabolism, Stem Cells <i>Métabolisme cellulaire, cellules souches</i>	8	-	-	-	Paolicelli R., Knobloch M., Jourdain A.		
Case Study on Metabolic Diseases <i>Etude de cas sur les maladies métaboliques</i>	-	10	-	-	Messina A., Papadakis G., Chartoumpekis D.		
Exercise and Metabolism <i>Exercice et métabolisme</i>	6	-	2	-	Amati F.		
Sport, Metabolism, Health and Performance <i>Sport, métabolisme, santé et performance</i>	6	-	-	-	Place N., Zanou N.		
Energy Metabolism and Bone Physiology <i>Métabolisme énergétique et physiologie de l'os</i>	10	-	-	-	Geurts J., Habib S., Naveiras O.		
Human-Microbes Interactions <i>Interactions entre l'homme et les microbes</i>	10	-	2	-	Opota O., Bertelli Lombardo C., Jacot D., Niculita-Hirzel H., Mazza-Stalder J.		
Human Microbiota in Metabolic Health and Diseases <i>Microbiote humain dans la santé métabolique et les maladies</i>	12	-	2	-	Bertelli Lombardo C., Ubags N., Guery B., Stojanov M., Vonaesch P.		
Preventive and Therapeutic Interventions on Microbiota <i>Interventions préventives et thérapeutiques sur le microbiote</i>	8	-	-	-	Galperine T., Vonaesch P., Favre L., Homicsko K.		
Case Study on the Microbiome and Human Health <i>Etude de cas sur le microbiome et la santé humaine</i>	-	10	-	-	Opota O.		
Laboratory Approaches for Metabolic Diseases <i>Approches de laboratoire pour les maladies métaboliques</i>	14	-	-	4	Braissant O., Binz P.-A., Choong E., Gallart-Ayala H., Ivanisevic J., Gentleman E., Murisier A.		
Laboratory Approaches in Medical Microbiology <i>Approches en microbiologie médicale</i>	8	-	-	4	Opota O., Bertelli Lombardo C., Jacot D., Niculita-Hirzel H.		
Monitoring Physiological Functions <i>Méthodes analytiques des fonctions physiologiques</i>	-	-	-	8	Puder J., Amati F., Mansuy-Aubert V.		
Fundamental Principles : Pharmacokinetics / Pharmacogenomics <i>Principes fondamentaux de pharmacocinétique et pharmacogénomique</i>	10	-	2	-	Firsov D.		
Principles of Chemotherapy : Infectious Diseases <i>Principes de la chimiothérapie : les maladies infectieuses</i>	6	-	2	-	Staub O.		
Career Development Visit (Company, Organisation, Laboratory)	-	-	-	8	Opota O.		
Recent Advances in Metabolic Health/Career Development	-	-	6	-	Opota O.		
Write and Defend Grant Proposal, prepare Journal Club <i>Rédaction et défense d'une demande de subside, préparation d'un journal Club</i>	-	2	-	-	Opota O.		
Biostatistics <i>Biostatistiques</i>	2	-	-	13	Schütz F.		
Elective course 1 / Enseignement à choix							
Training in Animal Experimentation (RESAL Module 1) * <i>Expérimentation animale (RESAL module 1)</i>	-	20	-	20	Broillet M.-C., Cadilhac C.		
Clinical Research Module <i>Module de recherche clinique</i>	-	20	-	-	Wuerzner G.		
Elective course 2 / Enseignement à choix							
Regenerative Medicine <i>Médecine régénérative</i>	20	-	-	-	Habib S.		
Data Sciences <i>Sciences des données</i>	20	-	-	-	Luther S.		
	174	30	16	57			277

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Neuroscience
Neurosciences

Responsibles: Murray M. and Knobloch M.

At the end of the course the students will be able to:

- Mobilise theoretical knowledge about the physiological, pathological and medical aspects of selected domains of neuroscience such as nervous system development, sensory functions, neuron-glia interactions, synaptic functions, neuronal death and tissue repair, psychiatric neuroscience, as well as techniques used to study neurosciences and how they have changed over the history of neuroscience.
- Use advanced research techniques to study the physiological function of the nervous system or neuropsychiatric diseases in animal models or in humans.
- Systematically analyse fundamental and clinical problems and experimental approaches in neuroscience.

MODULE 3

Courses / Enseignements	Hours per semester				Teaching Staff	ECTS Credits	
	C	E	S	PW			
Introduction to Clinical Medicine <i>Introduction à la médecine clinique</i>	20	-	-	-	Wuerzner G., Gonzalez Rodriguez E.	15	
History of Neuroscience Research and Techniques to Study Neuroscience <i>Histoire de la recherche en neurosciences et techniques d'étude des neurosciences</i>	14	-	-	8	Knobloch M., Tzanouliou S., vacat, vacat, vacat		
Brain Development <i>Développement du cerveau</i>	16	-	2	4	Bagni C., vacat, Achsel T., Puyal J., Restivo L.		
Sensory Functions <i>Fonctions sensorielles</i>	24	-	2	-	Murray M., Broillet M.-C., Chu Sin Chung P., Mamei M., Neukomm L., Collignon O., Pascucci D., Crottaz-Herbette S.		
Neuron-glia Biology <i>Biologie neurones-glie</i>	18	-	2	-	Bezzi P., Nikolettou V., Finsterwald C., Lengacher S., Paolicelli R., vacat, Richetin K.,		
Modulation of Synaptic Transmission <i>Modulation de la transmission synaptique</i>	16	-	2	-	Nikolettou V., Fasshauer D., Lüthi A., Stoop R., Croizier S.		
Neuronal Death and Repair in the Central Nervous System <i>Mort neuronale et réparation dans le système nerveux central</i>	16	-	2	-	Toni N., Brunet J.-F., Courtine G., Déglon N., Hirt L., Puyal J., Truttmann A., vacat		
Introduction to Psychiatric Neuroscience <i>Introduction aux neurosciences psychiatriques</i>	20	-	2	-	Cardinaux J.-R., Dwir D., Klauser P., Kolly S., Magara F., Preissmann D., Steullet P., Marquet P.		
Write and Defend Grant Proposal, prepare Journal Club <i>Rédaction et défense d'une demande de subside, préparation d'un journal Club</i>	-	18	-	-	Murray M., Bagni C., Cardinaux J.-R.		
Industry Day (excursion/presentations) <i>Journée de l'industrie (excursion/présentations)</i>	-	-	-	6	Murray M., Knobloch M.		
Biostatistics <i>Biostatistiques</i>	2	-	-	13	Schütz F.		
Elective course 1 / Enseignement à choix							
Training in Animal Experimentation (RESAL Module 1) * <i>Expérimentation animale (RESAL module 1)</i>	-	20	-	20	Broillet M.-C., Cadilhac C.		
Clinical Research Module <i>Module de recherche clinique</i>	-	20	-	-	Wuerzner G.		
Elective course 2 / Enseignement à choix							
Regenerative Medicine <i>Médecine régénérative</i>	20	-	-	-	Habib S.		
Data Sciences <i>Sciences des données</i>	20	-	-	-	Luther S.		
	166	24	12	51		253	

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Pharmacology and Toxicology
Responsible: Broillet M.-C.
Pharmacologie et toxicologie

At the end of the course the students will be able to:

- Mobilise knowledge from a physiological point of view on the functioning of five major classes of drugs (anti-infection, anti-cancer, neurological, cardiovascular and hormonal)
- Acquire a current vision of the issues of pharmacogenetics, personalised medicine and pharmacovigilance.
- Critically analyse and present the practical steps of drug development, pharmaceutical industry and the drug-market policy.
- Interact with scientists and professionals from different backgrounds to learn and practice the various steps involved in the identification of a toxic substance, from the discovery of its mechanism of action to the press release and risk management.

MODULE 3

Courses / Enseignements	Hours per semester				Teaching Staff	ECTS Credits	
	C	E	S	PW			
Introduction to Clinical Medicine <i>Introduction à la médecine clinique</i>	20	-	-	-	Wuerzner G., Gonzalez Rodriguez E.	15	
Case Study in Toxicology <i>Etude de cas en toxicologie</i>	-	12	-	-	Broillet M.-C.		
Development of Drugs : Practical Aspects <i>Développement de médicaments : aspects pratiques</i>	4	-	-	-	Dumont J.-M.		
Development of Therapeutics <i>Développement d'agents thérapeutiques</i>	10	-	-	-	Broillet M.-C.		
Drug Design <i>Conception de médicaments</i>	4	-	-	-	Scapoza L.		
Fundamental Principles : Pharmacokinetics / Pharmacogenomics <i>Principes fondamentaux de pharmacocinétique et pharmacogénomique</i>	10	-	2	-	Firsov D.		
Optimization of Drug Treatment <i>Optimisation des traitements médicamenteux</i>	6	-	-	-	Choong E.		
Pharmaceuticals as Doping Drugs <i>Les médicaments comme produits dopants</i>	4	-	-	-	Leuenberger N.		
Principles of Chemotherapy : Infectious Diseases <i>Principes de la chimiothérapie : les maladies infectieuses</i>	6	-	2	-	Staub O.		
Principles of Chemotherapy : Cancer <i>Principes de la chimiothérapie : le cancer</i>	6	-	2	-	vacat		
Radiation Protection and Radiological Risk: Quantitative and Public Health Aspects <i>Protection contre les radiations, risque radiologique : aspects quantitatifs et de santé publique</i>	2	-	-	-	Staedler D.		
Regulation and Regulatory Agencies <i>Réglementations et les agences de réglementations</i>	2	-	-	-	Girardin F.		
Seminars on Drug Discovery & Development <i>Séminaires sur la découverte et le développement de médicaments</i>	-	-	12	-	Kellenberger S., Staub O.		
System Pharmacology : Cardiovascular Pharmacology <i>Pharmacologie des systèmes : pharmacologie cardiovasculaire</i>	8	-	2	-	Kellenberger S. Diviani D.		
System Pharmacology : Neuropharmacology <i>Pharmacologie des systèmes : neuropharmacologie</i>	18	-	4	-	Kellenberger S., Eap C., Paolicelli R., Steullet P.		
System Pharmacology : Endocrine Pharmacology <i>Pharmacologie des systèmes : pharmacologie endocrinienne</i>	8	-	2	-	vacat		
Toxicology <i>Toxicologie</i>	16	-	4	-	Broillet M.-C., Hopf N., Chèvre N.		
Toxicology : e-Learning <i>Toxicologie : formation en ligne</i>	-	8	-	-	Broillet M.-C.		
Visit of an Industrial Pharmaceutical Research Center <i>Visite d'un centre de recherche d'une industrie pharmaceutique</i>	-	-	-	8	Staub O., Broillet M.-C.		
Visit of a Waste or Water Recycling Plant <i>Visite d'une station d'épuration des eaux ou d'une usine de recyclage</i>	-	-	-	5	Broillet M.-C.		
Analytical Techniques in Toxicology and Ecotoxicology (optional) <i>Techniques d'analyses en toxicologie et écotoxicologie (cours à option)</i>	10	-	-	-	Staedler D.		
Synthetic Drugs : an Emerging Toxicology and Social Health Problem (optional) <i>Drogues de synthèse : un problème d'actualité en matière de toxicologie et de santé publique (cours à option)</i>	10	-	-	-	Gilardi F.		
Pharmaceutical Drugs : Pregnancy and Breastfeeding (optional) <i>Médicaments : grossesse et allaitement (cours à option)</i>	10	-	-	-	Winterfeld U.		
Write and Defend Grant Proposal, prepare Journal Club <i>Rédaction et défense d'une demande de subside, préparation d'un journal Club</i>	-	2	-	-	Broillet M.-C.		
Biostatistics <i>Biostatistiques</i>	2	-	-	13	Schütz F.		
Elective course 1 / Enseignement à choix							
Training in Animal Experimentation (RESAL Module 1) * <i>Expérimentation animale (RESAL module 1)</i>	-	20	-	20	Broillet M.-C., Cadilhac C.		
Clinical Research Module <i>Module de recherche clinique</i>	-	20	-	-	Wuerzner G.		
Elective course 2 / Enseignement à choix							
Regenerative Medicine <i>Médecine régénérative</i>	20	-	-	-	Habib S.		
Data Sciences <i>Sciences des données</i>	20	-	-	-	Luther S.		
	176	42	30	46		294	
Total per study path / Total par filière						15	

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Spring semester (semester 2) and Autumn Semester (semester 3)

MODULE 4	Personal Research Project / Projet de recherche personnel		ECTS Credits
	Master Research Project / <i>Travail de Master</i>	Thesis Director	45

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- change / modification of evaluation modalities, without inducing derogations from the Study Regulations (oral <-> written, exam <-> validation, individual work <-> group work, practical work <-> theoretical work, face-to-face evaluation <-> online evaluation, etc.)
- alternative or time-shifted modalities for teachings, internships, practical work, fieldworks and camps that could not take place or teachings that could no longer take place in the form initially planned.

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