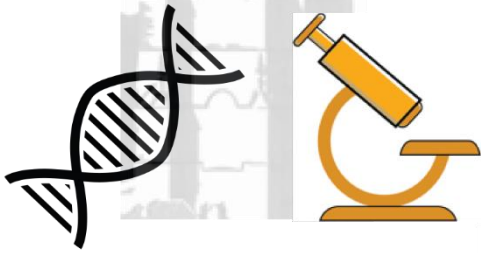
Experimental Biomedical Research



Section of Medicine
Faculty of Science and Medicine
University of Fribourg

Specialized Master of Science in Experimental Biomedical Research

SPECIALIZED MASTER OF SCIENCE IN EXPERIMENTAL BIOMEDICAL RESEARCH

TARGET STUDENTS AND OBJECTIVES

International program with students coming from all around the world

Broad topics:
Neuroscience, Tissue Degeneration and Regeneration, Infection Inflammation and Cancer

<u>Who can apply?</u>
Students with an undergraduate degree in Life Sciences or a related subject area,
who wish to deepen their knowledges and acquire practical skills and experience in the area of biomedical research.

TARGET STUDENTS AND OBJECTIVES

Objectives

Acquisition of advanced competences:

- Theoretical background: Advanced structure and function of biological systems. Mechanisms underlying normal function and dysfunction of the human body at molecular, cellular and systems levels. State of the art methods in biomedical research. Scientific thinking, formulation of scientific hypotheses, research project design, data analysis and interpretation.

- Practical experience: Practical research skills necessary for scientific investigations in the medical field. Master thesis of 18 months in a research group from the section of Medicine.

Perpectives

•Fundamental research
•Clinical research
•Biotechnology
•Pharmaceutical industry
•Medical technology
•Health care sector
•Other connected domains (economy, journalism, consulting, patent law, marketing).

GENERAL STRUCTURE

Program: 120 ECTS in total, distributed on 5 modules:

1. **Compulsory common courses (27 ECTS)**
2. **Elective courses (6 ECTS)**
3. **Compulsory courses in one of the three options (12 ECTS):**
   - **Neuroscience**
   - **Infection, Inflammation and Cancer**
   - **Tissue Degeneration and Regeneration**
4. **Master thesis related activities (15 ECTS)**
5. **Master thesis (60 ECTS)**

Duration: 4 semesters.
From 2nd Semester: Begin of practical work in the laboratory of your choice for your master thesis.
1st Semester exclusively courses.

GENERAL STRUCTURE

⇒ Description of the courses:
https://cdn.unifr.ch/scimed/plans/current/Plan_MScSp_EBR_en.pdf

Some teachings are offered
by Department of Biology
by Department of Psychology

***Compulsory** Course Units*

Code		Title of UE	Semester	tot. h.	ECTS
SME.07010	L	Basic knowledge upgrading	AS	6-9	1
SME.07100	L	Models for human diseases	AS	28	3
SME.07200	L	Infection, inflammation and cancer	AS	28	3
SME.07300	L	Central nervous system regeneration and repair	AS	28	3
SME.07400	L+P	Microscopy in life sciences	AS	28	3
SME.07501	L+P	Scientific communication	AS	28	3
SME.07502	L+P	Advanced scientific writing	SS	28	3
SME.07700	L+P	Data analysis and statistics with the R programming language	AS	28	3
SME.07701	L+P	Introduction to modern instrumentation	SS	28	3
SBL.00427	L+P	Visual communication of data	SS	8	1
SBL.10004	L	Ethics in stem cell research	SS	8	1
Total					**27**

SME.07800	Master thesis	**Lab work (3 semesters)+written thesis**	**60**

***Elective** Course Units*

Code	Title of UE	Semester	tot. h.	ECTS
SBL.00420[a#]	Career profiling in life sciences	SS	8	1
–	*English courses for Master students*	AS/SS	-	max 6
SBL.00115[#]	The RNA world	AS	12	1.5
SBL.00419[#]	Advanced imaging	SS	8	1
SBL.00451[b#]	Introduction to mass spectrometry and proteomics	AS	8	1
SBL.00452[b#]	Advanced quantitative proteomics	SS	12	1
SBL.00119[c#]	Molecular genetics of model organism development	AS	28	3
SBL.10001[c#]	Modelling human diseases in experimental genetic systems	SS	20	2
SBL.10002[c#]	From bench to bedside	SS	5	0.5
SBL.00428 [a#]	Optogenetics and photopharmacology	SS	8	1
SCH.05123	Innovation and Entrepreneurship	AS	48	4
L25.01485[a*]	Neurochemistry	SS	28	3
L25.01486[a*]	Development, learning and memory: Neuroscience perspectives	AS	30	3
L25.01655[a*]	Visual and social neuroscience	AS	28	3
L25.01658[a*]	Affective and decision making neuroscience	AS	28	3
L25.01661[a*]	Clinical neuroscience	SS	XX	3
L25.01398[*]	Multisensory Perception and Plasticity	SS	XX	3
L25.01487[*]	What is special about the human brain ?	AS	XX	3
Minimum ECTS credits required from elective Course Units				**6**

*Compulsory course Units in the **Neuroscience** option*

Code		Title of UE	Semester	tot. h.	ECTS
SME.07301	L+P	Behavioural methods in neuroscience	AS	28	3
L25.00715*	L	Neuroethics	SS	16	3
L25.01478*	L	Sleep and Cognition	AS	22	3
L25.00644*	L+P	Introduction to Matlab I	SS	14	3
Total					**12**

* Offered by the Dept. of Psychology, Faculty of Humanities
Subject to change.

*Thesis-related activities in the **Neuroscience** option* **Meetings, journal clubs, seminars**

Code	Title of UE	Semester	tot. h.	ECTS
SME.07002	Fribourg day of cognition	AS	8	0.5
SME.06001§	Neurobiology (seminar)	AS	5	0.5
SME.07001§	Neurobiology (seminar)	SS	5	0.5
SME.07306	Frontiers in neuroscience BENEFRI (workshop) NEW	block	6	0.5
SME.07307	Neuroscience journal club NEW [2 semesters x 18h]	AS/SS	36	4
SME.07609	Research group meetings in Neuroscience NEW [3 semesters x 18h]	AS/SS	54	4.5
SME.07602	Project design in Neuroscience	SS	42	4.5
Total				**15**

§ At least 2/3 of the seminar sessions must be taken in the option chosen. 1/3 of the seminars can be taken in the other options.

*Compulsory Course Units in the **Infection, Inflammation and Cancer** option*

Code	Title of UE	Semester	tot. h.	ECTS
SME.07201 L+P	Cellular immunology: theory and practice	AS	28	3
SME.07215 L	Hot topics in Cancer research, Metabolic health and Regenerative biomedicine	SS	28	3
SME.07203 L+P	Principles and methods in investigating and treating age-associated heart and vascular diseases	SS	28	3
SME.07209 L+P	Concepts and approaches in metabolic phenotyping, anti-obesity targeting and hypoxia research	SS	28	3
Total				**12**

*Thesis-related activities in the **Infection, Inflammation and Cancer** option*

Code	Title of UE	Meetings, journal clubs, seminars	Semester	tot. h.	ECTS
SME.07210§	Section of medicine research (seminar)		AS	6	0.5
SME.07211§	Section of medicine research (seminar)		SS	6	0.5
SME.07213	Joint research group meetings of Dept OMI (Oncology, Microbiology and Immunology)		AS/SS	6	0.5
SME.07212	Research Day in Medicine		SS	8	0.5
SME.07214	Cancer/inflammation research journal club [2 semesters x 18h]		AS/SS	36	4
SME.07603	Research group meetings in cancer/inflammation [3 semesters x 18h]		AS/SS	54	4.5
SME.07604	Project design in cancer/inflammation		SS	42	4.5
Total					**15**

§ At least 2/3 of the seminar sessions must be taken in the option chosen. 1/3 of the seminars can be taken in the other options.

*Compulsory Course Units in the **Tissue Degeneration and Regeneration** option*

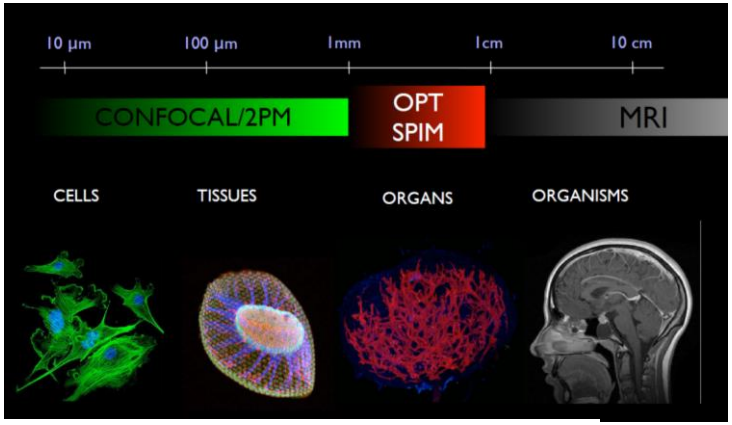
Code		Title of UE	Semester	tot. h.	ECTS
SME.07203	L+P	Principles and methods in investigating and treating age-associated heart and vascular diseases	SS	28	3
SME.07209	L+P	Concepts and approaches in metabolic phenotyping, anti-obesity targeting and hypoxia research	SS	28	3
SME.07201	L+P	Cellular immunology: theory and practice	AS	28	3
SME.07215	L	Hot topics in Cancer research, Metabolic health and Regenerative biomedicine	SS	28	3
Total					**12**

*Thesis-related activities in the **Tissue Degeneration and Regeneration** option*

Code	Title of UE	Meetings, journal clubs, seminars	Semester	tot. h.	ECTS
SME.07104§	Joint research group meetings of Dept EMC (Endocrinology, Metabolism and Cardiovascular System)		AS/SS	12	1
SME.07212	Research Day in Medicine		SS	8	0.5
SME.07102	Research symposium		AS or SS	8	0.5
SME.07105	Tissue Degeneration and Regeneration journal club [2 semesters x18h]		AS/SS	36	4
SME.07607	Research group meetings in Tissue Degeneration and Regeneration [3 semesters x 18h]		AS/SS	54	4.5
SME.07608	Project design in Tissue Degeneration and Regeneration		SS	42	4.5
Total					**15**

§ At least 2/3 of the seminar sessions must be taken in the option chosen. 1/3 of the seminars can be taken in the other options.

MASTER'S PRACTICAL WORK: VARIOUS RESEARCH FIELDS AND LABS



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Section of Medicine

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Research · Research Groups

Research Groups
Scientific Report

ABCCD - Autism, Bilingualism, Cognitive & Communicative Development →
Stephanie Durrleman
[EN]

Adaptive Immunity Laborator →
Jens Stein
[EN]

Applied Neurophysiology Research Laboratory (ANRL) →
Pascal Missonnier-Evrard
[EN]

Autophagy Lab →
Patricia Boya
[EN]

Biological Roles of Labile, Diffusible Molecules →
Csaba Szabo
[EN]

Cardiology →
Stéphane Cook, Mario Togni
(EN)

https://www.unifr.ch/med/fr/research/overview.html

WHAT IS LEARNED AND EXPECTED FROM THE MASTER THESIS?

A. Writing a proposal together with your supervisor

B. Perform experiments in the laboratory

C. Written thesis (report on your work)

D. At the end, a 20 minutes oral presentation

WEBSITE:

https://www.unifr.ch/med/de/studium/master/mscebr/

CONTACT FOR INFOS:

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melanie.kaeser@unifr.ch

Deadline for application

Applications for 2025/2027 have started in February 2025 and last until ***June 30, 2025***

https://www.unifr.ch/med/de/studium/master/mscebr/admission.html

WHY TO CHOOSE FRIBOURG?
TESTIMONIAL

Mrs. Shekoofeh Yaghmaei, former EBR student

now Evidence Generation Specialist (Medical Affairs) in Biopharmaceutical industry (AstraZeneca)