

**Section of Medicine  
Faculty of Science and Medicine  
University of Fribourg**

**Specialized Master of Science  
in  
Experimental Biomedical Research**

# TARGET STUDENTS AND OBJECTIVES

**Very international program with students coming from all around the world**

**Broad topics:**

**Neuroscience, Tissue Degeneration and Regeneration, Infection Inflammation and Cancer**

**Who can apply?**

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.

## Perspectives

- 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 2<sup>nd</sup> Semester: Begin of practical work in the laboratory  
of your choice for your master thesis.

1<sup>st</sup> Semester exclusively courses.

⇒ Description of the courses:

[https://cdn.unifr.ch/scimed/plans/current/Plan\\_MScSp\\_EBR\\_en.pdf](https://cdn.unifr.ch/scimed/plans/current/Plan_MScSp_EBR_en.pdf)

**Compulsory Course Units**

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

SME.07800	Master thesis			<b>60</b>
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### *Elective Course Units*

<b>Code</b>	<b>Title of UE</b>	<b>Semester</b>	<b>tot. h.</b>	<b>ECTS</b>
SBL.00420 <sup>a#</sup>	Career profiling in life sciences	SS	8	1
I02.00106	<i>B2-C2 English for Master Students of Science I</i>	AS	-	3
I02.00107	<i>B2-C2 English for Master Students of Science II</i>	SS	-	3
SBL.00115 <sup>#</sup>	The RNA world	AS	12	1.5
SBL.00419 <sup>#</sup>	Advanced imaging	SS	8	1
SBL.00451 <sup>b#</sup>	Introduction to mass spectrometry and proteomics	AS	8	1
SBL.00452 <sup>b#</sup>	Advanced quantitative proteomics	SS	12	1
SBL.00119 <sup>c#</sup>	Molecular genetics of model organism development	AS	28	3
SBL.10001 <sup>c#</sup>	Modelling human diseases in experimental genetic systems	SS	20	2
SBL.10002 <sup>c#</sup>	From bench to bedside	SS	5	0.5
SBL.00428 <sup>a#</sup>	Optogenetics and photopharmacology	SS	8	1
SCH.05123	Innovation and Entrepreneurship	AS	48	4.5
L25.01485 <sup>a*</sup>	Neurochemistry	SS	28	3
L25.01486 <sup>a*</sup>	Development, learning and memory: Neuroscience perspectives	AS	30	3
XXX <sup>a*</sup>	Visual and social neuroscience	AS	XX	3
XXX <sup>a*</sup>	Affective and decision making neuroscience	AS	XX	3
XXX <sup>a*</sup>	Clinical neuroscience	SS	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	Behavioural methods in neuroscience	AS	28	3
L25.00715*	Neuroethics	SS	16	3
L25.01478*	Sleep and Cognition	AS	22	3
L25.00644*	Introduction to Matlab I	SS	14	3
<b>Total</b>				<b>12</b>

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

### Thesis-related activities in the Neuroscience option

Code	Title of UE	Semester	tot. h.	ECTS
SME.07002	Fribourg day of cognition	AS	8	0.5
SME.06001 <sup>§</sup>	Neurobiology (seminar)	AS	5	0.5
SME.07001 <sup>§</sup>	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
<b>Total</b>				<b>15</b>

<sup>§</sup> 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	Cellular immunology: theory and practice	AS	28	3
SME.07215	Hot topics in Cancer research, Metabolic health and Regenerative biomedicine	SS	28	3
SME.07203	Principles and methods in investigating and treating age-associated heart and vascular diseases	SS	28	3
SME.07209	Concepts and approaches in metabolic phenotyping, anti-obesity targeting and hypoxia research	SS	28	3
<b>Total</b>				<b>12</b>

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

Code	Title of UE	Semester	tot. h.	ECTS
SME.07210 <sup>§</sup>	Section of medicine research (seminar)	AS	6	0.5
SME.07211 <sup>§</sup>	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
<b>Total</b>				<b>15</b>

<sup>§</sup> 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*

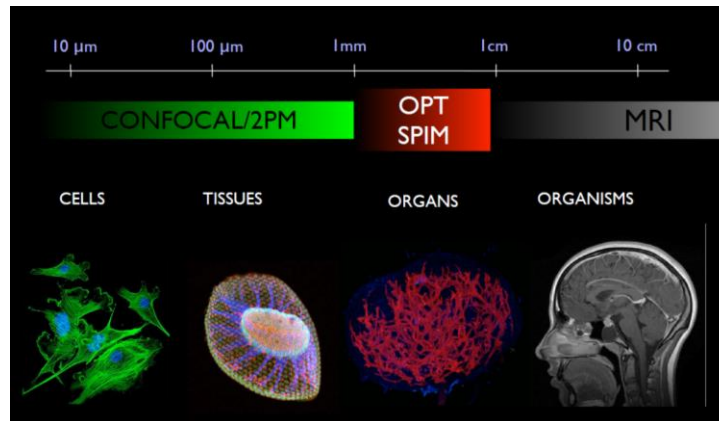
Code	Title of UE	Semester	tot. h.	ECTS
SME.07203	Principles and methods in investigating and treating age-associated heart and vascular diseases	SS	28	3
SME.07209	Concepts and approaches in metabolic phenotyping, anti-obesity targeting and hypoxia research	SS	28	3
SME.07201	Cellular immunology: theory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

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

Code	Title of UE	Semester	tot. h.	ECTS
SME.07104 <sup>§</sup>	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
<b>Total</b>				<b>15</b>

<sup>§</sup> 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



© Dr. Spierer's research lab  
© Dr. Stein's research lab

# MASTER'S PRACTICAL WORK: VARIOUS RESEARCH LABS

🏠 > Math.-Nat. und Med. Fakultät > Abteilung Medizin

FR | DE

🔍 SCHNELLZUGRIFF



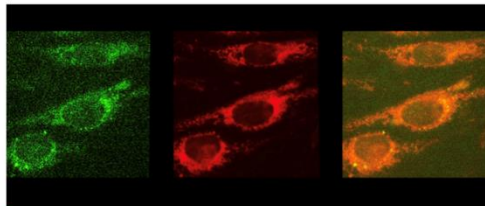
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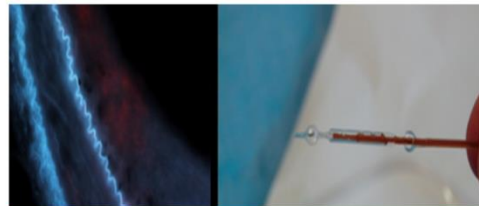
🏠 · Forschung · **Forschungsgruppen**

## Research Groups



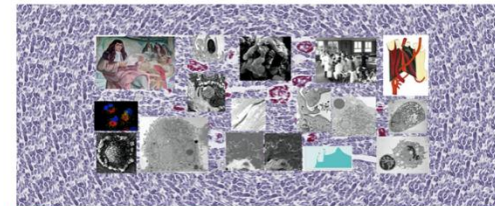
**Biological Roles of Labile, Diffusible Molecules**

Csaba Szabo



**Cardiology**

Stéphane Cook, Mario Togni



**Clinical Anatomy and Cell Biology**

Luis Filgueira



<https://www.unifr.ch/med/de/research/researchgroups/>

# 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 15 minutes oral presentation**



# WHY TO CHOOSE FRIBOURG? TESTIMONIAL

**Mrs. Shekoofeh Yaghmaei, former EBR student**





## WEBSITE:

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

## CONTACT FOR INFOS:

[mscebr@unifr.ch](mailto:mscebr@unifr.ch)

### Deadline for application

*Applications for 2023/2025 have started in February 2023 and last until **June 30, 2023***

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

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