



**FEDERAL UNIVERSITY OF SANTA CATARINA
CENTER OF BIOLOGICAL SCIENCES
BIOCHEMISTRY POSGRADUATE PROGRAM**

1) Discipline/Course: BQA 510040 - Structure-functions of ion channels
Number of credits: 02.

Professors:

- Prof. Romain Guinamard - France (1.0 credit; 15 h/classes) – PVB/CAPES-PRINT
- Prof. Fátima Regina Mena Barreto Silva – Federal University of Santa Catarina, Brazil (1.0 credit; 15 h/classes).

Semester / Year: 2024.1

Period: From February 24 to March 11 - For PhD and Master Students.

Maximum of 8 regular students who have electrophysiology as an approach to develop part of their graduate project. An interview will be part of the selection of student in order to prioritize the projects related.

Total Schedule: 30 h

Aims: The course addresses the basic understanding of cellular electrophysiology, comprising first the physiological aspects of cells, the main recording techniques to evaluate cell bioelectricity and practical classes on patch clamp single channels.

Content

- Prof. Fátima RMB Silva and Prof. Romain Guinamard: Course presentation and introduction.
- Prof. Romain Guinamard and Fátima Silva: Theoretical classes: Basis for electrophysiological recordings: extracellular macroelectrodes, intracellular microelectrodes, patch-clamp, Analysis of ion channel recordings: single channel and whole-cell recordings analysis, conductance, ion selectivity and regulation. Structure-function of ion channels: molecular structure, pore architecture, selectivity filter, voltage sensor. Practical classes: Training in single channel recordings (five days) and Seminar in the lab and for PPG-BQA Seminars Program on the Prof. Romain Research: History and properties of TRP channels.

- **Programmatic Content and Schedule:** Class hours will be distributed as follows: 2 credits, equivalent to 30 hours (3 hours per day in 10 days) corresponding to the participation in the discipline.

Basic Bibliography

- 1) Dee Unglaub Silverthorn. **Fisiologia humana:** Uma abordagem integrada. 7. ed. Porto Alegre: Artmed, 2017.
- 2) Margarida de Mello Aires. **Fisiologia.** 5° edição. Editora: Guanabara Koogan, 2018.
- 3) William F. Ganong. **Review of Medical Physiology.** 24st edition. Mcgraw-Hill, 2014.
- 4) Narahashi T. Principles of electrophysiology: an overview. Curr Protoc Toxicol. 2003; Chapter 11: Unit11.10. doi: 10.1002/0471140856.tx1110s17
- 5) Keller AF, Bouteiller JC, Berger TW. Development of a Computational Approach/Model to Explore NMDA Receptors Functions. Methods Mol Biol. 2017;1677:291-306. doi: 10.1007/978-1-4939-7321-7.17.

Papers related to the topics studied: See updated bibliography.

This updated papers will be choose and distributed to the student during the course by Prof. Guinamard.

2) Schedule for 2024.1 Structure-functions of ion channels

SCHEDULE	ACTIVITY	CONFERENCIST
(Monday) 14 h – 17 h Classroom G301	Presentation and Introduction	Prof. Fátima RMB Silva Prof. Romain Guinamard
(Tuesday) 14 h – 17 h Classroom G301	Theoretical Class: Cellular Bioelectricity I	Profa. Fátima Silva Prof. Romain Guinamard
(Wenesday) 14 h – 17 h Classroom G301	Theoretical Class: Cellular Bioelectricity II	Profa. Fátima Silva Prof. Romain Guinamard
(Thursday) 9 h – 12 h Classroom G301	Theoretical Class: Basis for electrophysiological recordings	Profa. Fátima Silva Prof. Romain Guinamard
(Friday) 9 h – 12 h Classroom G301	Theoretical Class: Basis for electrophysiological recordings	Profa. Fátima Silva Prof. Romain Guinamard
(Monday) 9 h – 12 Classroom G301	Theoretical Class: Structure-function of ion channels	Prof. Romain Guinamard
(Tuesday) 14 h – 17 h	Practical class :Training in single channel recordings	Dr. Romain Guinamard

(Wednesday) 14 h – 17 h Electrophysiology & Patch Clamp Laboratory	Practical class :Training in single channel recordings	Dr. Romain Guinamard
(Thursday) 9 h – 12 h Electrophysiology & Patch Clamp Laboratory	Practical class :Training in single channel recordings	Dr. Romain Guinamard
(Friday) 14 h – 17 h Electrophysiology & Patch Clamp Laboratory	Practical class :Training in single channel recordings and departure	Dr. Romain Guinamard

Prof. Fátima RMB Silva.