

NAME	ION CHANNELS	CODE:
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MASTER DEGREE	YEAR OF STUDY 1	SEMESTER 1	STATUS OF THE DISCIPLINE (F-fundamental / S-specialisation / C-complementary) S	TYPE OF THE DISCIPLINE (OB-obligatory / opt-optional / fac-facultative) OB
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TOTAL HOURS/ WEEK				TOTAL HOURS /SEMESTER	TOTAL HOUS INDIVIDUAL ACTIVITY*	NUMBER OF CREDITS	TYPE OF EVALUATION (P-on going, C-coloquy, E-exam, M-mixed)	LANGUAGE
C	S	L	Pr.					
2		2		56	68	5	E	Romanian

TEACHER	TEACHING AND SCIENTIFIC DEGREE, SURNAME, NAME	DEPARTMENT
	PROFESSOR ALEXANDRU BABEȘ	DAFAB

BACKGROUND	Human Physiology, Biophysics
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OBJECTIVES	To understand the structure and function of ion channels, their role in excitable and non-excitable tissues, as well as their involvement in human genetic diseases.
TEMATICĂ GENERALĂ	<ol style="list-style-type: none"> 1. introduction in the study of ion channels 2 hours 2. The role of ion channels in establishing the resting membrane potential 2 hours 3. Ion channels involved in the generation and propagation of the action potential 2 hours 4. Ion channels and synaptic transmission 2 hours 5. Modulation of ion channels through signal transduction cascades 2 hours 6. Ion channels involved in sensory transduction I 2 hours 7. Ion channels involved in sensory transduction II 2 hours 8. The role of ion channels in learning and memory 2 hours 9. Voltage-gated sodium channels: structure, function and pathologies 2 hours 10. Voltage-gated potassium channels: structure, function and pathologies 2 hours 11. Voltage-gated calcium channels: excitation-contraction coupling and secretion 2 hours 12. TRP (Transient Receptor Potential) channels: roles in sensory physiology 2 hours 13. Nicotinic accetylchline receptors 2 hours 14. Glutamate receptors 2 hours
PRACTICAL SESSIONS	<ol style="list-style-type: none"> 1. Membrane transport 4 hours 2. Electrical properties of the plasma membrane 4 hours 3. Kinetics and voltage-dependence of ion channels in excitable cells 4 hours 4. Simulations of single-channel recordings 4 hours 5. Introduction to the patch clamp technique 4 hours 6. Introduction to calcium imaging 4 hours 7. Ion channels involved in cardiac muscle function 4 hours
TEACHING METHODS	At the course: power point presentations, discussion of critical issues. Practical sessions: demonstrations of physiological and biophysical processes, hands-on approach to modern techniques; journal club sessions.

REFERENCES	<ol style="list-style-type: none"> 1. Principles of Neural Science (4th Edition) , Kandel, Schwartz, Jessel, McGraw-Hill, 2000 2. Ion channels and disease, Frances Ashcroft, Academic Press, 2000
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EVALUATION	conditions	Participation to all practical sessions and also to the final practical exam; timely delivery of all assigned lab work
	criteria	The quality of theoretical and practical knowledge and the progress shown by each student

	type	a) Final exam (evaluation) b) Periodic testing during practical sessions and assigned lab work c) Final practical exam Optional: d) presentations/essays; participation with posters in scientific meetings; involvement in research projects
	Final grade	$a \times 0.6 + (b+c) \times 0.4$ One extra point for activities under d)

Specific competences *	
1. Competences about learning and understanding:	<ul style="list-style-type: none"> - knowing and correctly using specific terms for this subject - understanding fundamental processes in physiology - identification of terms, relationships, processes based on the knowledge acquired - correct use of physiology terms - defining /naming physiology concepts - acquire basic and specific knowledge
2. Competences about explanation and interpretation:	<ul style="list-style-type: none"> - explaining and interpreting processes and theoretical ideas specific to the subject - generalizing, particularization, integration of the information - making connections between results - ability to analyse and synthetise information
3. Practical competences:	<ul style="list-style-type: none"> - utilization of methods, techniques and specific intrumest of investigations - connections between different types of representations, between representations and object - describing states, systems, processes, phenomenons - ability to put into practice the theoretical knowledge - research abilities
4. Competences about attitude	<ul style="list-style-type: none"> - developing positive attitudes and responsibility towards science - getting involved in its own personal development - implication in scientific activities related to the subject - ability to collaborate with other specialists in the field

Professor Alexandru Babeș
