

Cellular Neurobiology 2019-20

SVB0069/SVB0055



Patrizia Bovolin

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https://cmb.campusnet.unito.it/do/docenti.pl/Show?_id=pbovolin#profilo



Yoav Gothilf - Tel Aviv University – Visiting professor

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<http://gothilflab.wixsite.com/gothilflab>

Regular Schedule

Master in CELLULAR AND MOLECULAR BIOLOGY - A.Y. 2019-2020 - 1° semester					
1° year NEUROBIOLOGICAL					
From October 3, 2019					
	Monday	Tuesday	Wednesday	Thursday	Friday
8-9	ACBB	OMP	ACBB		NEUROBIOLOGY
9-10	ACBB	OMP	ACBB	NEUROANATOMY	NEUROBIOLOGY
10-11	ACBB		OMP	NEUROANATOMY	ACBB
11-12	ACBB	NEUROANATOMY	OMP	NEUROBIOLOGY	ACBB
12-13		NEUROANATOMY		NEUROBIOLOGY	
13-14					
14-15					
15-16					

From October 21, 2019					
	Monday	Tuesday	Wednesday	Thursday	Friday
8-9		OMP	NEUROBIOLOGY		ACBB
9-10	ACBB	OMP	NEUROBIOLOGY	NEUROANATOMY	ACBB
10-11	ACBB		ACBB	NEUROANATOMY	NEUROANATOMY
11-12	ACBB	NEUROANATOMY	ACBB	*NEUROBIOLOGY	NEUROANATOMY
12-13	ACBB	NEUROANATOMY		NEUROBIOLOGY	
13-14					
14-15	ACBB		**OMP		
15-16	ACBB		OMP		
16-17	ACBB				
17-18	ACBB				

Classroom S5, Aldo Moro, via Verdi angolo via Roero di Cortanze

Classroom S1, Aldo Moro, via Verdi angolo via Roero di Cortanze

Classroom Spallanzani, Palazzo Campana, via Carlo Alberto, 10

**dal 30/10

→ Classroom Istologia, Palazzo Campana, via Carlo Alberto, 10

* 12/12 aula Lodi, Palazzo Campana

→ Classroom Monod, Palazzo Campana, via Carlo Alberto, 10

MORPHOLOGICAL LABORATORY, via Accademia Albertina 13

CLASSROOM C, via Accademia Albertina 13

Visting professor Schedule

Gothilf: October 16th – 25th, 2019

Week October 14-18, 2019					
	Monday	Tuesday	Wednesday	Thursday	Friday
8-9					NEUROBIOLOGY
9-10					NEUROBIOLOGY
10-11					
11-12				NEUROBIOLOGY	
12-13				NEUROBIOLOGY	
13-14					
14-15			NEUROBIOLOGY		
15-16			NEUROBIOLOGY		

Week October 21-25, 2019					
	Monday	Tuesday	Wednesday	Thursday	Friday
8-9			NEUROBIOLOGY		
9-10			NEUROBIOLOGY		
10-11					
11-12				NEUROBIOLOGY	
12-13				NEUROBIOLOGY	
13-14					
14-15					NEUROBIOLOGY
15-16					NEUROBIOLOGY
16-17					
17-18					

Classroom S5, Aldo Moro, via Verdi angolo via Roero di Cortanze

Classroom S1, Aldo Moro, via Verdi angolo via Roero di Cortanze

Classroom Spallanzani, Palazzo Campana, via Carlo Alberto, 10

Classroom Istologia, Palazzo Campana, via Carlo Alberto, 10

Classroom Monod, Palazzo Campana, via Carlo Alberto, 10

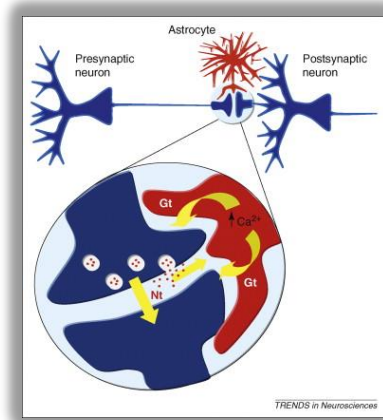
MORPHOLOGICAL LABORATORY, via Accademia Albertina 13



Student survey

<p>Your previous degree (title, University)</p>	
<p>Year (first or second) and type of Master Degree (if different from CMB)</p>	
<p>Level of English knowledge, type of English courses taken before</p>	
<p>Neurobiology courses attended before</p>	
<p>Specify from which courses you obtained some Neurobiology background in the past</p>	
<p>In which of the following fields of neuroscience do you have significant background? Put a cross near the fields that you choose</p>	<ul style="list-style-type: none"> <input type="checkbox"/> Neuroanatomy <input type="checkbox"/> Neurochemistry <input type="checkbox"/> Neurophysiology <input type="checkbox"/> Cellular Neurobiology <input type="checkbox"/> Molecular Neurobiology <input type="checkbox"/> Developmental Neurobiology <input type="checkbox"/> Neuropathology <input type="checkbox"/> Behavioural studies <input type="checkbox"/> Neuropsychology <input type="checkbox"/> Other.....
<p>Which of the above Neurobiology fields do you like most?</p>	
<p>Do you like best classical lectures (only the teacher speaks) or interactive</p>	

Course delivery



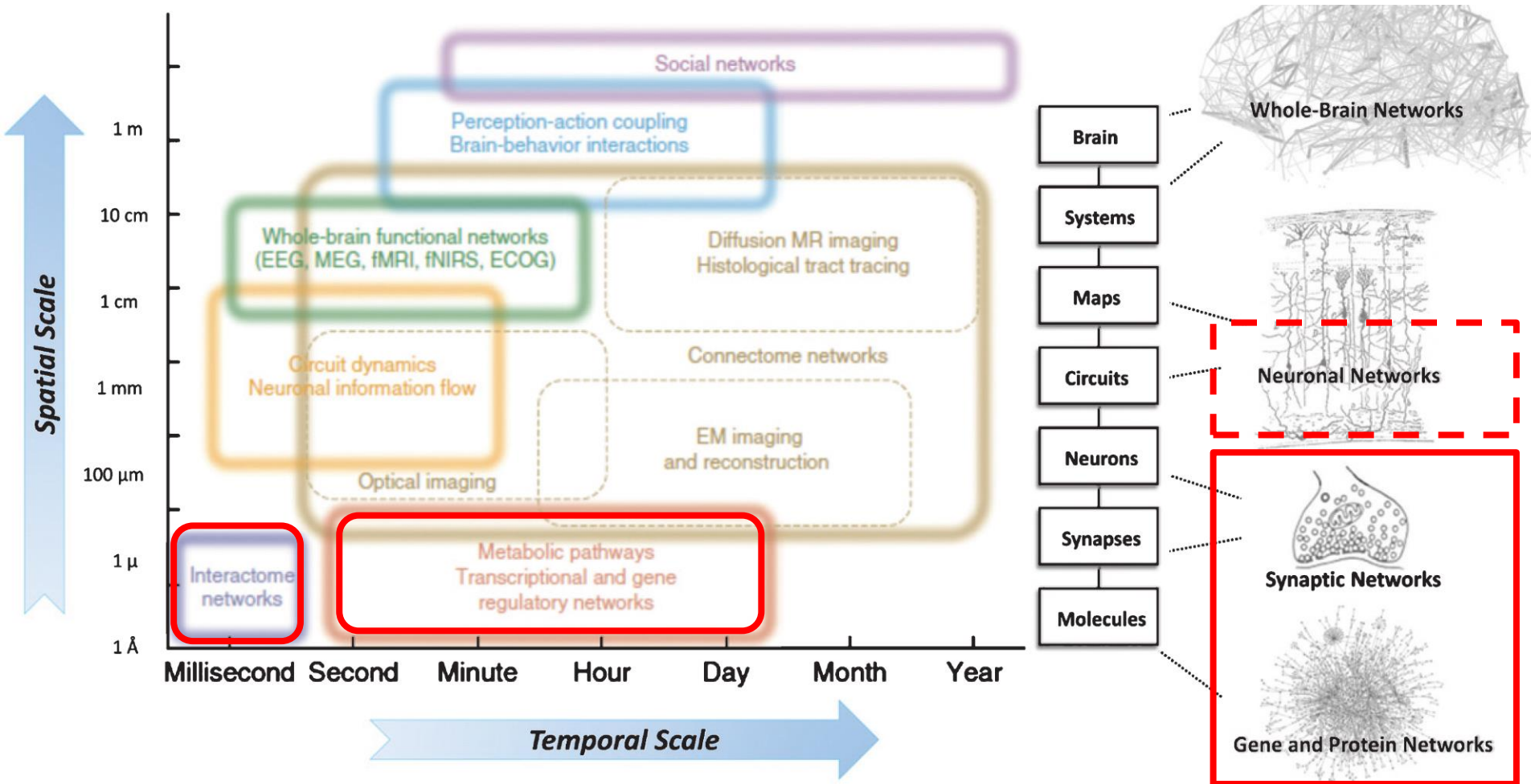
- This course includes **44 hours of in-class lectures** and seminars, exercises discussions times and short movies.
Bovolin (32 hrs)
Gothilf (12 hrs)
- By the end of the course the students will be engaged in **short ppt presentations of an experimental article** related to the topics presented in class by the teachers (about 4 hrs)

What is Neuroscience about?



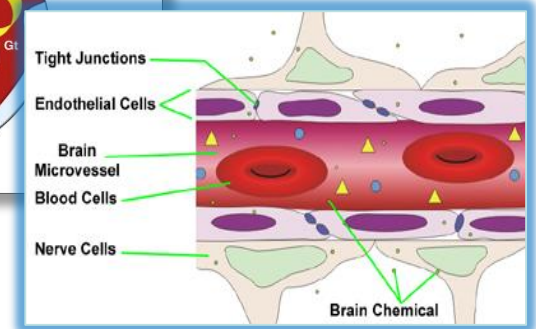
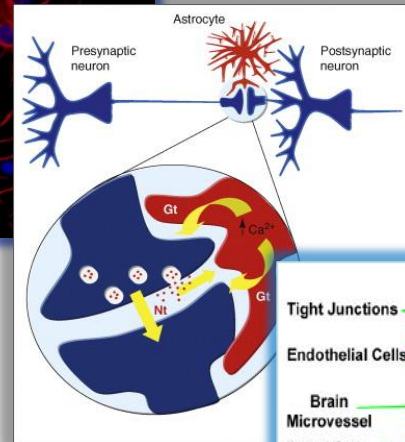
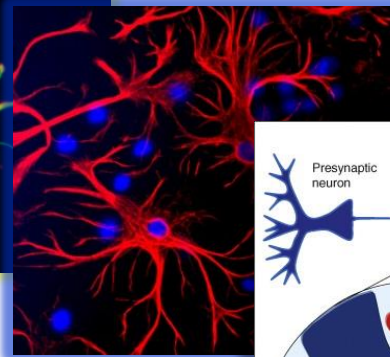
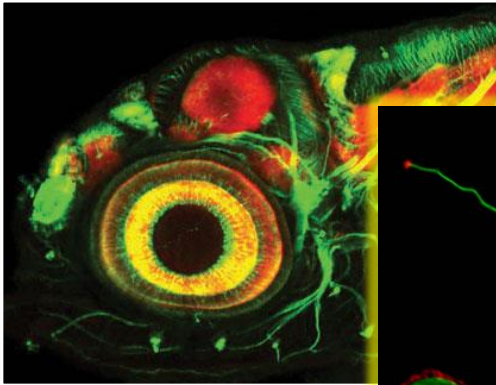
<https://www.youtube.com/watch?v=PfQkDHopJs8>

Schematic representation of how structural levels within the nervous system integrate over multiple spatial and temporal scales

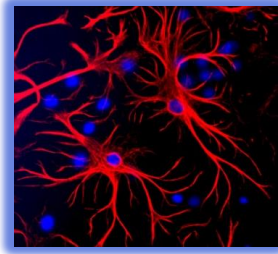


Hampel et al., 2018

Main focus of our course: Cells of the Nervous System, cell communication, circuits

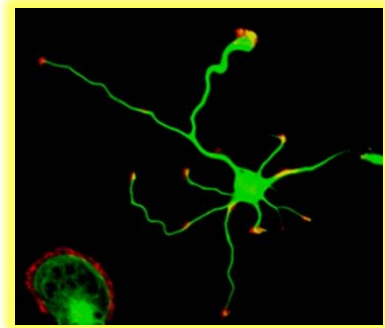


Course Syllabus



- **Ependymal, choroidal and endothelial cells:** BBB, B-CSF-B, the problem of delivery of exogenous molecules to the brain
- **The zebrafish model in Neurobiology**
- **Cellular-Molecular neuroendocrinology:** Anatomical organization and molecular mechanisms of the circadian clock system in vertebrates - Neuroendocrine regulation of food consumption, of reproduction and associated pathological aspects from fish to mammals
- **Glial cells:** - classification, morphology and classical roles – reactive gliosis - gliotransmission - microglia
- **The neuron:** - origin and function of neuronal multiplicity - subcellular organization of the neuron - origin, maintenance and functional aspects of neuronal polarity - dendritic spines, transport and targeting of dendritic mRNA, local synthesis of proteins - trafficking of axonal and dendritic proteins
- **Cellular communication in the nervous system:** - organization of the presynaptic and postsynaptic density – neurotransmitter release - general classification of neurotransmitters and their receptors - structure and function of GABA and glutamate receptors - the endocannabinoid system - synaptic maintenance and plasticity - non-synaptic communication

Course objectives



- This course aims to provide students with an advanced knowledge of **cell and molecular biology of neurons, glia and other neural cell types**.
- The students will familiarize with **techniques and research strategies** employed in cellular neurobiology
- They will improve their **comprehension** of scientific articles and develop their **skills in choosing, reporting and discussing data** from the neurobiology scientific literature

Textbooks

This course is not based on a specific textbook. However for basic or additional information you can refer to the following books (DBIOS library):

- **Neuroscience** – Purves et al. (Sinauer)
- **From molecules to networks : an introduction to cellular and molecular neuroscience** – J.H. Byrne, J.L. Roberts. (Academic Press)
- **Principles of Neural Sciences**– Kandel (McGraw-Hill)
- **Fundamental Neuroscience** – L. Squire et al. (Elsevier)
- **Basic neurochemistry: principles of molecular, cellular and medical neurobiology** - Brady et al. (Academic Press)
- **Cellular and Molecular Neurophysiology** – Hammond (Academic Press)
- **Principles of Neurobiology** – Luo (Garland)

Teaching materials and activities

Campusnet web page:

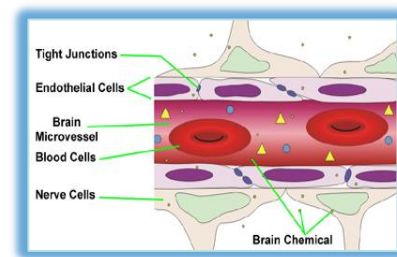
http://cmb.campusnet.unito.it/do/corsi.pl/Show?_id=c9db

Moodle web page:

<https://cmb.i-learn.unito.it/course/view.php?id=191>

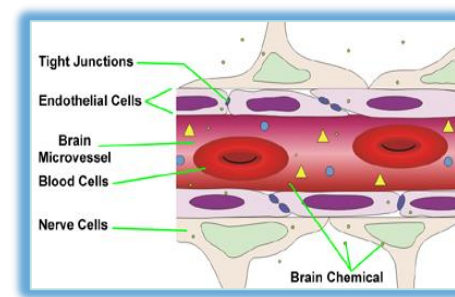
- **Please register yourself to the Cell Neurobiology websites on Campusnet and Moodle**
- **Please check often these pages for last moment news**

Learning assessment (1)



- **Bibliographic search activity (obligatory)** - For each main topic (4 in total) presented in lecture form by the teacher, all the students will make a bibliographic search on PubMed/Google Scholar to find one research article, which should be interesting and pertinent to the topic. The teacher will select four-five articles per topic, among all the ones proposed by the students, for student ppt presentations
- **Short article presentation (optional):** groups of 2 students will give a ppt presentation before the end of the course on one of the articles previously selected through the Bibliographic Search activity. This presentation provides **additional points to the grade of the final exam** of Cellular Neurobiology, provided this will be passed in the first exam session (January-February 2020).

Learning assessment (2)



- **Final exam** – This exam will be an **oral colloquium** consisting of a discussion on the topics covered in the lectures. In **alternative**, students can request a written **exam** by writing an email to the teacher at least 1 week in advance. The **written test will consist** of 20-25 questions with different formats: word definitions; open questions; short reading-comprehension exercises based on literature material.
- **Scores** - **20%** of the final grade will be based on the **Bibliographic Search activity**. The remaining **80%** will be covered by the **final exam**. The maximum grade will be 32/30. “ 30 cum laude” will be assigned to grades 31 and 32. **Additional points obtained by the PPT presentation** will be added to the final exam of the first exam session (January-February 2018).