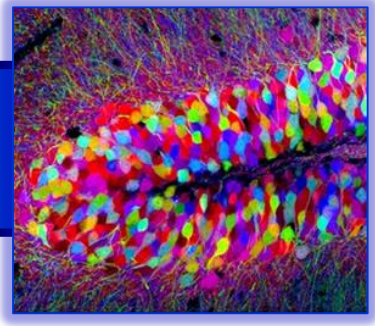
Cell Neurobiology Course 2016-17



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 2012, 5th ed.)
- **From molecules to networks : an introduction to cellular and molecular neuroscience** – J.H. Byrne, J.L. Roberts. (Academic Press 2014, 3rd ed)
- **Principles of Neural Sciences**– Kandel (McGraw-Hill 2012, 5th ed.)
- **Fundamental Neuroscience** – L. Squire et al. (Elsevier 2013, 4th ed. Ed.)
- **Basic neurochemistry: principles of molecular, cellular and medical neurobiology -** Brady et al. (Academic Press, 2012)
- **Cellular and Molecular Neurophysiology –** Hammond (Academic Press 2015, 4th ed.) *(soon available)*
- **Principles of Neurobiology** – Luo (Garland 2016, 1st ed.) *(soon available)*

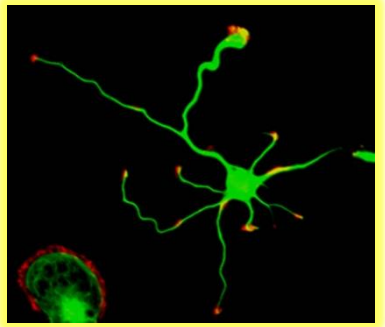
Campusnet web pages:

http://cmb.campusnet.unito.it/do/corsi.pl/Show?_id=c9db;sort=DEFAULT;search=;hits=25

http://cmb.campusnet.unito.it/do/corsi.pl/Show?_id=oi0m;sort=DEFAULT;search=;hits=25

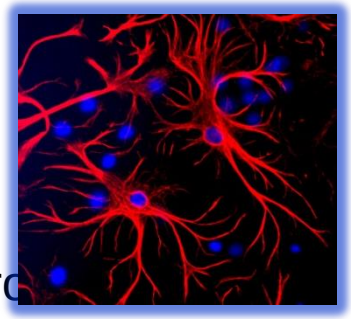
- **Please register yourself to the Cell Neurobiology website on Campusnet. This way your teacher can contact you via e-mail**

Course objectives



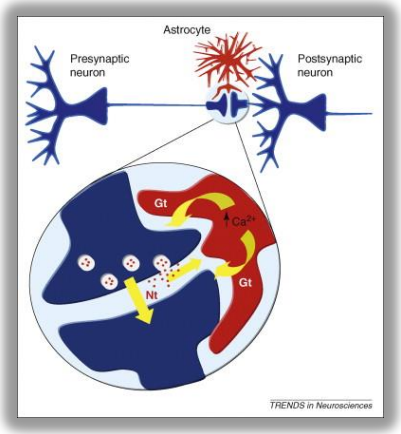
- This course aims to provide students with an advanced knowledge of **cell and molecular biology of neurons, glia and other neural cell types**.
- The students will familiarize with **techniques and research strategies** employed in cellular neurobiology
- They will improve their **comprehension** of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

Course Syllabus

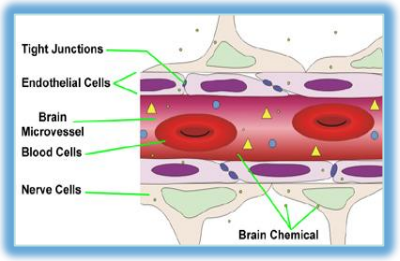


- **Ependymal, choroidal and endothelial cells**: BBB, B-CSF-B, the pro
  delivery of exogenous molecules to the brain
- **The neuron**: - origin and function of neuronal multiplicity - subcellular organization of the neuron - origin, maintenance and functional aspects of neuronal polarity - neuronal cytoskeleton, molecular motors and axonal transport - dendritic spines, transport and targeting of dendritic mRNA, local synthesis of proteins - trafficking of axonal and dendritic proteins
- **Cellular communication in the nervous system**: - the neuron as a secretory cell and the organization of the presynaptic terminal - the postsynaptic density, neuromuscular junction versus central synapses - general classification of neurotransmitter receptors, structure and function of GABA and glutamate receptors - molecular composition and dynamic regulation of gabaergic and glutamatergic synapses – the endocannabinoid system - adhesion molecules, synaptic maintenance and synaptic plasticity - non-synaptic communication – targeting neurons for Optogenetics - the Zebrafish model in Neurobiology
- **Glial cells:** - classification, morphology and classical roles – reactive gliosis - gliotransmission - myelination: regulation and pathological aspects

Course delivery

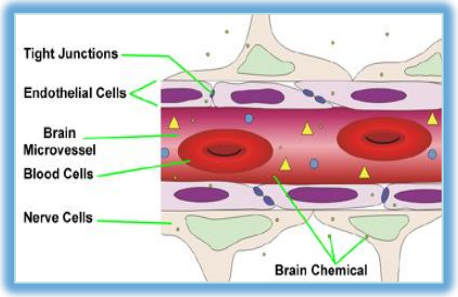


- This course includes **40 hours of in-class lectures** and seminars, discussions times and short movies
- Some **seminars** on special topics will be delivered by invited speakers
- The teacher will select several articles, among all the ones proposed by the students for the Bibliographic search activity, for **end-of-the-course student ppt presentations**



Learning assessment (1)

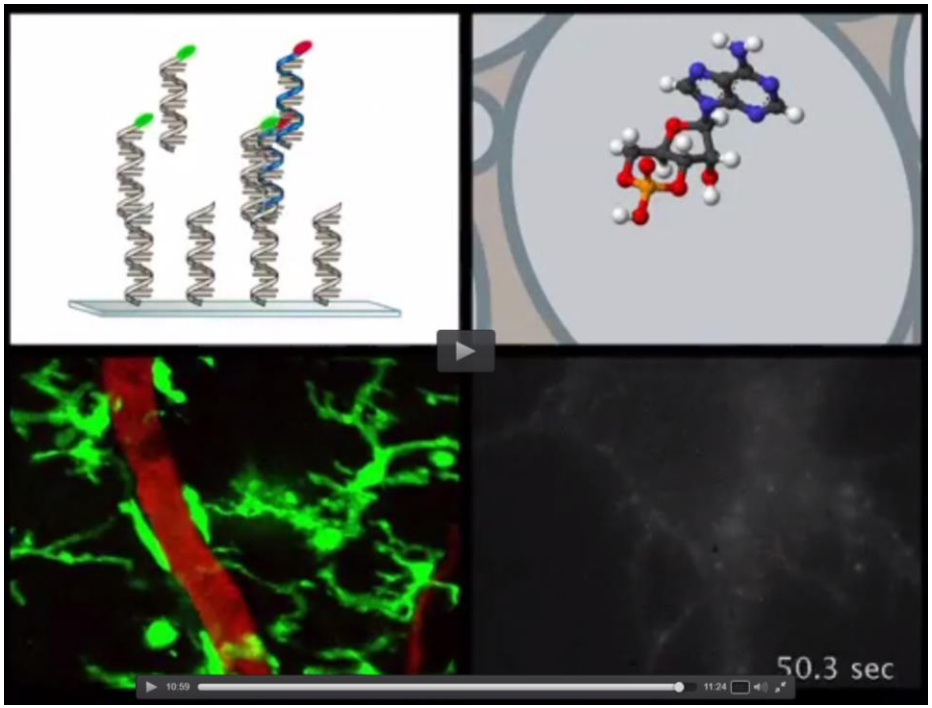
- **Bibliographic search activity (obligatory) -** For each main topic (4-5) presented in lecture form by the teacher, all the students will make a bibliographic search on PubMed/Google Scholar to find one research article, which should be interesting and pertinent to the topic. The teacher will select four-five articles per topic, among all the ones proposed by the students, for end-of-the-course student ppt presentations
- **Short article presentation (optional):** students will give a ppt presentation before the end of the course on one of the articles previously selected through the Biobliographic Search activity.This presentation may provide **additional points to the grade of the final exam** of Cellular Neurobiology, provided this will be passed in the first exam session (January-February 2017).



Learning assessment (2)

- **Final exam –** This exam will be a **written test** of 20-25 questions with different formats : word definitions; multiple choice quizzes; open questions; short reading-comprehension exercises based on literature material.
- **Scores** - **15%** of the final grade will be based on the **Bibliographic Search activity**. The remaining **85%** 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. Any **additional points obtained by the PPT presentation** will be added to the final exam of the first exam session (January-February 2017).
- Upon request, students can take an **integrative oral examination**.

An Introduction to Cellular and Molecular Neuroscience



http://www.jove.com/science-education/5213/an-introduction-to-cellular-and-molecular-neuroscience