UCLouvain

wsbim2155

2024

Developmental neurobiology

4.00 credits	30.0 h	Q1

Teacher(s)	Tissir Fadel ;
Language :	French
Place of the course	Bruxelles Woluwe
Prerequisites	none
Main themes	The aim of these lectures is to address the developmental processes that contribute to the formation of the central and of the peripheral nervous system, and the molecular, cellular and systemic mechanisms that regulate these processes. The development will be studied from the initial formation of the neural tissue (neurulation) to the wiring of interconnected functional circuits. Mechanistic aspects will focus on the genetic regulators and signalling pathways involved in neural induction, patterning of the nervous system (morphogens), neuronal and glial differentiation, neuronal migration, axonal growth and guidance and synaptogenesis, and on activity-dependent maturation of neural circuitry. The alterations of the development of the nervous system, either of endogenous or exogenous origin, will be analyzed. Finally, the experimental approaches specifically dedicated to the study of neural development will be presented.
Learning outcomes	**At the end of this learning unit, the student is able to :** 1 At the end of the course, the student will be able : - to describe the processes that contribute to the formation of the structures of the central and peripheral nervous system, and to explain the developmental relationships between these structures - to understand and compare the regulatory mechanisms that are activated during development in different regions of the nervous system (organizing centres, control of neurogenesis, of neuronal differentiation and migration, of axonal growth, of synaptogenesis and of circuit formation) - to explain the mechanisms and the consequences of endogenous or exogenous alterations of these processes - to propose adequate experimental strategies to study specific aspects of neural development - to make anatomical and functional links between developing structures and structures of the adult nervous system The contribution of this Teaching Unit to the development and command of the skills and learning outcomes of the programme(s) can be accessed at the end of this sheet, in the section entitled 'Programmes/courses offering this Teaching Unit'.
Evaluation methods	Oral examination (online). The students have the choice to take the examination in english or in french.
Teaching methods	The course will be given as a series of lectures including collective analysis of key research articles or textbook chapters. Exercises based on *in silico* training or searches (expression databases, ...) or laboratory demonstrations could be organized.
Content	All the lectures will be delivered in english. They will address the following topics : 1. Neural induction and neurulation 2. Antero-posterior and dorso-ventral patterning of the nervous system 3. Neural stem cells and neurogenesis 4. Neuronal specification and differentiation 5. Neuronal migration 6. Neuronal survival and neuronal death 7. Neural crest cells 8. Axonal growth and guidance 9. Development of glial cells, myelinisation 10. Synaptogenesis and synaptic pruning 11. Neural circuit formation and activity-dependent maturation 12. Developmental alterations of the nervous system 13. Specific experimental approaches

Inline resources	Available on Moodle : pdf file of the slides; copies of articles or textbook chapters; web sites
Faculty or entity in charge	FASB

Programmes containing this learning unit (UE)				
Program title	Acronym	Credits	Prerequisite	Learning outcomes
Master [120] in Biomedicine	SBIM2M	4		🔍
Master [60] in Biomedicine	SBIM2M1	4		🔍