



The Hebrew University of Jerusalem

Syllabus

DEVELOPMENTAL BIOLOGY - 72320

Last update 16-04-2020

HU Credits: 5

Degree/Cycle: 1st degree (Bachelor)

Responsible Department: Life Sciences

Academic year: 0

Semester: 2nd Semester

Teaching Languages: Hebrew

Campus: E. Safra

Course/Module Coordinator: Prof. Nissim Ben-Arie

Coordinator Email: Nissim.Ben-Arie@mail.huji.ac.il

Coordinator Office Hours: Email-continuously, meeting by appointment.

Teaching Staff:

Prof Nissim Ben-Arie
Dr. Itamar Harel
Ms.
Mr.

Course/Module description:

Developmental biology is the forefront of research in the life sciences today and is engaged in deciphering the processes occurring during the transformation of a single cell, the fertilized egg, into an embryo and a mature organism. The course will follow the steps that describe the processes of early development and later discussed the development of various body systems, the central and peripheral nervous systems, the eye and skeleton. The course will describe the development of genetic and molecular level through cellular aspects to the whole animal. We will explore both normal development and diseases resulting from abnormal development. Students will become familiar with various animal models, as well as the tools and techniques through which one can explore stages and mechanisms acting during development.

Course/Module aims:

The course is designed to expose students to various mechanisms involved in the creation of an organism. This course is unique as it examines development at a variety of levels from a whole organism, through tissue and cell, to molecules and genes.

Learning outcomes - On successful completion of this module, students should be able to:

1. Identify structures and stages of development in different organisms. 2. Describe the signal transduction pathways operating in the development and analyze situations in which they are not working properly. 3. Correlate diseases with genetic or developmental abnormalities.

Attendance requirements(%):

80

Teaching arrangement and method of instruction: Lecture, exercise, computer exercises, computerized exams.

Course/Module Content:

Introduction to Developmental Biology, stages of embryonic development
When a sperm meets an egg - the magnificent process of fertilization

History of developmental biology - from Aristotle through embryologists to Developmental Biology
Principles and mechanisms of early embryonic development
Introduction to Developmental Genetics - Drosophila and molecular evolution
Genetic control of the development of the fruit fly's embryo axes
Sea urchin and the network of developmental control genes
Amphibians: from a zygote to a gastrula in the frog
Spemann's organizer and the determining the body axis in the frog
Transition to land : the early development of the chicken embryo
Mammals and invention of the placenta
Early development in man : embryology and genetics of twins
Structure and development of the central nervous system
Structure and development of the spinal cord
Neural crest and the development of the peripheral nervous system
Genetic control of neurogenesis : lessons from the fruit fly (Notch and asymmetrical cleavage)
Normal development of the cortex , mutants and disease, OR molecular evolution of eye development
Destroy to build : skeletal development in the embryo , child , adolescent, adult and injured organisms.

Required Reading:

Principles of Development, Lewis Wolpert and Cheryll Tickle, Oxford
Developmental Biology, Scott Gilbert, Sinauer

Additional Reading Material:

None

Course/Module evaluation:

End of year written/oral examination 90 %
Presentation 0 %
Participation in Tutorials 0 %
Project work 0 %
Assignments 10 %
Reports 0 %
Research project 0 %
Quizzes 0 %
Other 0 %

Additional information:

Frontal exercises with a tutor, Moodle assignments (bonus to the final grade)