Mechanisms of cell motility

Verkhovsky Alexander

Cursus
Biotechnologie et génie biologique

Sem. Type

Language
English

Credits
2

Session

Exam
Oral

Workload
60h

Hours
28

Lecture
28

Number of positions
15

Frequency
Every 2 years

Remarque
Next time: Spring 2020

Summary
Mechanisms of cell motility

Content
2. Eucaryotic cell motility: flagellated and ciliated cells, crawling cell motility.
3. Motile machinery: types of the cytoskeletal structures, principles of assembly of cytoskeletal filaments (treadmilling, dynamic instability).
5. Methods to study cytoskeletal dynamics: live digital fluorescence microscopy, photoactivation, photobleaching, fluorescence speckle microscopy, and others.
6. Mechanisms of actin assembly in protrusion at the leading edge of the cell.
7. Biophysics of protrusion, forces and modeling.
9. Introduction to motor proteins, active cycle, steps and forces.
10. Microtubule-dependent motors, role in intracellular transport and mitosis.
12. Myosin II, coordination of protrusion, attachment and contraction in the cell translocation.
13. Signaling to motility and the origins of cell polarity (directional sensing in chemotaxis, PH-domain proteins, small GTPases, calcium).

Note

Learning outcomes
The course will be given in 14 weekly sessions, each either a 2h lecture or 1.5h lecture followed by 30 min presentation by one of the attendees and a guided group discussion. Presenters will discuss original papers related to this day's lecture topic.

This course requires a minimum of 4 participants and is limited to 15 participants.

Keywords
cell migration, cytoskeleton, actin, myosin, microtubules

Learning Prerequisites
Recommended courses
basic biology

Assessment methods
Oral