Life Sciences represent a strong focus of research at EPFL, with many PhD students pursuing their thesis in this discipline. The Doctoral Program in Molecular Life Sciences (EDMS) offers an entryway to research groups in and outside EPFL working on basic and translational aspects of biology. EDMS provides the education necessary to become leaders in biology by combining laboratory research with advanced courses and access to modern technological platforms.

Research topics of the EDMS program include:

- Cell biology
- Developmental biology
- Biochemistry & biophysics
- Cancer research
- Host-pathogen interactions
- Systems biology
- Genetics
- Microbiology
- Immunology
- Computational biology
- Stem cells
- Metabolism
- Human genetics
- Immunology
- Computational biology
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- Human genetics
- Stem cells

Sveta Chakrabarti and collaborators report that *Pseudomonas entomophila* kills *Drosophila* by a translational blockage that disrupts both immune and repair programs required to resist infection in the gut. This translation blockage results from the activation of stress pathways upon damages to cells caused by reactive oxygen species and exposure to pore-forming toxins. This indicates that stress-responsive pathways, usually involved in host protection, can become deleterious upon infection.


NMDAR, a glutamate receptor, is the predominant molecular device for controlling synaptic plasticity and memory function. Interestingly, Leanne Li and collaborators found that NMDAR is functionally important for cancer cell proliferation and invasion. Moreover, expression of NMDAR signaling components predict prognosis in selected human cancers, and preclinical trials in a mouse model with NMDAR antagonists decreases tumor burden, suggesting potential applicability as cancer therapeutics.


During limb bud development, *Hoxd* genes are transcribed in two waves: an early phase controlling the arm and the forearm morphogenesis and a late phase patterning the digits. Guillaume Andrey and collaborators describe two opposite regulatory landscapes, flanking the Hox cluster, which alternatively control *Hoxd* gene transcription first in the presumptive arm and forearm and then in digits, respectively. This switch in function between both regulatory domains allows for the formation of an intermediate zone where neither domain is active. This Hox-free zone will produce the wrist. The articulation between both regulatory domains, in the chromatin landscape, thus produces the articulation between our arms and our hands.


The structure of the oligomeric transmembrane pore formed by the bacterial toxin aerolysin has remained resistant to determination by X-ray crystallography. A team of two PhD students, Ioan Iacovache and Matteo Degiacomi, in two EPFL labs was set up to elucidate the structure by combining experimental approaches, including mutagenesis, single particle electron microscopy studies, molecular dynamics simulation and analysis of protein intrinsic dynamics. The hand in hand works of the PhD students lead to the unraveling of a completely novel membrane insertion mechanism that involve major concerted conformational changes and which are relevant for a very large class of pore-forming proteins.
Your application: how it works

There are two yearly application deadlines: **May 1st and November 15th.**
You will first have to fill in the online application form including your personal details, official transcripts of diplomas and your academic background, as well as your statement of objectives and the contact details of three referees.
The program’s committee will evaluate and make a decision on your application, taking into account the research interests and potential thesis directors you indicate.
Some applicants will be selected and invited for interviews at EPFL for three days. During this time, they will meet group leaders with open positions, present their master’s project and visit the institute, as well as Lausanne. At the end of the three days interview, some of the students will be accepted in the program and invited to pursue a PhD with their chosen thesis director.

Overview of the program

The duration of PhD studies is usually of 4 years or less.
Students will obtain a doctoral degree from EPFL (Swiss Federal Institute of Technology).
During their PhD studies, students will participate in teaching (contact hours, preparation, corrections of exams, supervision of bachelor student projects, currently a total of approximately 300 hours during the entire PhD).
Students will be followed by a PhD committee that offers guidance. A mentor will ensure that the student has settled satisfactorily into the lab and the program.
Graduate students complete their education by attending practical and theoretical courses, as well as seminars.
Students are required to accumulate 12 ECTS credits during their doctoral studies.
Starting salary: 51'400 CHF

Why choose the EDMS doctoral program?

- Access to a large portfolio of laboratories in both basic and applied life sciences.
- Access to state-of-art technology platforms and core facilities.
- International environment.
- Education « à la carte » in a European leading university.
- Experience in teaching at the university level.
- Access to all EPFL courses and events including seminars, courses, training and industrial network.
- Conviviality: participation to the student retreat and other get-together activities.
- Alumni PhD students have access to Swiss fellowships.
- Life in a beautiful environment, Lausanne.

Contacts:

Further information and contacts can be found at:

**http://phd.epfl.ch/EDMS/en**

Committee & Thesis Directors:

**http://phd.epfl.ch/EDMS/members**