

Syllabus

Transposable elements: Genomes and their epigenetic regulation, 1.5 credits (PNS0143)

Syllabus approved: 2016-07-19

Subject: Biology

Marking scale: Pass / Failed

Prerequisites: Basic knowledge of molecular genetics. The course is primarily for PhD students within the SLU Graduate School "Organism Biology" but will be open for all interested PhD students/researchers.

Objective: The course will cover essential topics related to transposable element biology with an emphasis on molecular genetics aspects in plant systems. At the end of the course, students will be able to:

- Distinguish different types of repeat sequences and identify transposons from nucleotide sequence
- Interpret the relationship between host genomes and transposable elements
- Assess genetic or epigenetic effects of transposons in genes of interest
- Understand, adopt and evaluate new trends within transposon element biology put forward in the scientific literature

Contents: Transposable elements occupy large fractions of the genomes of many organisms. These sequences affect gene expression through epigenetic regulation and also contribute to genome evolution. Although transposable elements once were considered junk DNA substantial recent advances have considerably changed this picture.

The course consists of six two-hour classes focusing on different aspects of transposon element biology. Each class starts with a short introductory lecture followed by a summary of the assigned literature and a concluding discussion. Students will be responsible for presenting one or two topics from the assigned literature and are also expected to come to class prepared to be involved in discussion on the topics of the day.

The course will cover the following essential aspects of transposable element biology:

- History of transposable elements
- Classification and variation of repeat sequences
- Transposable elements in genome evolution

- Transposable elements as genetic/genomic tools
- Definition and identification tools (methodology in dry and wet)
- Regulation and control of transposable elements by the host: influence of RNA silencing and epigenetic pathways
- Transposable element effect on gene regulation & domestication
- Transposable element dynamic regulation during plant development

Literature: Articles and handouts

Examination: Attendance at all scheduled activities, presentation of assigned topics from the literature and active engagement in discussions.

Additional information: The course is organized jointly by German Martínez Arias and Miyuki Nakamura from the Department of Plant Biology on behalf of the research school Organism Biology.

Responsible department:
Department of Plant Biology

Location:
Uppsala