

P000008 Real Time Quantitative PCR – theory, experimental design and data analysis, 3.5 credits

Language: English

Subject: Biology

Marking scale: Pass / Failed

Syllabus approved: 2022.10.12

Prerequisites

The course is intended for PhD students within the SLU Graduate School Organism Biology, but is open for all interested SLU PhD students. If space allows, other SLU staff and PhD students from other universities are also welcome to apply. Lectures and seminars will be open for all SLU staff and PhD students from other universities, practical part of the course will be available only for registered attendees.

Objective

The course aims to equip students with comprehensive knowledge of applicability of qPCR methods, train relevant technical skills and introduce currently available tools. After the course students will be able to decide whether qPCR is the best method to address a given problem, design a qPCR experiment following MIQE guidelines for scientific publications of qPCR data, analyze the data and write it up for a publication.

Content

The course includes a strong theoretical background in qPCR, practically-oriented modules on the design of qPCR experiments, the analysis and presentation of qPCR data. Students will have an opportunity to learn about practical application of the qPCR method in the context of other existing techniques (NGS, Microarrays etc). The course also includes a practical part, during which students will design their own experiments, design and order primers, prepare templates, perform qPCR and analyze the data. Teaching will be carried out in the form of lectures and seminars combined with group works as well as lab work at Uppsala BioCenter. Additionally students will be asked to perform several homework tasks in groups.

Students will be encouraged to design and perform experiments based on their own project, however it will be also possible to perform an experiment using material provided by the course.

Literature

1. Bustin, S. A., Benes, V., Garson, J. A., Hellemans, J., Huggett, J., Kubista, M., et al. (2009). The MIQE Guidelines: Minimum Information for Publication of Quantitative Real-Time PCR Experiments. *Clinical Chemistry*, 55(4), 611–622.
2. <http://statistics.gene-quantification.info/>

Examination

A student should attend at least 80% of teaching sessions and complete the practical and ALL homework tasks. Students will be asked to work in groups of 2-3 people. For examination, each group will make a powerpoint presentation presenting the results of their data analysis as it would be done for a publication, summarizing the principles behind the experiment layout and their conclusions. These presentations will be discussed by all course participants at the final seminar.

Course Organizer:

Alyona Minina, E-mail: alena.minina@slu.se

Additional information

The course is organized by Alyona Minina (Department of Molecular Sciences, NJ faculty) on behalf of the SLU Organism Biology research school. Most of the course activities will take place at Uppsala

BioCenter, Ultuna campus, SLU. Lectures and seminars might be moved to Zoom in case of unforeseen lockdowns. For the practical part students will have to attend Uppsala BioCenter in small groups. The course program is designed for maximum 15 students per course occasion.

Responsible department

Department of Plant Biology, BioCenter, SLU