



**Karolinska  
Institutet**

Course syllabus for

## **Molecular Biology 2, 7.5 credits**

Molekylärbiologi 2, 7.5 hp

This course has been cancelled, for further information see Transitional provisions in the last version of the syllabus.

Please note that the course syllabus is available in the following versions:

Autumn2011 , Autumn2013 , Spring2014 , Spring2018

Course code	1BA059
Course name	Molecular Biology 2
Credits	7.5 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Biomedical Laboratory Science
Level	G2 - First cycle 2
Grading scale	Fail (U), pass (G) or pass with distinction (VG)
Department	Department of Laboratory Medicine
Decided by	Programnämnd 6 (Biomedicinsk analytiker- och Röntgensjuksköterskeprogrammen)
Decision date	2011-04-18
Revised by	Programnämnd 6 (Biomedicinska analytikerprogrammet och Röntgensjuksköterskeprogrammet)
Last revision	2013-05-28
Course syllabus valid from	Autumn 2013

## **Specific entry requirements**

General entry requirements for higher studies, and specific entry requirements as stated in the programme syllabus for the Biomedical laboratory science education or the equivalent. In addition to this is required that at least 105 credits are passed from semester 1-4 in Biomedical laboratory science program or equivalent knowledge. In these credit points should be included Molecular Biology and methods in molecular biology equivalent to at least 7.5 HE credits.

## **Objectives**

The aim of the course is to give advanced knowledge about the structure and function in eukaryotic cells of the genetic material and advanced and increased knowledge and skills in molecular biological methodology. The student also should train his scientific approach by planning independently, carry out, evaluate and document a laboratory project according to the scientific progression syllabus of the

program.

**Knowledge and understanding** On completion of the course, the student should be able to

- account for organisation and contents of the human genome thoroughly.
- account for causes of to through be injured and changed and explain the different mechanisms that lie behind these changes.
- at a molecular level explain how changes in the genome can influence cells and organisms.
- explain different methods to identify, isolate and analyse gene sequences
- explain different methods to analyse gene products

**Skills and abilities**

On completion of the course, the student should be able to

- show how one prepares a research plan to be able to carry out a scientific study.
- independent, based on method descriptions, be able to carry out commonly occurring molecular biological methods with use of relevant controls,
- interpret, evaluate and compare own data with expected results and general principles critically.
- present a scientific study orally and in writing according to scientific structure.
- critically review and publicly discuss a written scientific work.

**Judgement and approach** On completion of the course, the student should be able to

- apply a scientific approach.
- demonstrate an understanding of the importance to review sample material critically, analysis procedures and results for a correct assessment of the results.
- show ability to analyse and identify his need of additional knowledge because develop his skills.

## Content

The course is divided in two parts:

**Theory and Methods in Molecular Biology, 6 hp** The theoretical part of the course intends to deepen and increase the knowledge in molecular biology and molecular biological methodology. Important parts within molecular biological theory are a specialisation human the organisation, function and contents of the genome. Mechanisms that cause instability and changes in the genome are discussed and how it influences the function of the cell. In this part, an introduction to cancer genetics is also included.

In molecular biological methodology is included how one can in various ways isolate and analyse genes. Among the methods that are discussed, include linkage analyses, cloning, PCR, sequencing and mutation analyses. Here, different methods are also included to analyse gene products such as blotting, hybridisation techniques and proteininteractionsanalyses, RT-PCR, micro array, mass spectrometry. Comparison of methods is made and which information one can obtain from different methods be discussed.

The students work during the theoretical part of the course with scientific articles within the different fields. The articles are discussed in groups from different issues.

**Laboratory experiments, 1.5 hp** A large part of the course is occupied by a laboratory project, where the student should write a project plan that should be accepted of supervisor before it is started. During the project period, the student works independently with carrying-out and interpretation of the included

analyses. The laboratory project is presented orally and in writing in a report written according to scientific structure. Here is included also to review and publicly discuss another student's report. Laboratory parts that are included during the project period are nucleic acid preparation, RT-qPCR including primer design, immunohistochemistry and Western blot. The work is documented running in a workbook.

## Teaching methods

The teaching is given form of seminars, lectures, laboratory sessions and project work. Seminars and laboratory sessions are compulsory. In case of absence, an agreement between the student and responsible teacher concerning compensation is made.

## Examination

The theoretical part of the course is examined through a written take-home examination and an oral examination. Grading scale VG-G-U The laboratory part is examined regarding planning and practical implementation of the laboratory parts, submitting of workbook, oral and written presentation and critical review of the report of a fellow student. Grading scale G-U To pass the course, it is required that both the parts are passed. To pass with distinction is required in addition to the passed with distinction on the oral the examination.

Seminars and laboratory sessions are compulsory. In case of absence, an agreement concerning compensation is made between the student and the responsible teacher. At failed laboratory session, the student has the opportunity to redo the laboratory session once at the next course date. For take-home examination and the oral examination be given a re-examination in connection with the course and under the reexaminationperiod in August.

## Other directives

Course evaluation will be carried out in accordance with the guidelines established by the Board of Higher Education.

## Literature and other teaching aids

*Strachan, Tom; Read, Andrew P.; Strachan, T.*

### **Human molecular genetics**

4. ed. : New York : Garland Science, c2011 - xxv, 781 p.

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