



**Karolinska
Institutet**

Course syllabus for

Molecular Medicine - Oncology, 15 credits

Molekylär medicin - onkologi, 15 hp

This course syllabus is valid from autumn 2022.

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

Autumn2019 , Autumn2020 , Autumn2022

Course code	1BI049
Course name	Molecular Medicine - Oncology
Credits	15 credits
Form of Education	Higher Education, study regulation 2007
Main field of study	Biomedicine
Level	G2 - First cycle 2
Grading scale	Pass with distinction, Pass, Fail
Department	Department of Oncology-Pathology
Decided by	Programnämnden för biomedicinprogrammen
Decision date	2019-03-27
Revised by	Programme committee for study programmes in biomedicine
Last revision	2022-03-23
Course syllabus valid from	Autumn 2022

Specific entry requirements

At least grade pass (G) for the courses: Introduction to Biomedical Science; General and Organic Chemistry; Cell, Stem Cell and Developmental Biology; Biochemistry; Genetics, Genomics and Functional Genomics; Chemical Biology; Biostatistics; Tissue Biology; Immunology and Microbiology; Neuroscience; and Pathology. At least grade pass (G) for the parts "Integration of practical features" (4 credits) and "Project work" (2 credits) within the course Physiology, and at least grade pass (G) for the parts "Pharmacokinetics and pharmacodynamics" (2 credits), "Laboratory work in pharmacology" (1.5 credits) and "Group assignments in pharmacology and toxicology" (2.5 credits) within the course Pharmacology and Toxicology, in the Bachelor's Programme in Biomedicine.

Objectives

After the course the students should be able to:

Regarding knowledge and understanding

- describe general principles of cancer diagnostics and treatment,
- understand the basic processes underlying the transformation of a normal cell to its malignant

- counterpart, and the consequences of malignant transformation on the cellular and organism level,
- understand how the biological knowledge of cancer development is used in modern cancer treatment,
- show knowledge of laboratory techniques used in experimental cancer research,
- demonstrate knowledge in biostatistics and cancer epidemiology,

Regarding competence and skills

- show skills in relevant laboratory techniques used in experimental cancer research,
- use basic epidemiological research methods and describe their importance in complementing other (e.g., laboratory) research investigations,
- use the principles of good experimental design to plan valid and efficient experimental studies,
- find relevant original and review articles in the subjects of molecular oncology, and to analyse, reflect upon, give feedback and compile data from these in e.g. an oral presentation,

Regarding judgement and approach

- have knowledge about and be able to discuss ethical aspects in relation to research covered in the course,
- demonstrate an ethical approach in experimental investigations.

Content

Molecular oncology

Tumor biology: Causes of cancer. Cancer related genes, including oncogenes and tumor suppressor genes; their normal cellular function, mutagenesis and consequences of their mutant state in cancer. Hereditary cancer. The stepwise transformation process. The biological behaviour of tumors. Cell cycle control and apoptosis. Tumor progression and metastasis. The interaction between malignant and normal cells. Tumor virology. Research methodology.

Oncology

Malignant diseases. Diagnosis. Molecular tumor pathology. The major treatment principles of cancer (surgery, radiotherapy, hormonal treatment, and biological therapy). Novel and developing treatment strategies. Ethics. Palliative treatment. Cancer epidemiology. Prevention. Clinical trials.

Biostatistics

Study design: Randomized controlled trial, cross-sectional study, case-control study, cohort study.

Epidemiological concepts: confounding bias, selection bias, mediation, interaction.

Statistical models and methods: linear regression (with ANOVA), logistic regression, proportional hazards regression.

The course is divided into the following parts:

Laboratory practicals, 5.0 hp

Grading scale: GU

Problem based seminars and group seminars, 5.0 hp

Grading scale: GU

Integration of Molecular oncology, 3.5 hp

Grading scale: VU

Integration of Biostatistics, 1.5 hp

Grading scale: GU

Teaching methods

The teaching includes lectures, patient demonstrations, problem based seminars, group seminars and laboratory practicals.

Examination

Laboratory practicals (5 credits). The examination consists of active participation. Graded Fail/Pass.

Problem based seminars and group seminars (5 credits). The examination consists of active participation. Graded Fail/Pass.

Integration of Molecular oncology (3,5 credits)

Written exam on the molecular oncology aspects of the course. Graded Fail/Pass/Pass with distinction

Integration of Biostatistics (1,5 credits)

Written or digital (computer-based) exam on biostatistics. Graded Fail/Pass

The final grade for the whole course is based on the results from the part Integration of Molecular Oncology. To pass the whole course, the grade Pass must have been obtained for all parts of the course (Laboratory practicals, Problem based seminars and group seminars, Integration of Molecular oncology and Integration of Biostatistics).

Compulsory participation

Laborations, seminars, patient demonstrations and a written part exam covering the first parts of the course are compulsory. The course director decides if and how absence from compulsory components can be compensated. The component is not registered in LADOK unless the student has passed the compulsory component or compensated according to the course director's directions.

Limited number of examinations or practical training sessions

Students who have not passed the regular examination are entitled to participate in five more examinations. If the student has failed six examinations/tests, no additional examination or new admission is provided.

The number of times that the student has participated in one and the same examination is regarded as an examination session. Submission of a blank examination is regarded as an examination. An examination, for which the student registered but not participated in, will not be counted as an examination.

If there are special grounds, or a need for adaptation for a student with a disability, the examiner may decide to deviate from the syllabus's regulations on the examination form, the number of examination opportunities, the possibility of supplementation or exemptions from the compulsory section/s of the course etc. Content and learning outcomes as well as the level of expected skills, knowledge and abilities may not be changed, removed or reduced.

Other directives

The course language is English.

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

Oral evaluation in the form of course council meetings will be carried out during the course.

Literature and other teaching aids

Mandatory literature

Weinberg, Robert A.

The biology of cancer

2. ed. : New York : Garland Science, 2014 [dvs 2013] - 876, 6, 30, 28 s.

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