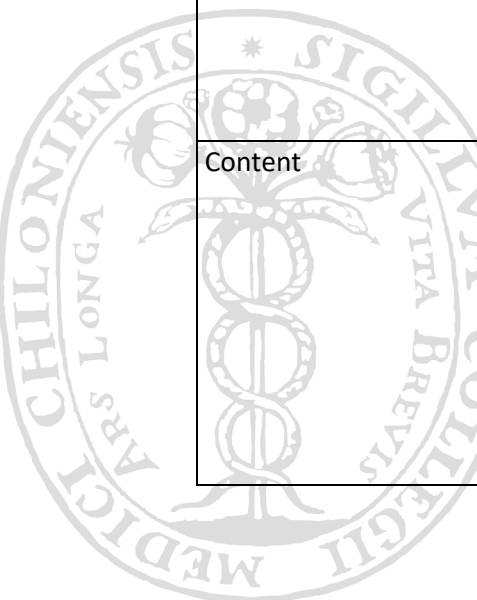


Basics of molecular research	
Module code	mlsMolBio-01a
Abbreviated title	MolBio
Module components	Lecture, practical, tutorial
When	Semester 1
Module coordinator/ Organiser	A. Nebel (IKMB)
Lecturers	A. Tholey, J. Baines (IEM); A. Nebel , F. Sommer, S. Jabs, R. Häsler (IKMB), S. Fuchs (Experimental Trauma Surgery), K. Reiß (Dermatology)
Contact hours	Lecture 3 CH Practical 5 CH Tutorial 1 CH
Workload	<u>Lecture: 60 h</u> Attendance time 38 h, preparation 8 h, revision 14 h <u>Tutorial: 30 h</u> Attendance time 14 h, preparation 6 h, revision 10 h <u>Practical: 150 h</u>
Total: 240 h	Attendance time 80 h, preparation 46 h, revision 24 h
Credit points	8 (lecture 2 CP, tutorial 1 CP, practical 5 CP)
Requirements	-
Expected outcome	<p><u>Knowledge:</u> Students</p> <ul style="list-style-type: none"> - can explain and correctly use molecular-biological terminology - have a thorough basic knowledge of genomics, proteomics and cell biology - understand the most important lab techniques in the research areas mentioned above and can explain the respective underlying principles and concepts. <p><u>Skills:</u> Students</p> <ul style="list-style-type: none"> - can apply the basic techniques for safe, precise and tidy lab work - can apply techniques for DNA, RNA and protein analytics and work with cell cultures in the lab efficiently - can write experimental protocols. <p><u>Competences:</u> Students</p> <ul style="list-style-type: none"> - understand the molecular-biological and chemico-physical principles behind lab experiments - are able to interpret, critically review and discuss the acquired data - can transfer their knowledge to other scientific questions.
Content	<u>Lecture and practical:</u> Basics of molecular biology and genomics (DNA/RNA), proteomics, cell biology; lab safety, basic lab techniques (weighing, measuring, pipetting, error analysis, titration, photometric measurements); SDS-PAGE proteins, Western Blotting; protein identification, enzyme kinetics, phosphorylation, mass spectrometry analytics, plasmid DNA: preparation, processing, agarose gel electrophoresis; cell cultures (laminar flow, cell splitting, cell proliferation, cell viability assays, apoptosis, FACS, ELISA, biological barriers; contamination, transient transfections, transfection analysis, cell stimulation); DNA extraction, PCR, Sanger sequencing, sequence analysis, polymorphism



	<p>detection; RNA extraction, RT-PCR; immunofluorescence staining, live cell imaging.</p> <p><u>Tutorial</u>: Exercises to corroborate knowledge gained in lecture</p>
Module examination/ exam	<p>Ungraded (pass/fail distinction)</p> <p>Written exam lecture + tutorial [individual exam]</p> <p>Lab interviews for practical [compound exam]</p>
Media used	<p>PPT presentations, show-case experiments, manuals and instructions for lab work</p>
Literature	<p>Berg JM, Gumpert RI, Stryer L, Tymoczko JL, Biochemistry (W.H. Freeman 2006, 6th edition) [still valid]</p> <p>Strachan T, Read AP, Human Molecular Genetics (Taylor and Francis, 5th edition 2018)</p> <p>Jones A, Chemistry – An Introduction for Medical and Health Sciences (Wiley 2005) [still valid]</p> <p>Alberts B, Johnson A, Lewis J, Raff M, Roberts K, Walter P, Molecular Biology of the Cell (Taylor & Francis 2014, 6th edition)</p> <p>Nelson DL, Cox MM, Principles of Biochemistry: International Edition (WH Freeman 8th edition, 2021).</p>