

<b>Module Name Molecular Pathology</b>						
<b>Identification Number</b>	<b>Workload</b>	<b>Credit Points</b>	<b>Term</b>	<b>Offered Every</b>	<b>Start</b>	<b>Duration</b>
MN-BC-BSM06	360 h	12 CP	1 <sup>st</sup> or 2 <sup>nd</sup> term of studying	Winter term	Winter term only	7 weeks
<b>1</b>	<b>Course Types</b>		<b>Contact Time</b>	<b>Private Study</b>	<b>Planned Group Size*</b>	
	a) Lectures		20 h	75 h	max. 8	
	b) Practical/Lab		102 h	68 h	max. 8	
	c) Seminar		20 h	75 h	max. 8	
<b>2</b>	<b>Module Objectives and Skills to be Acquired</b>					
	Students who successfully completed this module					
	<ul style="list-style-type: none"> <li>• have acquired detailed knowledge about the basics of molecular pathology diagnostics</li> <li>• are able to interpret the results of certain molecular analyses in the context of clinical patient data</li> <li>• know how to apply molecular technologies like extraction of nucleic acid, PCR and sequencing</li> <li>• have learned how to design and carry out small scientific projects related to the content of the module</li> <li>• have the ability to evaluate, interpret and report their experimental results</li> <li>• have learned how to present research results in oral and written form and to critically discuss scientific publications related to the topic of the module on a professional level</li> <li>• are able to transfer skills acquired in this module to other fields of molecular biology</li> </ul>					
<b>3</b>	<b>Module Content</b>					
	<ul style="list-style-type: none"> <li>• Background of molecular pathology diagnostics: general pathology, principles of molecular medicine and genetics, signal transduction,</li> <li>• Molecular basis of tumor development in lung and gynecological cancer, therapeutic approaches (personalized therapy, inhibition of immune checkpoints)</li> <li>• Microscopy: Histology, immunohistochemistry, fluorescence microscopy</li> <li>• Preanalytical methods: Workflow of samples, macro- and microdissection, extraction of nucleic acids, quantification and quality control, electrophoresis and fragment length analysis</li> <li>• Mutation analysis, wet lab part: Melting point analysis, real-time PCR and digital PCR, Sanger Sequencing, next generation sequencing</li> <li>• Evaluation of sequencing data, bioinformatics basics, pipeline set-up, variant calling and filtering, variant annotation according to HGVS guidelines, data interpretation and reporting</li> <li>• Analysis of gene fusion and amplification by next generation sequencing and fluorescence in situ hybridization</li> <li>• Testing for microsatellite instability</li> <li>• Detection of Human Papillomavirus and Helicobacter pylori from formalin-fixed tissues</li> <li>• Quality control in patient health care</li> </ul>					

4	<p><b>Teaching Methods</b></p> <p>Lectures (including Q&amp;A); Practical work (including wet lab, data evaluation and microscopy); Seminar; Training on presentation techniques in oral and written form; Training on data evaluation and scientific writing</p>
5	<p><b>Prerequisites (for the Module)</b></p> <p>Enrollment in the Master’s degree course “Biochemistry”</p> <p><b>Additional academic requirements</b></p> <p>Basic experimental expertise in molecular biology techniques</p>
6	<p><b>Type of Examination</b></p> <p>The final examination consists of three parts (type BC7): written examination on topics of lectures and the practical/lab part (60 min; 50% of the total module mark); oral presentation (20-30 min; 25% of the total module mark); written experimental protocols (25% of the total modular mark)</p>
7	<p><b>Credits Awarded</b></p> <p>Regular and active participation</p> <p>Each examination part at least “sufficient” (see appendix of the examination regulations for details)</p>
8	<p><b>Compatibility with other Curricula</b></p> <p>Subject module “Human Genetics” in the Master’s degree course “Genetics and Biology of Aging and Regeneration”</p>
9	<p><b>Proportion of Final Grade</b></p> <p>In the Master’s degree course “Biochemistry”: 10 % of the overall grade (see also appendix of the examination regulations)</p>
10	<p><b>Module Coordinator</b></p> <p>Prof. Dr. Sabine Merkelbach-Bruse, phone 478-6369, e-mail: sabine.merkelbach-bruse@uk-koeln.de</p>
11	<p><b>Further Information</b></p> <p><b>Participating faculty:</b> Dr. Jana Fassunke, Dr. Carina Heydt, Dr. Michaela A. Ihle, Christoph Jonas, MSc, Dr. Roberto Pappesch, PD Dr.Dr. Udo Siebolts, Dr. Janna Siemanowski, Svenja Wagener-Ryczek, MSc, Vanessa Welter, MSc</p> <p><b>Literature:</b></p> <ul style="list-style-type: none"> <li>• Original publications will be handed out at the introduction to the module</li> </ul> <p><b>General time schedule:</b> Week 1-5 (Mon.-Fri.): Lectures, practical/lab, preparation for seminar talk, protocol writing; Week 6 (Mon.-Fri.): Preparing the presentation; protocol writing Week 7 (Mon.-Fri.): Preparation for the written examination</p> <p><b>Note:</b> The module contains hand-on laboratory work conducted by small groups of students or individually and is taught in course rooms and laboratories.</p> <p><b>Introduction to the module:</b> 27.11.23, 09:00, Lecture Hall Pathologie, Uniklinik Köln (further information/link will be sent to your Smail-Account)</p> <p><b>Written examination:</b> January 26, 2024, second/supplementary examination March 8, 2024; the later date may vary if students and module coordinator agree. More details will be given at the beginning of the module.</p>