

# Master in Life Sciences

A cooperation between  
BFH, FHNW, HES-SO, ZHAW

<b>Module title</b>	<b>Physiology and Immunotherapies</b>
<b>Code</b>	BP5
<b>Degree Programme</b>	Master of Science in Life Sciences
<b>Group</b>	Bio/Pharma
<b>Workload</b>	3 ECTS (90 student working hours: 42 lessons contact = 32 h; 58 h self-study)
<b>Module Coordinator</b>	<b>Name:</b> Dr. Bruno Schnyder <b>Phone:</b> +41 (0)58 606 86 59 <b>Email:</b> bruno.schnyder@hevs.ch <b>Address:</b> HES-SO, Institut für Life Technologies, Rte du Rawyl 64, 1950 Sitten / Sion
<b>Lecturers</b>	<ul style="list-style-type: none"> <li>• Dr. Bruno Schnyder, HES-SO Vs</li> <li>• Dr. William Pralong, EPFL</li> <li>• Dr. Gerrit Hagens, HES-SO Vs</li> <li>• Dr. Ulrich Siler, FHNW-HLS</li> </ul>
<b>Entry requirements</b>	<p>Bachelor Degree in Life Sciences (Biotechnology, Bioanalytics, Pharmatechnology) including the basics described by the following keywords:</p> <ul style="list-style-type: none"> <li>• properties of the biomolecules proteins, lipids, carbohydrates (sugars), genes, vitamins, small chemical molecules</li> <li>• analytical methods of proteins and cells</li> <li>• structure and function of living cells, physiological transport of nutrition across cell membranes</li> </ul> <p>These basics are summarized by the indicated literature (Silverthorn 2015) provided on moodle, including a self-test.</p>
<b>Learning outcomes and competences</b>	<p>After completing the module, students will be able to:</p> <ul style="list-style-type: none"> <li>• list the key physiological aspects of organs, cell systems, and molecular systems</li> <li>• master cell-based therapy and gene therapy</li> <li>• identify obstacles in recipients of a therapy e.g. adverse immune reaction</li> <li>• understand the fascinating complexity of the brain, and respective therapies</li> </ul>
<b>Module contents</b>	<p>“Physiology and Immunotherapies” introduces and goes beyond the medical aspects of classical “Physiology”. Physiology is the science of functioning of an organism, an organ, or a cell. Eventual dysfunctions can be repaired by newly adopted cells. Other dysfunctions are being targeted by molecular and gene therapies. The module’s training includes illustrative examples thereof.</p> <p>The tissues, cells, molecules, and genes under <i>in natura</i> conditions will be compared with those in engineering facilities. Novel and next generation therapies (e.g. CART cell-therapy) will be based on this. New gene therapy approaches are illustrated using the example of lentiviral gene therapy on the haematopoietic system for the treatment of primary immunodeficiencies</p> <p><u>Key aspects of Physiology:</u>  Brain science discoveries, Immune system defense (e.g. against infectious disease), Intestinal and Urinary tracts, whole organism models (e.g. gene-ko mice)</p>

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	<u>Key aspects of Immunotherapies:</u> Cell-based and antibody-based Immunotherapy, furthermore Gene-Therapy, Microbiota “our home pharmacy”
<b>Teaching / learning methods</b>	lectures in oral and written form <ul style="list-style-type: none"> <li>• exercise trainings individually and in groups</li> <li>• literature study of selected research publications</li> <li>• self-study, both prior to and following the lectures</li> <li>• Overview of teaching hours (12 lectures by B. Schnyder, 12 lectures by G. Hagens, 12 lectures by W. Pralong, 6 lectures by U. Siler)</li> </ul>
<b>Assessment of learning outcome</b>	1. Final written exam, closed book (100%)
<b>Format</b>	7-weeks
<b>Timing of the module</b>	Spring semester, CW 8-14
<b>Venue</b>	Blended learning format. Presence sequences take place in Berne
<b>Bibliography</b>	<u>pre-course work:</u> Silverthorn D.Unglaub “Human Physiology” Edit. Benjamin Cummings, Pearson ISBN-13: 978-0-321-75000-6: Summaries and a self-test (both are available on moodle)  <u>Course material (moodle):</u> Manuscripts and a selection of scientific papers
<b>Language</b>	English
<b>Links to other modules</b>	BP6 “Tissue Engineering for Drug Discovery”
<b>Comments</b>	
<b>Last Update</b>	05.09.2024