

Master in Life Sciences

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

Module title	Physiology and Immunotherapies
Code	BP5
Degree Programme	Master of Science in Life Sciences
Group	Bio/Pharma
Workload	3 ECTS (90 student working hours: 42 lessons contact = 32 h; 58 h self-study)
Module Coordinator	<p>Name: Dr. Bruno Schnyder Phone: +41 (0)27 606 86 59 Email: bruno.schnyder@hevs.ch Address: HES-SO, Institut für Life Technologies, Rte du Rawyl 64, 1950 Sitten / Sion</p>
Lecturers	<ul style="list-style-type: none"> • Dr. Bruno Schnyder, HES-SO Vs • Dr. William Pralong, EPFL • Dr. Gerrit Hagens, HES-SO Vs • Dr. Eric Kübler, FHNW-HLS
Entry requirements	<p>Bachelor Degree in Life Sciences (Biotechnology, Bioanalytics, Pharmatechnology) including the basics described by the following keywords:</p> <ul style="list-style-type: none"> • properties of the biomolecules proteins, lipids, carbohydrates (sugars), genes, vitamins, small chemical molecules • analytical methods of proteins and cells • structure and function of living cells, physiological transport of nutrition across cell membranes <p>These basics are summarized by the indicated literature (Silverthorn 2015) provided on moodle, including a self-test.</p>
Learning outcomes and competences	<p>After completing the module, students will be able to:</p> <ul style="list-style-type: none"> • list the key physiological aspects of organs, cell systems, and molecular systems • master cell-based therapy and gene therapy • identify obstacles in recipients of a therapy e.g. adverse immune reaction • understand the fascinating complexity of the brain, and respective therapies
Module contents	<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 new 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.</p> <p><u>Key aspects of Physiology:</u> Brain science discoveries, Immune system defense (e.g. against infectious disease, including antibiotics resistances), Intestinal and Urinary tracts, whole organism models (e.g. gene-ko mice)</p>

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	<p>Key aspects of Immunotherapies: Cell-based and antibody-based Immunotherapy, furthermore Gene-Therapy, Microbiota “our home pharmacy”</p>
Teaching / learning methods	<p>lectures in oral and written form</p> <ul style="list-style-type: none"> • exercise trainings individually and in groups • literature study of selected research publications • self-study, both prior to and following the lectures • Overview of teaching hours (18 lectures by B.Schnyder, 12 lectures by G.Hagens, 8 lectures by W.Pralong, 4 lectures by E.Kübler)
Assessment of learning outcome	<p>1. Final written exam, closed book (100%)</p>
Format	<p>7-weeks</p>
Timing of the module	<p>Spring semester, CW 8-14</p>
Venue	<p>Bern</p>
Bibliography	<p><u>pre-course work:</u> Silverthorn D.Unglaub “Human Physiology” Edit. Benjamin Cummings, Pearson ISBN-13: 978-0-321-75000-6: Chapters 1-2 (Introduction), 3 (Cells and tissues), 4-5 (Introduction : Cell physiology), 6 (Cell communications “Signalling”), 7 (Endocrinology / hormones), 8-9 (Brain), 16 (Blood), 21 (Digestion), 24 (Immunology)</p> <p><u>Course material (moodle):</u> A selection of scientific papers will be handed out</p>
Language	<p>English</p>
Links to other modules	<p>BP6 “Tissue Engineering for Drug Discovery”</p>
Comments	
Last Update	<p>23.02.2018</p>