

Master in Life Sciences

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

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	Name: Dr. Bruno Schnyder Phone: +41 (0)58 606 86 59 Email: bruno.schnyder@hevs.ch Address: HES-SO, Institut for Life Sciences, Rue de l'industrie 19, Campus Energypolis, 1950 Sitten / Sion
Lecturers	<ul style="list-style-type: none"> • Dr. Bruno Schnyder, HES-SO VS • Dr. William Pralong, EPFL • Dr. Valentin Jossen, HES-SO VS • Dr. Ulrich Siler, 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 described by the literature 'Silverthorn D – textbook' and in summarized form provided on moodle.</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 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. gene therapy, cell-therapy) will be based on this. New gene therapy approaches are illustrated using the example of lentiviral gene therapy on the hematopoietic 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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	Key aspects of Immunotherapies: Cell-based and antibody-based Immunotherapy, furthermore Gene-Therapy, Microbiota “our home pharmacy”
Teaching / learning methods	lectures in oral and written form <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 (12 lectures by B. Schnyder, 6 lectures by V. Jossen, 18 lectures by W. Pralong, 6 lectures by U. Siler)
Assessment of learning outcome	1. Final written exam, closed book (100%)
Format	7-weeks
Timing of the module	Spring semester, CW 8-14
Venue	Blended learning format. Presence sequences take place in Berne
Bibliography	<u>pre-course work:</u> Silverthorn D.Unglaub “Human Physiology” Edit. Benjamin Cummings, Pearson ISBN-13: 978-0-321-75000-6: Summaries thereof are available on moodle <u>Course material (moodle):</u> Manuscripts and a selection of scientific papers
Language	English
Links to other modules	BP6 “Tissue Engineering for Drug Discovery”
Comments	-
Last Update	25.08.2025