Title of module	**VIII Stem Cell Lecture Series**
Module coordinator	**Prof. Dr. Beate Brand-Saberi**

Credit points	7	**Semester(s) in which the module is taught**	1 and 2
Contact hours	3	**Workload**	150 hours

Lecturer(s)	Brand-Saberi, Bühler, Dehmelt, Dittmar, Eisenacher, Eysel, Faissner, Fuchs, Giebel, Heinrichs, Herz, Heumann, Pfannkuche, Thakur, Wiese, Zähres
Type of teaching	Lecture (1 hours per week) in the first semester Lecture (2 hours per week) in the second semester Scientific lectures presenting original research work, Moodle support of the presentations, further reading recommendations. Critical discussions concerning the presented research data. Skills for feedback of self-assessment of the learning progress; Developing a general awareness of stem cell related topics in society Making first contacts to PIs of international standing in their fields
Relation to curriculum	Compulsory; For master students of Biology/Biotechnology and Biochemistry of RUB also suitable as elective lecture.
Recommended prerequisites	No prerequisites from curriculum; Students taking this module will be expected to have a basic understanding of molecular biology, genetics, cell biology and cell physiology.
Aims	Students should develop an awareness of specific scientific questions related to stem cell biology and will be able to discuss them in context of current literature.
Learning outcome	Knowledge: Students have acquired an overview about views, problems and current research topics and know research fields and research groups related to stem cell biology Skills: Students are capable of understanding original research work and relate current research to basic knowledge Competencies: Students have learned to a) Relate current original research results to a theoretical background b) Follow-up recent achievements in the field c) Put relevant problems into a scientific context They are capable of communicating in a scientific context in front of an international audience.
Contents of module	Semester 1: - Neonatal stem cells in clinic and research (Kögler) - Typical characteristics of CB-derived stem cells in comparison to embryonic stem cells (ESC) and induced pluripotent stem cells (iPS) (NN) - Introduction to Biomedical Ethics (Eysel) Ethical Issues in Stem Cell Research and Synthetic Biology (Fuchs) Research and Publication Ethics I (Eysel) Gene Transfer to Hematopoietic Stem Cells (Klump) Self-renewal versus differentiation of hematopoietic stem cells (Giebel) Cellular Reprogramming I (Zähres) Cancer stem cells (Bühler)

	Stem-like cells in cancer (Bühler) Cellular Reprogramming II (Zähres) Semester 2: - Muscle Stem Cells and Myogenesis (Brand-Saberi) - Cell migration in cancer (Dittmar) - Embryonic and Induced Pluripotent Stem Cells for Research and Regenerative Medicine (Zähres) - Use of stem cells in transgenic and knock out technologies (Wiese) - Induction of pluripotent stem cells (Zähres) - Extracellular vesicles as a novel biomarker in monitoring clonal evolution of cancer stem cells (Thakur) - Intracellular signalling in stem cells (Heumann) - Molecular structure and functions of the stem cell niche (Faissner) - Limbal Stem Cells - from bedside back to bench (Brand-Saberi) - Mechanosensation in stem cell differentiation (Dehmelt)
Study and examination requirements; Forms of examination	Discussions during and after the lectures are required. The mode of examination on which the module mark is based will be a multiple-choice test. The examination will be 90 minutes and the question paper will consist of 9 questions with five choices for each question.
Literature	Eaves (2008) Cancer stem cells: Here, there, everywhere? Nature 456, 581–582 Hauser et al. (2012) Isolation of Novel Multipotent Neural Crest-Derived Stem Cells from Adult Human Inferior Turbinate. Stem Cells and Development Volume 21, Number 5, 742–756 Hennen E, Faissner A (2012) LewisX: a neural stem cell specific glycan? Int J Biochem Cell Biol 44:830-833. Chakrabarty, K., and Heumann, R. (2008). Prospective of Ras signaling in stem cells. Biological Chemistry 389, 791–798. Kim et. al., (2009) Direct reprogramming of human neural stem cells by OCT4 Nature 461: 649-653. Kögler et al. (2004) A New Human Somatic Stem Cell from Placental Cord Blood with Intrinsic Pluripotent Differentiation Potential JEM 200 no. 2 123-135 Manns, M., Leske, O., Gottfried, S., Bichler, Z., Lafenetre, P., Wahle, P., and Heumann, R. (2011). Role of neuronal ras activity in adult hippocampal neurogenesis and cognition. Front Neurosci 5, 18. Yusuf F. and Brand-Saberi B. (2012). Myogenesis and muscle regeneration. Histochemistry and Cell Biology, 138(2):187-199 Veninga V. and Voest E.E., (2021) Tumor Organoids: Opportunities and challenges to guide precision medicine. Cancer Cell Volume 39, Issue 9, p. 1190-1201