Title of module	**XII Lab Bench Project and Grant Writing (Wahlpflichtmodul)**
Module coordinator	**Prof. Dr. Beate Brand-Saberi**

Credit points	17	**Semester(s) in which the module is taught**	3
Contact hours	16	**Workload**	510 hours

Lecturer(s)	All PIs from the associated labs
Type of teaching	The module "Lab Bench Project and Grant Writing" consists of the lecture "Advances in Stem Cell Research" (2 CP), a seminar and laboratory work (15 CP). Advances: Lecture 1 hours per week, Seminar 1 hour per week Lab Bench: Practical work: 13 hours per week, Seminar 1 hour per week
Relation to curriculum	Compulsory; elective
Recommended prerequisites	Module I “Stem Cell Physiology”, module III “Stem Cell Practical Courses”, module VIII “Stem Cell Lecture Series” and module X “Lab Rotation” are recommended
Aims	The students will be enabled to plan, perform and interpret lab experiments choosing from a range of particular methods to solve a particular scientific question. They will also be able to design a research proposal for a suitable funding source.
Learning outcome	Knowledge: The students have gained knowledge in relevant topics in stem cell research by gaining an advanced insight into relevant research fields and identifying relevant research methods. They have obtained knowledge of funding agencies. Skills: Students have a command on particular research methods and the ability to document data. They can interact with others in a laboratory environment. Competencies: The students are able to participate actively in planning research projects and to identify relevant research methods. They can interpret obtained research data. They are capable of assembling a research proposal. Students have gained in self-dependence, responsibility and self-organization.
Contents of module	Seminar topics comprise: Relevant methods available in the lab of choice Lab security Standards of documentation What is a control? Structure of research proposals Funding agencies The lectures "Advances in Stem Cell Research" will be given by international experts in the field and present cutting edge research. Accordingly, lectures will vary from year to year.
Study and examination requirements; Forms of examination	Regular laboratory reports; students performance during discussions and interactions in the context of the lab bench project and in the seminar and lectures with lecturers and fellow students; The assessment will be done on the basis of a written research proposal according to DFG funding standards.

Literature	Yusuf F. and Brand-Saberi B. (2012). Myogenesis and muscle regeneration. Histochemistry and Cell Biology, 138(2):187-199 Mavrommatis L., Zaben A., …Zähres (2023) CRISPR/Cas9 Genome Editing in LGMD2A/R1 Patient-Derived Induced Pluripotent Stem and Skeletal Muscle Progenitor Cells. Stem Cells International Volume 2023, Article ID 9246825 Yahya I, Abduelmula A, Hockman D, Brand-Saberi B, Morosan-Puopolo G. Dev Biol. 2024 506:52-63. doi: 10.1016/j.ydbio.2023.12.001. Epub 2023 Dec 8. PMID: 38070699 Squire, Berg, Bloom, du Lac, Ghosh, Spitzer. Fundamental Neuroscience, 3rd Ed. AP (2008) Confocal Microscopy Methods and Protocols. Stephen W. Paddock (ed.) "Methods in Molecular Biology", v. 123, Humana Press. Electron Microscopy Methods and Protocols M A Nasser Hajibagheri, (ed.), 1999, "Methods in Molecular Biology", v. 117, Humana Press Microscopy and Histology for Molecular Biologists: A Users Guide (2002). J. Kiernan and I. Mason (eds.) Portland Press limited. Theiss C, Meller K (2012). Fluorescence Proteins and Time-Lapse Imaging of the Cytoskeleton. Protocols in Neuroscience, Interdisciplinary Methods for Investigation of the Cytoskeleton. Ed.: R. Dermietzel. Springer Press. 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. 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 “Vertebrate Myogenesis: Stem Cells and Precursors” Beate Brand-Saberi (ed.) Springer-Verlag 2014, Problems and Results in Cell Differentiation Denecke B, Horsch LD, Radtke S, Fischer JC, Horn PA, Giebel B. Human endothelial colony-forming cells expanded with an improved protocol are a useful endothelial cell source for scaffold-based tissue engineering. J Tissue Eng Regen Med. 2013 epub Klump H, Teichweyde N, Hinrichs C, Horn PA. Development of patient-specific hematopoietic stem and progenitor cell grafts from pluripotent stem cells, in vitro. Current Molecular Medicine. 2013