Angebot 5 „Reconstitutio ad integrum – Trends in regenerative therapies“
Wahlpflichtmodul ab Semester 7 (2700 Minuten)

Einrichtung
CC09 - Julius-Wolff-Institut für Biomechanik und Muskuloskelettale Regeneration - CVK
CC12 - Institut für Medizinische Immunologie - CVK
CC12 - Medizinische Klinik mit Schwerpunkt Rheumatologie und Klinische Immunologie - CCM
CC17 - Institut für Medizinische Genetik und Humangenetik - CVK

Inhaltsbeschreibung
Ziele & Inhalt
Regenerative Medicine is an emerging field that combines basic science, biotechnology, materials science and clinical disciplines with the goal of repairing or replacing tissues and organs impaired by aging, diseases, trauma or congenital abnormalities. Major foci of regenerative therapies are i) the modulation of the immune response, ii) induction of tissue regeneration by derivatives of pluripotent stem cells, and iii) the promotion of the body's endogenous repair mechanisms by mechanical and biochemical stimuli. Regenerative Therapies have a growing impact, e.g. in the treatment of immunological, cardiovascular, and musculoskeletal diseases. Through interdisciplinary seminars and hands-on scientific practical work this course provides insight into basic principles involved in the field of regenerative therapies, i.e. molecular biology, human genetics, stem cell isolation and characterization, tissue engineering, cell-matrix interactions, cell stimulation, and will introduce to recent translations of scientific breakthroughs into clinical trials.

Wochenstruktur und Inhalte
Please note, that this course will be held in English. It will run over a three week period and will focus on.
• Targeting inflammation to support regeneration
• Cell-matrix interactions
• Monitoring of regeneration
The week starts with an introductory seminar, in which the targeted diseases and treatment concepts will be introduced. The course is a combination of interdisciplinary seminars followed by practical work in small groups, in which the students learn the basic principles and do hands-on exercises in the different laboratories of the Berlin-Brandenburg Center for Regenerative Therapies (BCRT).
The following practical courses will be conducted:
-Immune responsiveness to devices, cells, tissues, and organs
-T-cell therapy
-Characterization of stem cells
-Tissue Engineering
-Cell Therapies
-Carriers & scaffolds to support regeneration
-3D bioreactor technologies for cell therapies
-Cell stimulation
-Development of biomarkers for monitoring clinical trials in Regenerative Medicine
-Genetics
-Monitoring of regeneration from the cellular level to the organ level

Lernspirale:
This course will build upon Modul M02 (Bausteine des Lebens: DNA, Grundlagen Genetik, Struktur und Funktion von Proteinen), M03 (Biologie der Zelle: Grundlagen Zellaufbau, Struktur und Funktion, Genotyp-Phänotyp, Regulation der Genexpression, Transkription), M04 (Signal- und Informationssysteme: Extra- und intrazelluläre Signaltransduktion, Zell-Zell-Kommunikation, Zell-

Substrat-Interaktion, Wachstumshormone), M05 (Wachstum, Gewebe, Organ: Synthese und Abbau von Bindegewebe, Molekulare und strukturelle Komponenten der extrazellulären Matrix, Zelluläre Adaptation, Zellschädigung, Zelltod), M07 (Blut und Immunsystem: Grundlagen Immunsystem, Immunantwort, Entzündung, Genomische Grundlagen von Immunrezeptoren), M11 (Herz- und Kreislaufsystem: Molekulare und zelluläre Aspekte der Gefäßwandschädigung), M17 (Interaktion von Genom, Stoffwechsel & Immunsystem als Krankheitsmodell: Zelluläre Pathogenitätsmechanismen in der Interaktion von Genom, Stoffwechsel und Immunsystem, Molekulargenetische Diagnostik) and M27 (Erkrankungen der Extremitäten: Traumatologie, Remodeling muskuloskeletaler Gewebe).

Unterricht am Patienten
Visits in the clinical stations, in which, e.g. stem cell therapies are already at the stage of clinical trials, will complement the practical lab work.

Übergeordnetes Lernziel
- to explain the basic clinical and experimental concepts of tissue regeneration
- to understand the principles of tissue regeneration using cultured human cells
- to explain the essential characteristics of stem cells and cellular plasticity
- to describe the clinical options for treatment of end-stage heart failure and the potential regenerative treatment concepts
- to describe the impact of inflammation/immune response on endogenous regeneration
- to explain the difference between the therapies based on regulatory T cells and genetically modified T-cells

Prüfungsformat (Ihres Wahlpflichtmoduls)
During the final seminar each student group (4 students) has to present a treatment plan/concept for a particular target disease.

Notizen für die Evaluation

Platz für Aufzeichnungen

Wahlpflichtmodul 28
Angebot 05: Reconstitutio ad integrum – Trends in regenerative therapies

Gruppe 1

	Montag	Dozent	Dienstag	Dozent	Mittwoch	Dozent	Donnerstag	Dozent	Freitag	Dozent
08:00										
08:15										
08:30										
08:45										
09:00			Heart stem cell therapy	Prof. Stamm	Characterization of Stem Cells	Prof. Kurtz				
09:15										
09:30	Introduction	Prof. Duda	**Room 0.0028**		**Room 0.0043**					
09:45										
10:00	**Room 1.0028**									
10:15			Break		Break					
10:30	Break		Heart stem cell therapy	Prof. Stamm	Hands-On Stem Cells I	Prof. Kurtz				
10:45	Immune responsiveness	PD Dr. Seifert								
11:00			**Room 0.0028**							
11:15										
11:30	**Room 1.0028**									
11:45			Lunch							
12:00	Lunch				Lunch					
12:15										
12:30										
12:45										
13:00	Hands-On Immune responsiveness	PD Dr. Seifert	Biodegradable Metals	Prof. Witte	Characterization of Stem Cells	Prof. Kurtz				
13:15										
13:30			**Room 1.0028**							
13:45					**Room 0.0043**					
14:00					Break					
14:15	Break		Break		Hands-On Stem Cells II	Prof. Kurtz				
14:30	Hands-On Immune responsiveness	PD Dr. Seifert	Hands-On Biodegradable Metals	Prof. Witte						
14:45										
15:00										
15:15										
15:30										
15:45										
16:00										
16:15										

Gruppe 1

	Montag	Dozent	Dienstag	Dozent	Mittwoch	Dozent	Donnerstag	Dozent	Freitag	Dozent
08:00										
08:15										
08:30										
08:45										
09:00	Personalized Medicine - Genetic sequencing **CiPom**	Prof. Kornak	Cell therapies **Room 1.0028**	Dr. Geißler	3D bioreactor technologies **Room 1.0028**	Dr. Petersen/ Dr. Zeilinger/ Prof. Sittinger	Tissue Engineering I **Room 1.0028**	Prof. Sittinger		
09:15										
09:30										
09:45										
10:00										
10:15	Break		Break		Break		Break			
10:30	Hands-On Sequencing **CiPom**	Prof. Kornak	Hands-On Cell Therapies	Dr. Geißler	Hands-On Bioreactors	Dr. Zeilinger/ Dr. Petersen	Hands-On Tissue Engineering I	Prof. Sittinger		
10:45										
11:00										
11:15										
11:30										
11:45										
12:00	Lunch		Lunch		Lunch		Lunch			
12:15										
12:30										
12:45										
13:00	Genetic Engineering **Room 0.0028**	Dr. Gossen	Biomaterials for Carriers & Scaffolds **Room 1.0028**	Dr. Cipitria	Advanced Imaging **Room 1.0028**	Dr. Zaslansky	Tissue Engineering II **Room 1.0028**	Prof. Sittinger		
13:15										
13:30										
13:45										
14:00	Break		Break		Break		Break			
14:15	Hands-On Genetic Engineering	Dr. Gossen	Hands-On Carriers & Scaffolds	Dr. Cipitria	Hands-On Advanced Imaging	Dr. Zaslansky	Hands-On Tissue Engineering II	Prof. Sittinger		
14:30										
14:45										
15:00										
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15:45										
16:00										
16:15										

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	Montag	Dozent	Dienstag	Dozent	Mittwoch	Dozent	Donnerstag	Dozent	Freitag	Dozent
08:00										
08:15										
08:30										
08:45										
09:00			Histology & Immuno-histochemistry I **Room 0.0028**	Prof. Wildemann/ Prof. Witte						
09:15										
09:30										
09:45										
10:00			Break							
10:15			Histology & Immuno-histochemistry II **Room 0.0028**	Prof. Wildemann/ Prof. Witte						
10:30										
10:45										
11:00										
11:15			Lunch							
11:30										
11:45										
12:00										
12:15			Hands-On Histology & Immuno-histochemistry I	Prof. Wildemann/ Prof. Witte						
12:30										
12:45										
13:00					Final seminar & Exam **Room 0.0028**	Prof. Wildemann/ PD Dr. Seifert				
13:15										
13:30										
13:45										
14:00			Break							
14:15			Hands-On Histology & Immuno-histochemistry II	Prof. Wildemann/ Prof. Witte						
14:30										
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16:00										
16:15										