

# Introduction to Medical Science in Space

Summer term 2023, Friday 7-11 a.m., Room: G28-027

Date	Topic	Lecturer
14.04.2023	<b>Introduction to microgravity research</b> , everyday life in space, ...	Grimm, Wehland
	<i>Seminar: <b>Introduction of space science students</b></i>	
21.04.2023	<b>Physical basics:</b> motions, dynamics of mass points, Newton, gravity, equivalence principle, etc.	Harth
	<i>Seminar: <b>Drop experiments and scientific setups</b></i>	
28.04.2023	<b>History of space science</b> (Mercury, Apollo, Vostok, MIR, Skylab etc.)	Schulz
	<i>Seminar: <b>Literature seminar</b></i>	
05.05.2023	<b>Platforms for microgravity research I:</b> rotational bioreactors, drop tower, parabolic flight, sounding rockets (suborbital), balloons	Schulz
	<i>Seminar: <b>Rotating bioreactors</b></i>	
12.05.2023	<b>Platforms for microgravity research II:</b> satellites, space stations, typical project planning, campaigns, available flight hardware	Trittel
	<i>Seminar: <b>Literature seminar (Physics)</b></i>	
19.05.2023	<b>Cell biology:</b> cells, tissues, reactions to environmental conditions	Krüger
	<i>Seminar: <b>Working with human cells: Cell culture and more</b></i>	
26.05.2023	<b>Gravitational biology:</b> perception of gravity, cell physiology under gravitational stress, gravity experiments with living organisms	Krüger
	<i>Seminar: <b>Cells in rotating bioreactors. Microgravity, side effects, ...</b></i>	
02.06.2023	<b>Tissue engineering</b> under microgravity conditions, bioprinting in space	Wehland, Schulz
	<i>Seminar: <b>Spheroids</b></i>	
09.06.2023	<b>Human physiology under microgravity conditions I:</b> musculoskeletal system, cardiovascular system, immune system, typical diseases of astronauts	Grimm, Schulz
	<i>Seminar: <b>Literature seminar</b></i>	
16.06.2023	<b>Human physiology under microgravity conditions II:</b> "space pharmacology", bed rest studies, exercise in space, human centrifuges, electrostimulation	Wehland
	<i>Seminar: <b>Molecular biology, genetic engineering</b></i>	
23.06.2023	<b>Genetics and epigenetics in microgravity</b> , AI projects, ...	Schulz
	<i>Seminar: <b>Molecular biology, genetic engineering</b></i>	
30.06.2023	<b>Life in outer space:</b> radiation protection, behavior of liquids & crystals in microgravity	Wehland
	<i>Seminar: <b>Life support systems I: technology development for biomedical space research: hardware requirements and tests, technical implementations</b></i>	
07.07.2023	<b>Technological challenges and strategies in human space exploration:</b> life support systems, space greenhouses, human habitats	Krüger
	<i>Seminar: <b>Life support systems II</b></i>	
14.07.2023	EXAM	