

M. Sc. Infectious Diseases and One Health

Module II of VI

Translational Medicine and Innovative Therapies

Organization:

Hannover Medical School

Teaching unit coordinator:

Ulrich KALINKE

Position:

Professor, TWINCORE Centre for Experimental and Clinical Infection Research

Teaching unit outline

Transfer of knowledge in translational medicine in infectious disease and early phase clinical research with specific focus on vaccine development.

Classification of the three major classes of medicines, small molecules, biologicals, and medicinal devices. Introduction of state of the art preclinical test systems, including animal experimentation, with a focus on systems that are particularly suited to predict effects in humans. Key principles to be considered to prepare for application of clinical trial authorization at the competent authorities will be discussed. Relevant infrastructure and measures necessary in order to carry out first-in-human clinical trials will be addressed.

The workshop on advanced bioinformatics will enable students to handle, process and interpret large data sets such as Omics or Deep Sequencing data.

Topics

- The three major classes of therapeutics: natural compounds, biologicals, devices
- Coding and noncoding RNA
- Monoclonal antibodies and innovative antibody formats
- Vaccines
- Combination therapies
- Preclinical testing: Animal experiments vs. assays based on primary human cells
- Regulatory framework for clinical trial application in the EU
- Phase I clinical trials and translational medicine

Students will gain knowledge about all relevant steps towards clinical development of innovative therapies after envisioning a new therapeutic strategy.

After successfully completing the module, the students are able to



INFECTIOUS DISEASES
ONE HEALTH



MHH

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- understand the clinical development of a new medicine in a phase I trial
- discuss the specific characteristics of vaccine development
- understand novel approaches in drug development (e.g. telomerase modulation)
- understand the importance of animal phenotyping during drug development
- get an overview about bioinformatics tools in drug development
- perform key experiments in RNA biology (detection, quantification of RNA molecules).

The advanced bioinformatics workshop will cover the following topics: Networks, Gene Set Enrichment Analysis, Deep Sequencing Data, Modeling of infectious diseases, Clusters, Support Vector Machine

ECTS	Lectures	Seminars	Practical work	Personal work
5	14 hours	12 hours	47 hours	80 hours

Assessment method:

- 100 % Written exam

Ungraded course work:

- Oral presentation (scientific paper)
- practical work (including written report)
- short lab project (including oral presentation)