



Degree Profile

Master in Infection Biology

Organizational unit	Swiss Tropical and Public Health Institute
Degree	MSc in Infection Biology
Range, Duration, Start	90 ECTS, 3 semesters (if full-time), autumn semester
Language of instruction	English

Program Goals

Students acquire solid theoretical and practical knowledge of infection biology with emphasis on pathogens causing poverty-related infectious diseases. They are able to plan and conduct their own research project and to analyse, interpret and present their findings orally as well as in written form.

Program Characteristics

Orientation	Scientific education
Subject area	Biology, Biochemistry, Human Medicine, Veterinary Medicine, Pharmaceutical Sciences
Majors	–
Program structure	The curriculum consists of the modules: Master's thesis (50 ECTS); Master's examination (10 ECTS), courses (30 ECTS, of which 18 ECTS must be taken within the Infection Biology course offerings).
Distinctive Features	The Swiss Tropical and Public Health Institute, an affiliated institute of the University of Basel, is a world-leading institution dedicated to improving global health through excellence in research, services and teaching and training. It offers an interactive and highly interdisciplinary environment for students interested in infection biology, epidemiology and public health and covers a wide spectrum of research areas. The degree program in Infection Biology is primarily connected to the teaching and research activities of the Department of Medical Parasitology and Infection Biology.

Career Opportunities

Employment	Research in higher education; pharmaceutical industry; governmental and non-governmental public health organisations and foundations; science communication.
Further Studies	Doctorate, teaching diploma for secondary schools

Teaching

Approaches	Lectures, practicals, problem-based learning, autonomous learning, research-oriented learning, seminars
Assessments	Written and oral examinations, active course participation, master's thesis, master's examination

Competences

Generic Attitude / Communication Approach / Management	Students acquire the skills to ... <ul style="list-style-type: none">– plan and conduct scientific experiments in the laboratory.– manage a small research project with respect to both time and content.– identify and critically analyse relevant scientific literature.– actively participate in scientific discussions.– work in a team.– document and critically interpret scientific results.– graph scientific results in a concise and informative manner.– present scientific concepts, results and conclusions orally and in written form.– write a concise and well-structured scientific text.– understand and respect ethical aspects of scientific research.– communicate ideas and results effectively in English language.
Subject-related Knowledge / Understanding Application / Judgment Interdisciplinarity	Students acquire the skills to ... <ul style="list-style-type: none">– understand and describe molecular, cellular and immunological processes linked to infection, pathogenesis and the transmission of infectious diseases.– understand the life cycles of different pathogens and their importance in pathology and disease transmission.– understand the nature and importance of host immune responses and pathogen immune evasion strategies in the context of infection.– understand different concepts and approaches used in drug and vaccine discovery and development.– propose suitable experimental methodology to study aspects of pathogen biology, host-pathogen interactions and immunity.– adhere to good laboratory practice and apply advanced experimental methods used in their specific area of infection biology research.– understand the basic concepts and applications of molecular epidemiological approaches to study infectious diseases.– understand pathogen virulence and transmission in the context of evolution.– understand and apply basic concepts in bioinformatics and computational data analyses.– apply basic statistical concepts and methods to analyse biological data.– appreciate the importance of interdisciplinary exchange in scientific research.

Learning Outcomes

Graduates of the master's program in Infection Biology...

- possess the knowledge and skills to plan and conduct a basic or applied research project in the area of infection biology through the targeted application of adequate methodology for experimental work and data analysis and are able to present their results and conclusions clearly to peers and the public in written and oral form.
- know current research and experimental methods and can use this knowledge to concisely formulate, analyze and test relevant research questions and hypotheses.
- understand the ethical aspects and considerations linked to their research involving human subjects, animal models or genetically modified pathogens and respect them in a most responsible manner.
- are able to appropriately apply basic approaches and methods for bioinformatic analyses of sequence data and can use this knowledge to independently address questions related to pathogen evolution with comparative genomics.
- know pathogen biology and host-pathogen interactions at the molecular and cellular level and are able to apply this knowledge to correctly comprehend their fundamental importance in infection, pathogen survival, pathogenesis and immunity.
- possess deep knowledge of the nature of human immune defence mechanisms in response to infection and upon vaccination and are able to propose approaches to correctly assess and analyse their involvement, diversity and plasticity in host-pathogen interactions.
- understand the concepts, analysis methods and study designs of molecular epidemiological studies and appropriately apply this knowledge to investigate infectious disease epidemiology and evolution.
- understand that pathogens evolve in order to evade host immune responses and develop drug resistance and based on this knowledge are able to propose measures that can be applied to effectively counteract these threats.
- have detailed knowledge of the drug discovery and development process, including key examples delivered by Swiss TPH, and owing to this understanding are able to propose appropriate strategic as well as technical approaches used to discover and develop drugs against infectious diseases.