



Infection Biology and Epidemiology block course 2024

Location: Swiss Tropical and Public Health Institute (Swiss TPH) Kreuzstrasse 2, 4123 Allschwil
Language: English
Dates/Info: **6-week block course** / 15 ECTS

Description

In this block course, you will examine cell biological as well as epidemiological concepts of the medically important pathogens causing **malaria** (*Plasmodium* parasites) and **tuberculosis** (*Mycobacteria*). You will learn about fascinating processes of infections **from the molecule to the organism** and consequences of pathogen-host interactions and **drug resistance**. Further, you will become familiar with epidemiological factors determining the frequency and spread of infections as well as the resulting disease in a host population. The block course places a **specific focus on practical work** and you will use diverse techniques in **molecular biology**, **immunology** and **epidemiology**. This includes hands-on work in a biosafety level 2 (BSL-2) laboratory. You will further be introduced to and learn how to apply basic **bioinformatics approaches**, including those used for analysing whole genome sequencing data.

Knowledge taught in the elective course "Parasitology and Parasitism" is recommended.

Epidemiological perspective:

- Observing the significance of infections for individuals and society using interdisciplinary approaches.
- Analysing host-parasite relationships and proposing control measures.

Infection biology perspective:

- Understanding the molecular basis of infections (antigenic variation, transmission, adaptation to host milieus, host cell invasion, etc.).
- Understanding the immunology of different infections and concepts of drug resistance and vaccine/drug discovery.

Focus pathogens

- *Mycobacterium tuberculosis* – the causative agent of tuberculosis
- *Plasmodium falciparum* – the causative agent of malaria tropica

Schedule

- first 2.5 weeks:
 - epidemiological concepts and practicals
- 1.5 weeks:
 - cell biological concepts of *P. falciparum*
 - wet laboratory and bioinformatics practicals on *P. falciparum*
- final 1.5 weeks:
 - biology and immunology of *Mycobacteria*
 - wet laboratory and bioinformatics practicals on *Mycobacteria*

Epidemiology practicals

- Disease frequencies and burden
- Designing and planning a study
- Outbreak investigation
- Meta analysis

Wet laboratory practicals & bioinformatics

Plasmodium parasites

- drug screening and drug resistance
- molecular techniques in malaria research

Mycobacteria

- biology and drug resistance of *Mycobacteria*
- immunology of *Mycobacteria* infections

Bioinformatics

- genomic data analysis