

Host-Pathogen Interactions

Organization: University of TOURS

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Position: Professor of Cell Biology at the Faculty of Medicine (PhD), INRAE Researchers (PhD)

Teaching unit outline

This teaching unit includes 20h of courses with about ten different speakers from the fields of bacteriology, virology and parasitology. Speakers will also include faculty members from other universities. These courses explore the fundamental aspects of host-pathogen interactions at the molecular level by focusing on the mechanism by which a given pathogen hijack, modify and/or disrupt host cell functions to its benefit. Methods and research approaches based on specific examples will also be studied (e.g. *in vitro* infection/entry models, cell imaging, protein-protein interactions, tools to inhibit expression or function of proteins).

Topics addressed

. Introduction to the cellular architecture, cytoskeleton and organelles.
. Methods for imaging the interplay between cells and pathogens (*different methods of microscopy with applications, protein-protein interactions such as co-immunoprecipitation, affinity chromatography, yeast two-hybrid method...*).

. Bacterial adhesion & virulence (*E coli*);
. Mechanism of cellular invasion by bacteria & secretion systems (*Salmonella, Yersinia, Listeria, Shigella*), intracellular growth and multiplication of bacteria;
. Bacteria and bacteriophages.

. Virus entry into host cells and tropism;
. Intracellular transport of viruses on cytoskeleton;
. Morphogenesis of enveloped viruses;
. Lipids and viral multiplication (Flipped classroom);
. Virus cell-to-cell spread.

Various examples of viruses will be described to illustrate the host-virus interaction models such as HIV, Coronavirus, Hepatitis B Virus, Hepatitis C virus, Herpesvirus, Influenzavirus, Rabies lyssavirus.

. Invasion strategies of intracellular parasites.
Several parasites of medical importance such as Toxoplasma gondii and Plasmodium falciparum and others of veterinary importance such as Eimeria tenella will be studied in this course.

ECTS	Lectures	Tutorials	Practical work	Digital learning	Personal work
3	25 hours	6 hours			44 hours

Assessment method

50% oral presentation (scientific article)

37.5% written examination

Review of a scientific paper (12.5%)