



Context

Infectious diseases are still responsible for nearly 25% of the total worldwide human mortality, with a global annual toll of about 13 million human lives. Tuberculosis, HIV/AIDS and malaria alone account for about 4 million deaths every year.

Over the past decades, research on pathogenic microorganisms brought huge progress and revealed essential clues for infection control programs. However, there is still a crucial need of better vaccines and new antimicrobials. The bacterial infections, which contribute most to human disease, are also those in which emerging and microbial resistance is most evident: diarrheal diseases, respiratory tract infections, meningitis, sexually transmitted infections, and hospital-acquired (nosocomial) infections. The development of resistance to drugs commonly used to treat malaria, AIDS and tuberculosis is also of huge concern. Finally, as a result of globalization and climate change the world is currently facing an unprecedented increase of emerging and re-emerging animal and human infectious diseases.

The Toulouse scientific community is at the forefront of research in infectious diseases

Toulouse and the Midi-Pyrénées region have an outstanding research capacity in the academic and private sectors to take forward an accelerated program on global infectious disease research. As a matter of fact, the two largest French companies in pharmaceutical industry (Sanofi-Aventis and Pierre Fabre Laboratories) are based in Toulouse. Moreover Midi-Pyrénées is among the most vivid region for the creation of Biotech companies. Toulouse is at the forefront of the "One-Health Initiative" concept with an ideal context of collaborations between the two university-hospitals, a national veterinary school, the University of Toulouse III, and INRA-, CNRS- and INSERM-supported research laboratories. The research teams involved in the Aninfimip project are internationally recognized for their contributions on pathogenic microorganisms and host immunology.



Concept and objectives

The Aninfimip project will allow the development of high-standard, high-security animal facilities with integrated and mutualized state-of-the-art equipment for monitoring physiological parameters and functional exploration of the immune response. A special emphasis will be put on medical imaging systems that will make possible functional monitoring of infected animals. International competitiveness of research conducted in Toulouse on infectious diseases and immunology in the academic and private sectors will undoubtedly be fostered by the Aninfimip project, which will be a key asset for the development of new options for the diagnosis, prevention and treatment of infection.

Technology integration

Aninfimip will allow the integrated mutualization of infrastructures and equipments, open to the public and private sectors involved in infectiology and drug/vaccine development:

- High-standard, high-security animal facilities
- Transgenesis & cryopreservation
- Experimental microsurgery
- Phenotype analysis
- Non-invasive functional exploration
- Experimental histopathology

Expected outcomes

The general objective of the Aninfimip state-of-the-art equipment is to fulfil the needs of academic and industrial research in the areas of infectious diseases and immunology. The acquired equipment will allow internationally recognized research teams to have access to innovative and high-standard pathophysiological models. One expected outcome of the project is to achieve a better and faster knowledge on the pathophysiology of infectious diseases in order to develop new concepts for diagnosis, prevention and treatment of infectious diseases.

From an industrial point of view, pharmaceutical industries, start-up and innovative technology companies (e.g. Sanofi Aventis, Pierre Fabre, Urosphere, Ambiotis) will have access to mutualized in vivo core facilities that will allow 1/ secured and good laboratory practices-compliant animal studies, and 2/ functional exploration of animal models of diseases. This is yet another expected outcome of the Aninfimip project.

Partners

The Aninfimip project gathers together major partners in academic research in infectious diseases, namely:

- The **Center for Pathophysiology Toulouse-Purpan (CPTP)** includes 14 internationally recognized teams working in the field of bacterial, viral and parasitic diseases (e.g. *Plasmodium*, *E. coli*, Borna disease virus, hepatitis E virus).
- The Molecular Mechanisms of Mycobacterial Infections (M3I) Department of the **Institute of Pharmacology and Structural Biology (IPBS)** includes 7 teams of international repute, whose aim is to tackle the issue of tuberculosis and other infections from different angles, ranging from the structural analysis of the microbial metabolome to cell biology and immunology of infection.
- The laboratory of **Host-Pathogenic Agents Interactions (IHAP)**, a joint research institute between the National Institute for Agricultural Research (INRA) and the Toulouse National Veterinary School (ENVT), contributes to study animal diseases that are listed as top priorities by the World Animal Health Organization and/or represent a threat for animal and public health. IHAP gathers 4 teams working in the field of bacterial, viral and parasitic diseases. The unit has an internationally recognized expertise in various pathogens including prions, mycoplasmas and avian flu.
- The **ANEXPLO** technological platform and its various facilities and units (animal core facility, transgenesis, in vivo imaging, phenotyping, histopathology, decontamination, and cryopreservation units).

- 1** Center for Pathophysiology Toulouse-Purpan (CPTP)
- 2** Laboratory of Host-Pathogenic Agents Interactions (IHAP)
- 3** Institute of Pharmacology and Structural Biology (IPBS)
- 4** ANEXPLO technological platform

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