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**UMR754**

# Viral Infections and Comparative Pathology (IVPC)

## Management

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## Research topics

- Emerging viral infections
- Pathophysiology of thoracic diseases

## Key figures

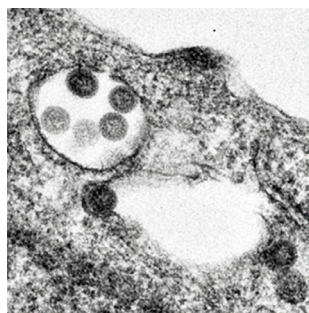
- 12 researchers and equivalent
- 10 engineers and technicians
- 3 research teams

## Keywords

- Virus
- Pathology
- Animal and human health
- Mosquito
- Zoonoses
- Cancer
- Lung

## Mission and objectives

"Viral Infections and Comparative Pathology" (IVPC) is a joint research unit co-supervised by INRAE, Université Claude Bernard Lyon 1 (UCBL) and Ecole Pratique des Hautes Etudes (EPHE). IVPC's research is part of the "One Health" approach which considers that human and animal health are interdependent and linked to the ecosystems in which they coexist. In recent years, there has been a significant increase in the emergence and spread of infectious agents and thus in the potential associated veterinary and human health risks. These diseases, emerging, re-emerging or endemic, highlight the importance of the animal/human or animal/vector/human interface in the context of trade, globalization and environmental modifications.



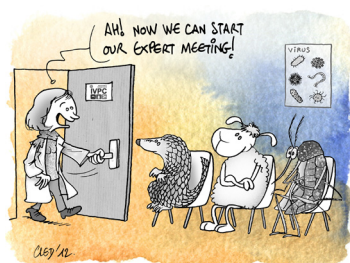
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Our main objectives are to:

- improve knowledge of virus-host or virus-host-vector relationships, in order to better anticipate and control animal and zoonotic infectious diseases;
- work at the animal/human health interface for infectious and rare lung diseases;
- consolidate our research work by including other parameters, e.g., environmental, in the "One Health" approach.

The unit's research work mainly involves:

- studying the mechanisms of infection and the deregulation induced by the virus in the cell, the organ, the host (livestock and human) or the insect vector;
- determining the factors (molecular, cellular, viral and environmental) involved in the pathogenicity and the transmission of these viruses;
- developing innovative models and tools for studying and diagnosing viral pathogens;
- evaluating alternative preventative or curative approaches in order to help with public health and veterinary decision-making.



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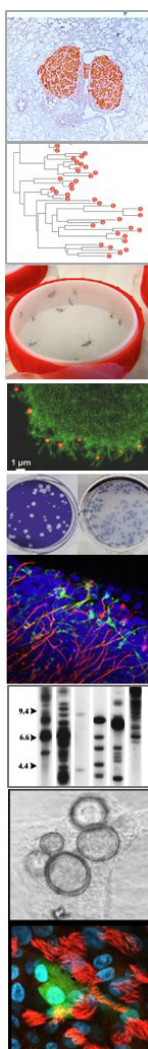
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#### IVPC Teams

- BUNYA "Bunyavirales biology"
- iWAYS "Cell biology of early interactions between the arbovirus and the host cell"
- PR2T "Pathophysiology, Retrovirus, Rare tumours"



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## Research

By studying infections caused by Retroviruses and Arboviruses (viruses transmitted by arthropod vectors), we are seeking to better understand the pathogenesis and host-virus relationships in mammals (livestock and human) but also, in the case of the arbovirus, the interactions with their insect vectors. Our research programmes are developed in collaboration with health practitioners and veterinarians, in a comparative pathology context, using *in vitro*, *ex vivo* and *in insecto* approaches. We are also developing diagnostic tools and antiviral strategies.

## Collaboration and expertise

### Local and national

- IVPC is part of two federative research organizations, Biosciences (UAR3444) and BIOENVIS, which offer high technology platforms. IVPC UMR co-runs the InfectioTron EQUIPEX+ which aims to develop the Lyon region's network of confined facilities in order to implement research programmes in accordance with the "One Health" concept in the field of emerging infectious diseases. IVPC is a member of the VPH (Lyon Veterinary Public Health initiative) hub, the first of its kind in the world. IVPC also co-runs the first thematic regional research network for animal health and welfare in Auvergne-Rhône-Alpes (SAARA) set up by INRAE, ANSES and VetAgroSup. Through its involvement in the development of innovative *in vitro* tools, IVPC is a member of the INRAE organoids working network and the French national organoids research group.
- Research into problems of retrovirus circulation in goat/sheep farms is being carried out in collaboration with professional organizations (GDS France, Anicap.org, OMACAP) and the LBBE, GenPhySE and Ampère academic laboratories.
- Research into the risks of virus transmission by biting insects is being carried out in collaboration with EID Rhône-Alpes, ARS Auvergne-Rhône-Alpes and Santé Publique France, with support from the Métropole de Lyon. IVPC is a member of the ArboFrance network and of the Vectors working group of ANSES (expertise). Studies of arboviruses are carried out in collaboration with CIRAD, ANSES, IRBA, Institut Pasteur, ONIRIS, CIRI, etc.

### International

- IVPC is a partner in several Horizon-Europe research programmes through four projects: ISIDORE (Integrated Services for Infectious Disease Outbreak Research, VetBionet, InfraVec), BCOMING (Biodiversity Conservation to Mitigate the Risks of Emerging Infectious Diseases), ISG (International Sheep Genomics Consortium), and VarGoats (Goat genome variation).
- Many academic laboratories are partners of IVPC including the Centre For Virus Research in Glasgow, Universities of Heidelberg and Groningen, Charles University, Prague, Wageningen University & Research, etc.

## Scientific facilities

IVPC has cell and molecular biology laboratories, as well as confined laboratories of level 2 (L2) and level 3 with the high security L3/I3 experimental platform for studying virus-host and virus-vector interactions *in vitro* and *in insecto* (Biosciences SFR). IVPC has access to cutting-edge facilities for imaging, cytometry, proteomics, bioinformatics, etc.

## Teaching

IVPC unit staff are heavily involved in scientific, medical and veterinary teaching either as supervisors or teachers on various modules in the fields of infectious diseases, pathology and pneumology (EPHE, Université Lyon 1 and VetAgroSup) or by welcoming and supervising national and international students.



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