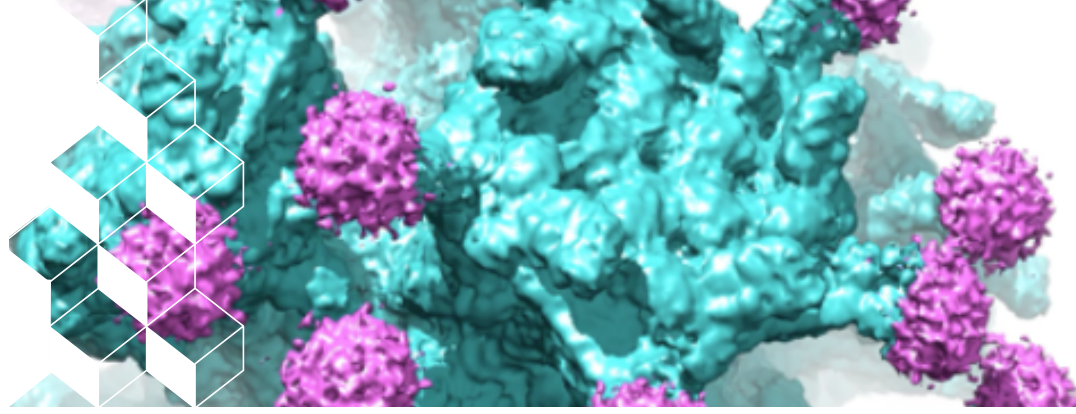




Preventing and treating infectious diseases

Combating bacterial and fungal infections through novel approaches to prevention and treatment

- Analyse the molecular mechanisms of antibiotic resistance and host-pathogen interactions.
- Identify and validate new therapeutic targets.
- Isolating antibacterial or antifungal molecules through library screening and molecular design.
- High-resolution characterization of molecular structures for inhibitor design.

Combating pathogenic and emerging viruses

- Analyse the molecular mechanisms underlying viral infections.
- Defining novel therapeutic targets and characterising their structures.
- Building efficient multi-purpose vaccine platforms.
- Characterizing molecular structures for the development of vaccines and treatments.

To enhance the value of technical platforms, knowledge and molecules in collaboration with the pharmaceutical industry

Applications

Pathogens

P. aeruginosa, *S. pneumoniae*, *Candida auris*, VIH, influenza and chikungunya viruses, Nipahvirus, virus Epstein-Barr, ...

Diseases

Mucoviscidosis, measles, rabies, influenza, COVID-19...

Therapies

HIV neutralising antibodies, polyvalent vaccines, phagotherapy, beta-lactam resistance, bacterial anti-virulence factors

Expertise

In vitro biofilm engineering

Microbiology

Cellular and *in vitro* infection models

Pan-genomic screening

Human monoclonal antibodies

Click chemistry labelling

Design of vaccine platforms

Phage display directed evolution

Super-resolution microscopy

Cryo-electron microscopy

Protein crystallography

High field NMR

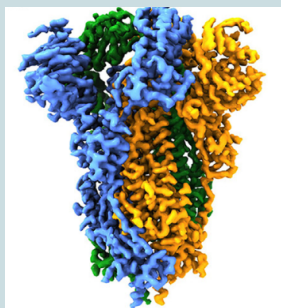
Atomic force microscopy

In figures

8 PhD students incl. CIFRE per year
41 researchers
41 publications per year
2 patents
2 EU projects
2 industrial partnerships

Networks & ecosystem





Covid-19 sterilising vaccines

SARS-CoV-2: Complete protection of macaques with synthetic virus-like particles

> Sterilising and mucosal immunity-enhancing vaccines

Cell Reports Medicine 2022, 3(2):100528

Prevention and vaccines

Antigenic pseudo-viruses against SARS-CoV-2
Human monoclonal antibodies (mAb)
Multimeric vaccine platform

Anti-virals

Human mAb neutralisation tests
Viral polymerase inhibitors

Viral targets

Structures of viral proteins
Viral envelope glycoproteins
Cell entry and budding
Viral polymerases

Anti-fungals

Candida auris
Epigenetic targets
Transcription factors

Prevention and treatment

Bacterial targets

Structures of bacterial proteins
Secretion systems
Division complexes
Bacterial spores
Biofilms

Antibiotics and resistance

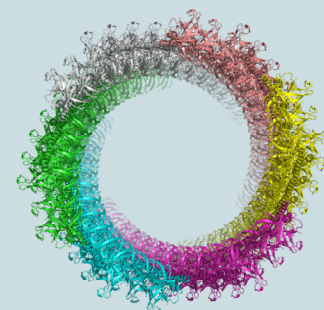
Antimicrobial peptides
Bacterial wall
Penicillin binding proteins
Antibodies mAb

Synergy of methods in structural biology

Regulation of bacterial growth.

> Development of new antibiotics

Nature Communications, 2021, 12(1):2987



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