

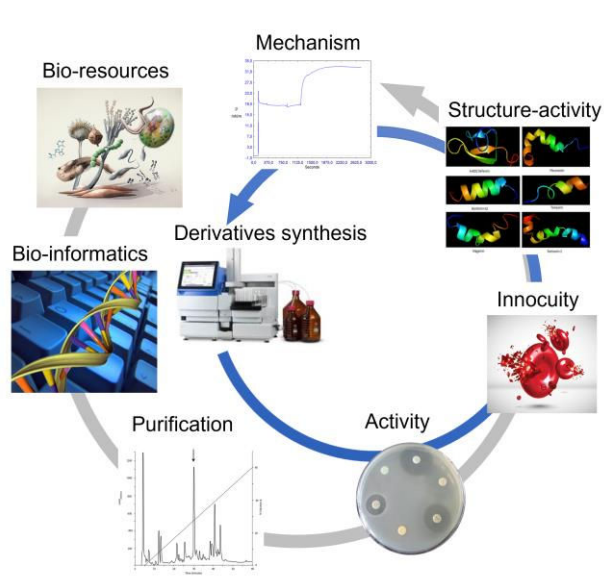
Peptides and Peptidomimetics as antimicrobial therapeutic agents

Context

Antibiotic resistance is currently a major public health challenge and one of the priorities of the World Health Organization. It is responsible for 750,000 deaths per year and is expected to increase to 10 million by 2050. This dramatic situation is leading scientists to search for new molecules with different structures and mode of action to overcome resistance. Lately, our laboratory has been successfully exploring different strategies to combat this resistance by identifying and characterizing new antimicrobials [1-4]. Among them, our group has demonstrated the potent activity of temporins (amphibian AMPs) and lynronnes (ruminal AMPs obtained by metagenomics approach) against various bacteria infecting humans (*H. pylori*, *S. aureus*, *P. aeruginosa*, ...) and their safety toward human cells and tissues [5-9].

PhD Project

In this project, we intend to develop novel peptides and/or peptidomimetics based on the temporins and lynronnes families with the final goal of obtaining antimicrobial agents with higher activity and stability. Different derivatives will be produced containing diverse modifications (e.g. D-amino acids, non-proteinogenic amino acids, peptide backbone cyclization, peptoid building blocks, ...) and their antimicrobial activity as well as their stability, mechanism of action and safety towards human cells will be studied. This is an interdisciplinary Ph.D. project covering fields as varied as peptide design, solution and solid-phase peptide synthesis, organic synthesis, antimicrobial activity studies, toxicology and microbiology.



References

1. Chiumento *et al.*, *Sciences advances*, 2019, 5, (10.1126/sciadv.aaw9969); 2. Roblin *et al.*, *Proc. Natl. Acad. Sci. U.S.A.*, 2020, 117, 19168.; 3. Hadiouch *et al.*, *Polym Chem.* 2022, 13, 69; 4. Casanova *et al.*, *Antibiotics*, 2023, 12, 120. 5. Olleik *et al.*, *Biomolecules*, 2019, 9, 598. 6. Mulkern *et al.*, *Nature Biofilms Microbiomes*, 2022, 8, 70; 7. Oyama *et al.*, *Nature Biofilms Microbiomes*, 2022, 8, 58; 8. Khan *et al.*, *Biomolecules*, 2022, 12, 770; 9. Maharjan *et al.*, *Probiotics Antimicrob Proteins.* 2022, 14, 391.

Keywords

Peptides, peptidomimetics, antimicrobial activity, cytotoxicity, microbial death mechanism

Profile and required skills

Master in chemistry or chemical engineering.

Background in organic and/or peptide synthesis. Knowledge in medicinal chemistry, drug design, toxicology and/or cells studies would be appreciated.

Applications

Candidates should send a CV, a motivation letter, transcripts of academic records and the contact information of two referees to:

Dr Olga Iranzo olga.iranzo@univ-amu.fr & Dr Marc Maresca marc.maresca@univ-amu.fr
Aix Marseille University, iSm2 CNRS UMR 7313, BiosCiences team

Application deadline: **30/04/2023**