

### Resistance to the Last-Resort Antibiotic Colistin in Pseudomonas aeruginosa

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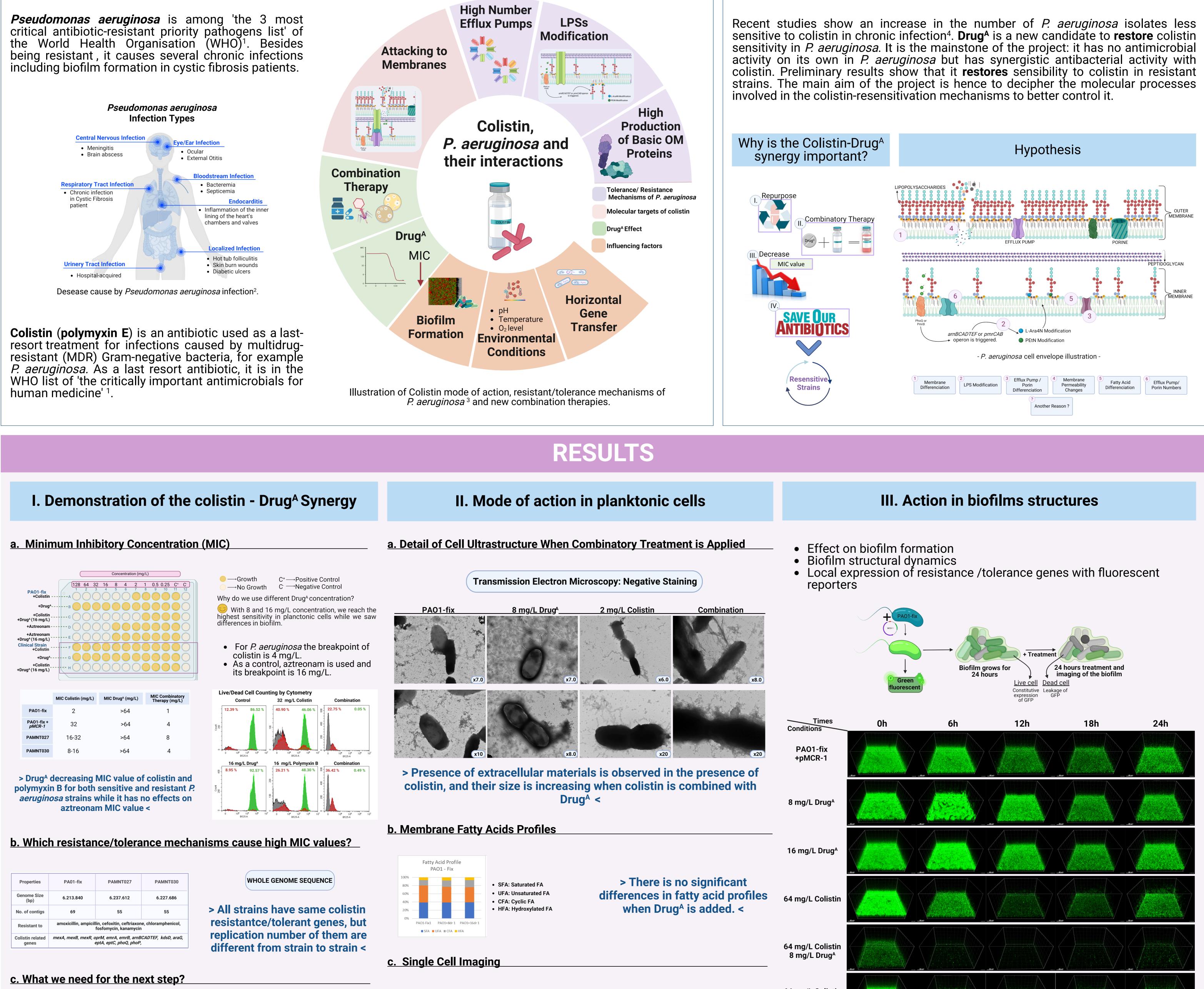
# **Resistance to the Last-Resort Antibiotic Colistin in** Pseudomonas aeruginosa



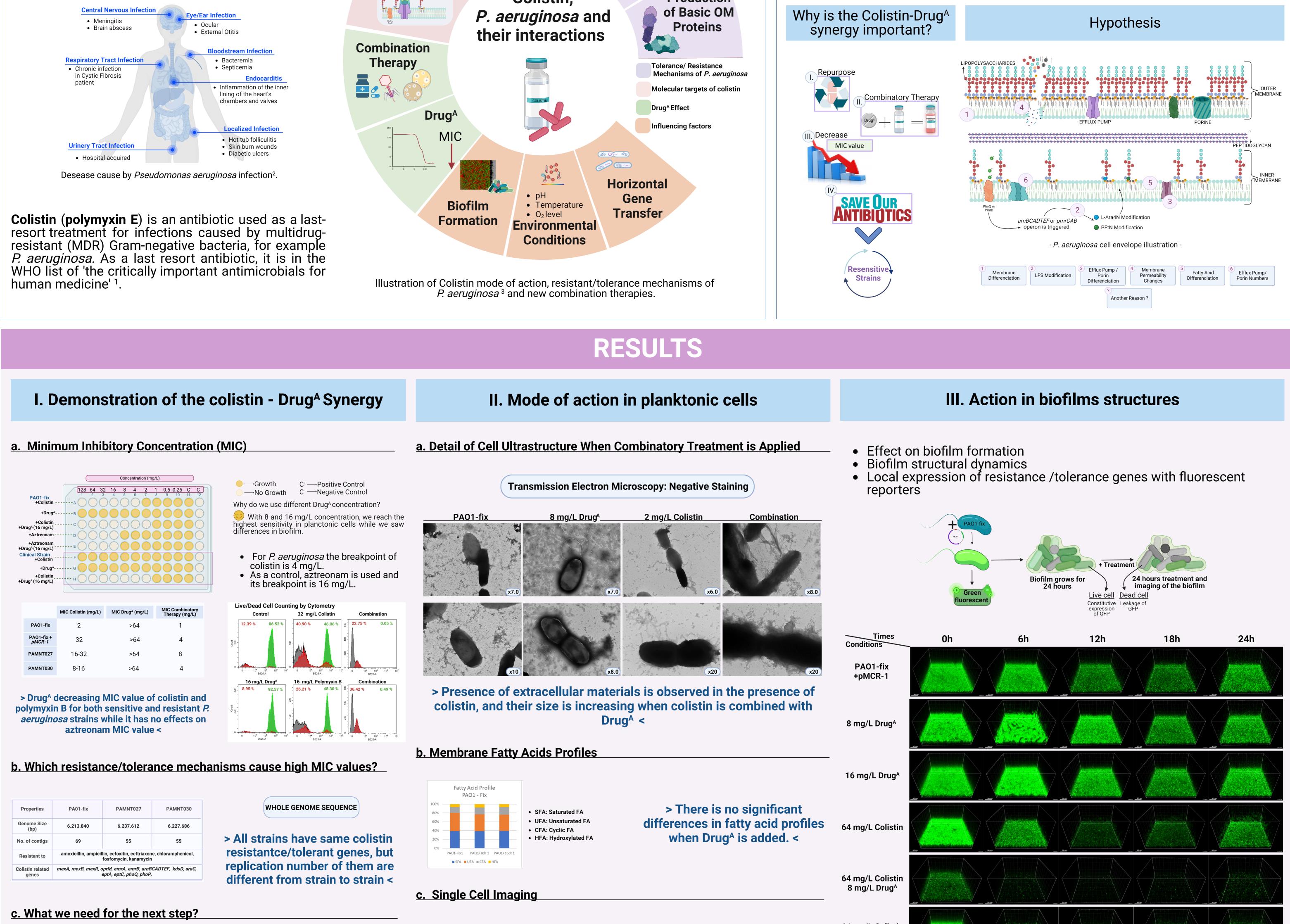
**\* île**de**France** 

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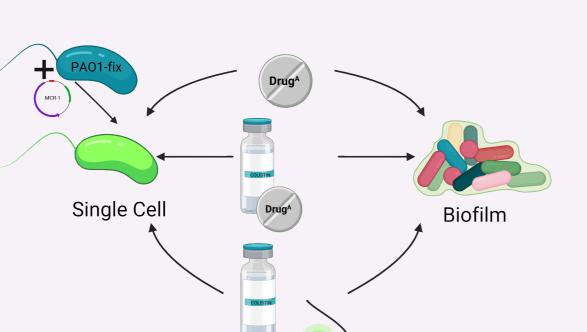
**OBJECTIVE** 

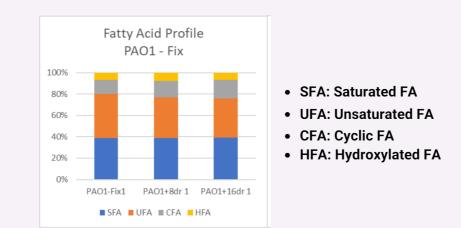


	MIC Colistin (mg/L)	MIC Drug <sup>A</sup> (mg/L)	MIC Combinatory Therapy (mg/L)
PA01-fix	2	>64	1
PAO1-fix + <i>pMCR-1</i>	32	>64	4
PAMNT027	16-32	>64	8
PAMNT030	8-16	>64	4

Properties	PA01-fix	PAMNT027	PAMNT030
Genome Size (bp)	6.213.840	6.237.612	6.227.686
No. of contigs	69	55	55
Resistant to	amoxicillin, ampicillin, cefoxitin, ceftriaxone, chloramphenicol, fosfomycin, kanamycin		
Colistin related genes	mexA, mexB, mexR, oprM, emrA, emrB, arnBCADTEF, kdsD, araG, eptA, eptC, phoQ, phoP,		

- > Strain with known resistant mechanism
- > Fluorescent colistin
- > Fluorescent strains

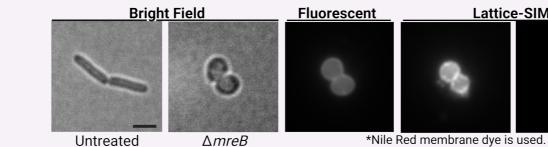




## by Lattice SIM Imaging

• Effect on the growth rate Membranes permeability • Cell death differences





P. aeruginosa

P. aeruginosa

\*Please scan the QR code to observe the preliminary results of Lattice-SIM time-lapse imaging of *P. aeruginosa* with colistin alone, Drug<sup>A</sup> alone, and their combination.

64 mg/L Colistin 16 mg/L Drug<sup>A</sup>

3D z-stack visualisation of live cell biofilm population of PAO1-fix + pMCR-1 strain. Biofilm was grown for 24 hours and treated with only colistin, Drug<sup>A</sup>, and a combination of them for 24 hours. Green channel refers to sfGFP fluorescent protein expressed live cell population in the biofilm.

> There is a decrease of live cell biofilm population in the end of 24 hour treatment when Drug<sup>A</sup> is combined with colistin, but quantitative analysis

## results are needed to make a conclusion <

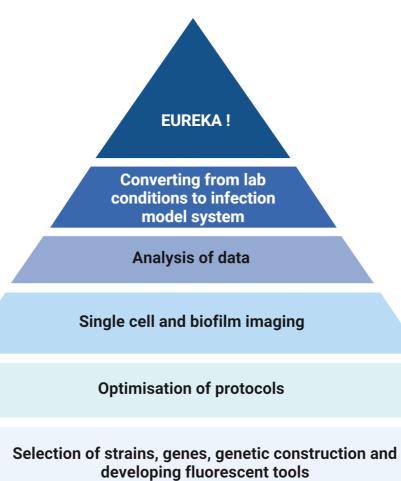
## **CONCLUSION/ PERSPECTIVES**

## ACKNOWLEDGEMENTS

Even though the bactericidal mechanism of colistin is not fully known yet, several hypotheses could be involked to explain the synergistic interaction of colistin and Drug<sup>A</sup>. The first results suggest that the leading cause of this synergistic interaction is not related to membrane fatty acids modification or colistin resistance mechanism of *P. aeruginosa*.

The first steps were taken for the genetic construction of the strains required for the test of bacterial membrane structure and permeability. Developed fluorescent tools including Lattice-SIM, 4D-LSC Microscopy and cytometry will be put in used to decipher the molecular origin of the observed synergy.

The Pathway to Reach the Mechanism of Resensitivity



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