



**HAL**  
open science

## An exopolysaccharide tale

M. Gohar

► **To cite this version:**

M. Gohar. An exopolysaccharide tale: the case of Bacillus thuringiensis strain 407. Bacillus anthracis cereus thuringiensis 10th international conference, Apr 2022, Paris, France. hal-04300720

**HAL Id: hal-04300720**

**<https://hal.inrae.fr/hal-04300720>**

Submitted on 6 Dec 2023

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

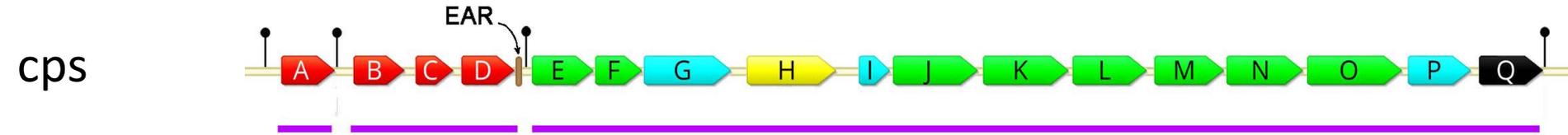


INRAE

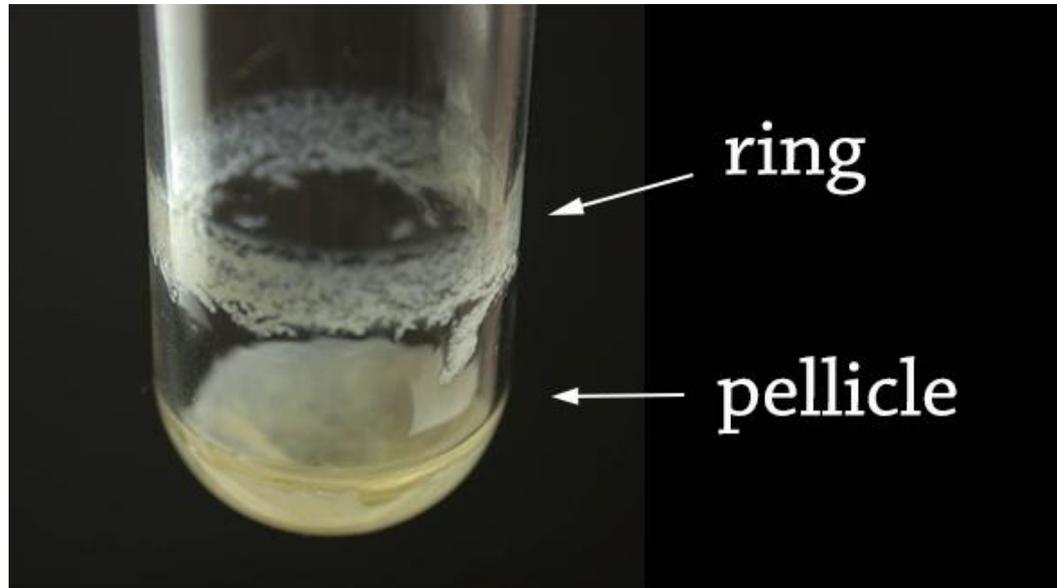
# An exopolysaccharides tale

The case of *Bacillus thuringiensis* strain 407

# The 407 *exopolysaccharides* chromosomal loci



# The *Bt* floating biofilm in glass tubes

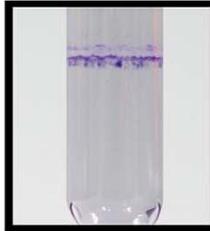


# Biofilm assays in glass tubes: top and lateral views

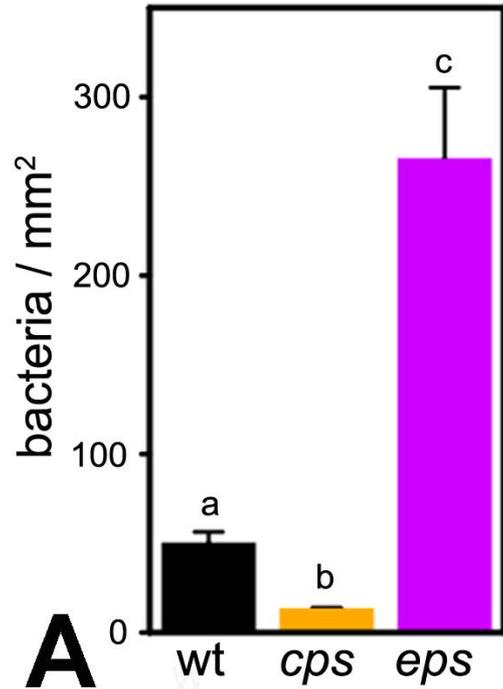
wt



wt

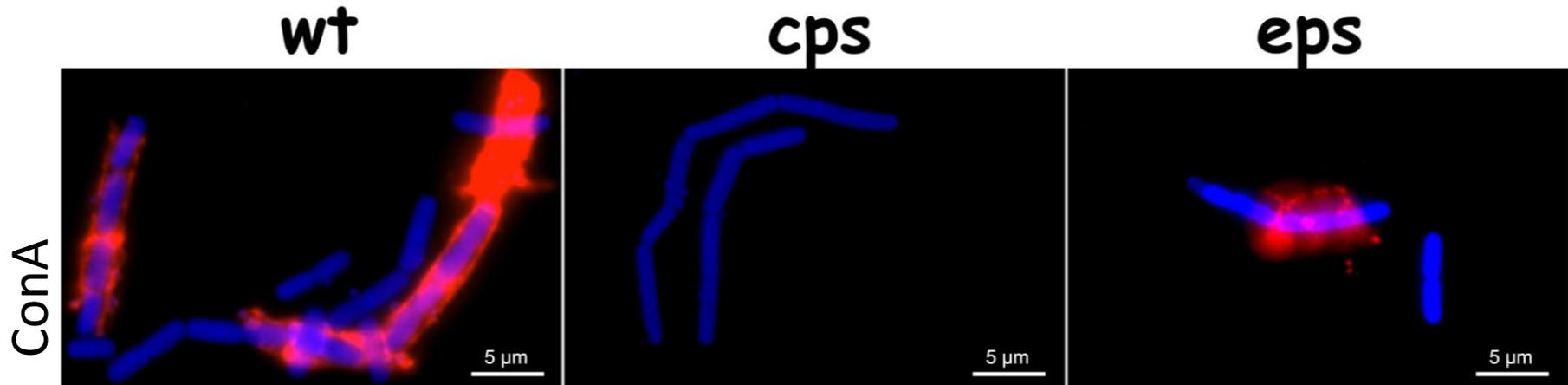


# Adhesion assays



Bars and error bars represent means & standard errors of the means. Bars with different letters (a, b, c) on their top indicate significant differences in their mean values ( $P < 0.05$ , Wilcoxon test)

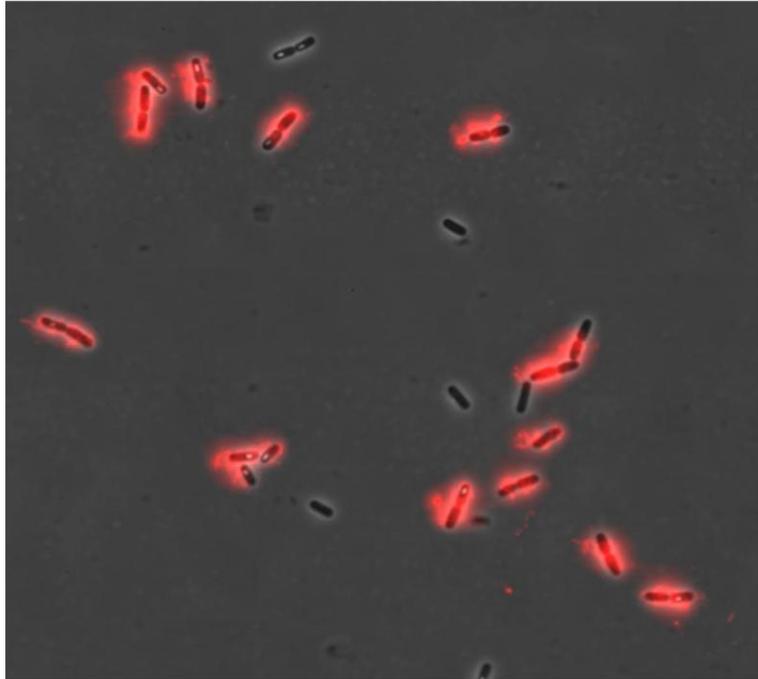
# Capsule determination



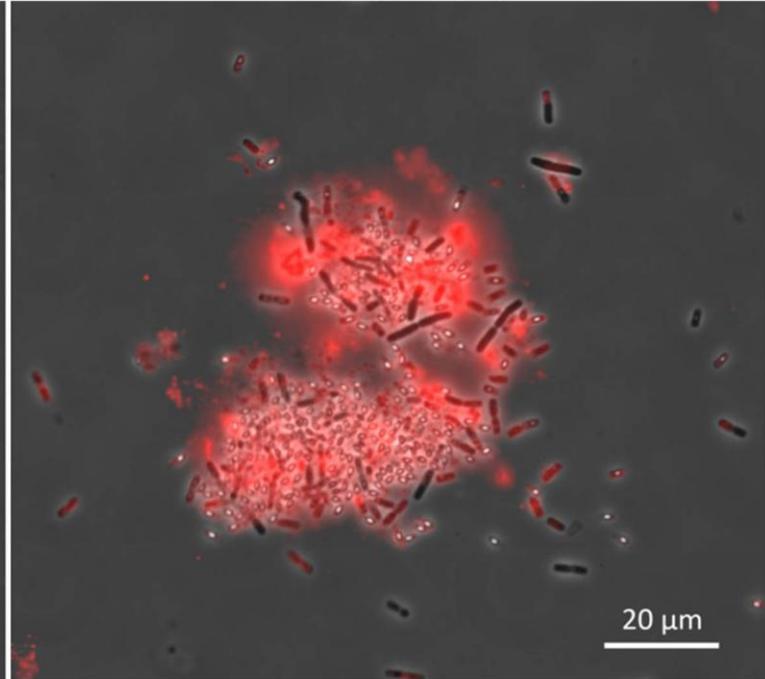
Planktonic cultures of the wild type strain and the  $\Delta esp1$  mutant strain were harvested at an  $OD_{600}$  of 6.0 and were kept on the bench (at room temperature) with no agitation for one hour. Cultures were subsequently stained with the Alexa595-labelled lectin Concanavalin A (red) and with DAPI (blue) and observed with a fluorescence microscope or stained with Ruthenium Red and observed in TEM

# Cps polysaccharide distribution in planktonic cultures

12 h

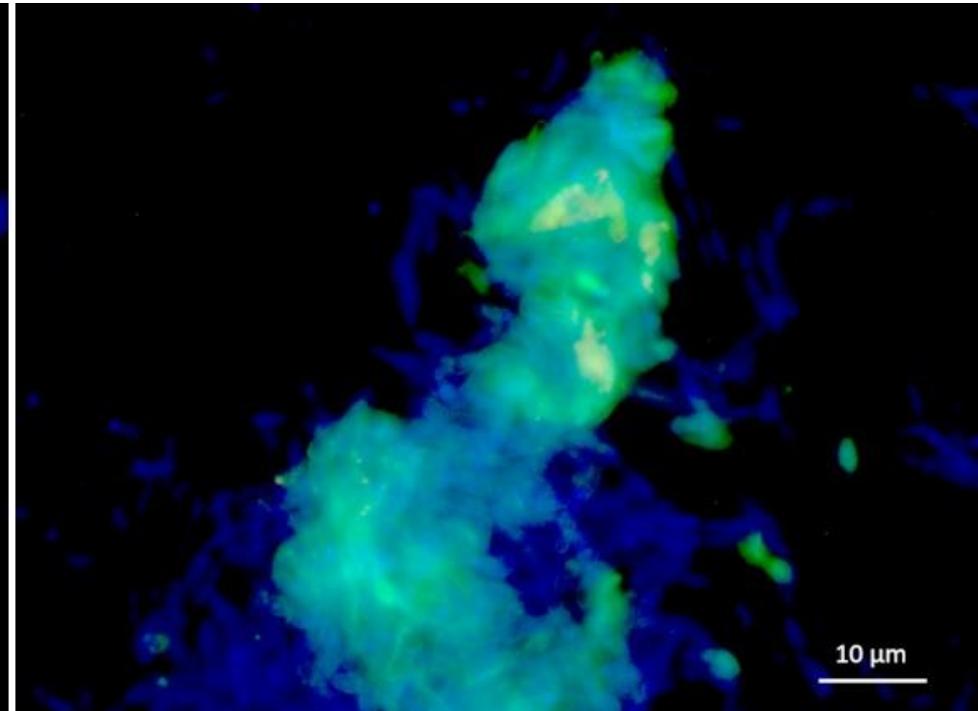
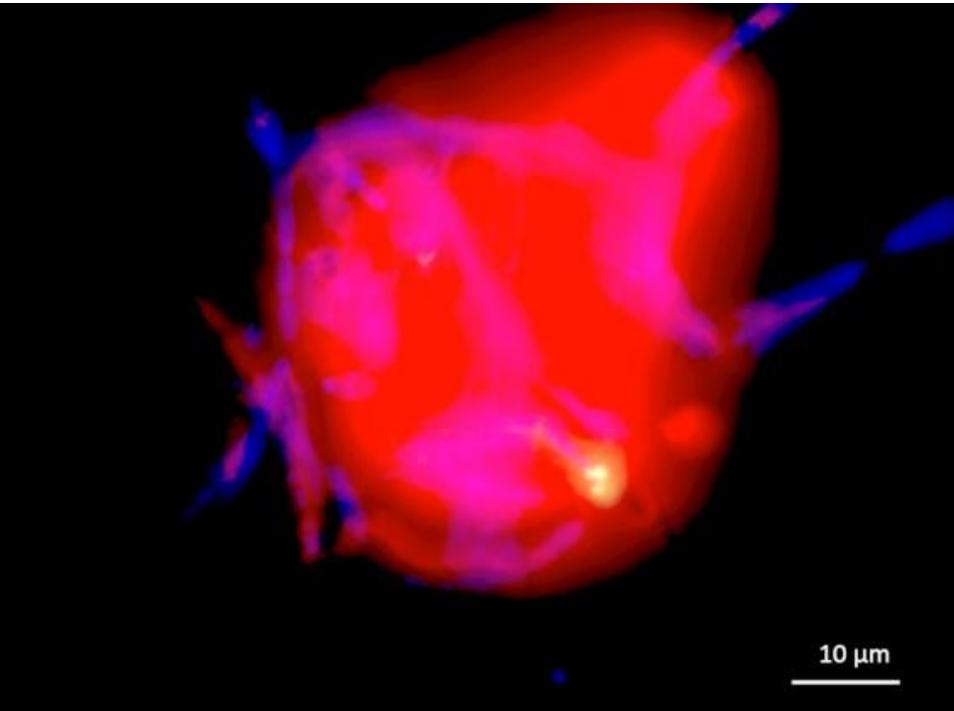


48 h



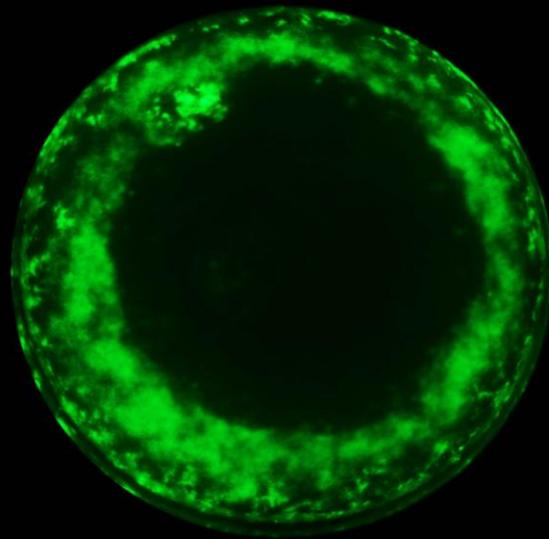
A planktonic cultures of the wild type strain was harvested after 12 h (left) or 48 h (right) of culture, stained with Alexa595-labelled ConA, and observed in phase-contrast microscopy.

## Cps and eps polysaccharide distribution in biofilm



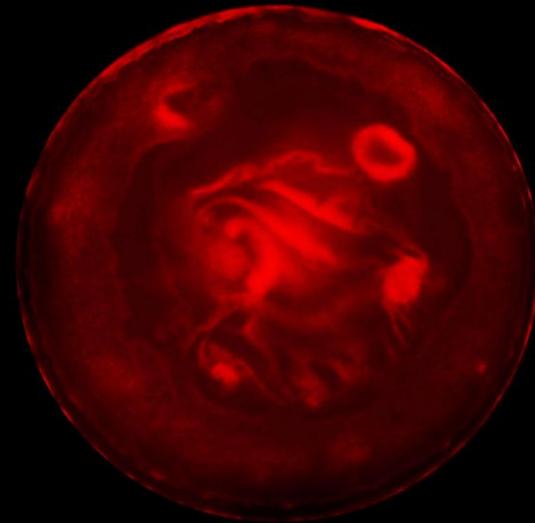
The ring and the pellicle of a 48 h-aged biofilm produced the wild type strain in glass tubes in HCT medium at 30°C were harvested separately, stained with Alexa595-labelled ConA, FITC-labelled Datura lectin and DAPI, and observed with a fluorescence microscope.

## Mutants co-cultures : time course



$\Delta eps$

48 h



$\Delta cps$

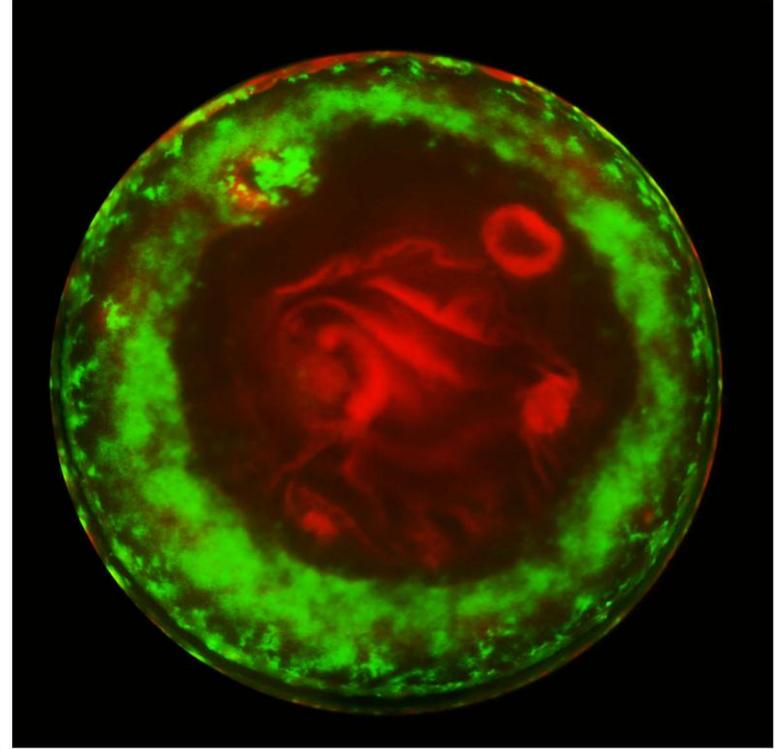
The  $\Delta cps$  strain, producing only Eps, was tagged with mCherry (in red) while the  $\Delta eps$  strain, producing only Cps, was tagged with GFP (in green). Both strains were mixed in a 1:1 ratio and grown in biofilm in 48-wells polystyrene microtiter plate in HCT media at 30°C, and observed in top-view with a fluorescence stereomicroscope.

Mutants co-cultures : relative distribution

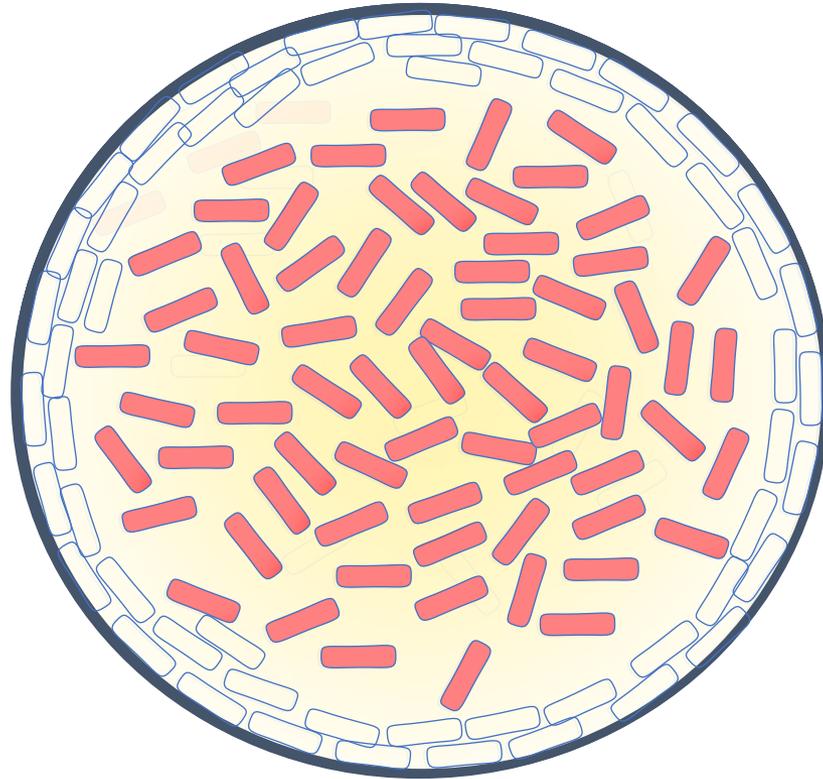
**white light**



**fluorescence**

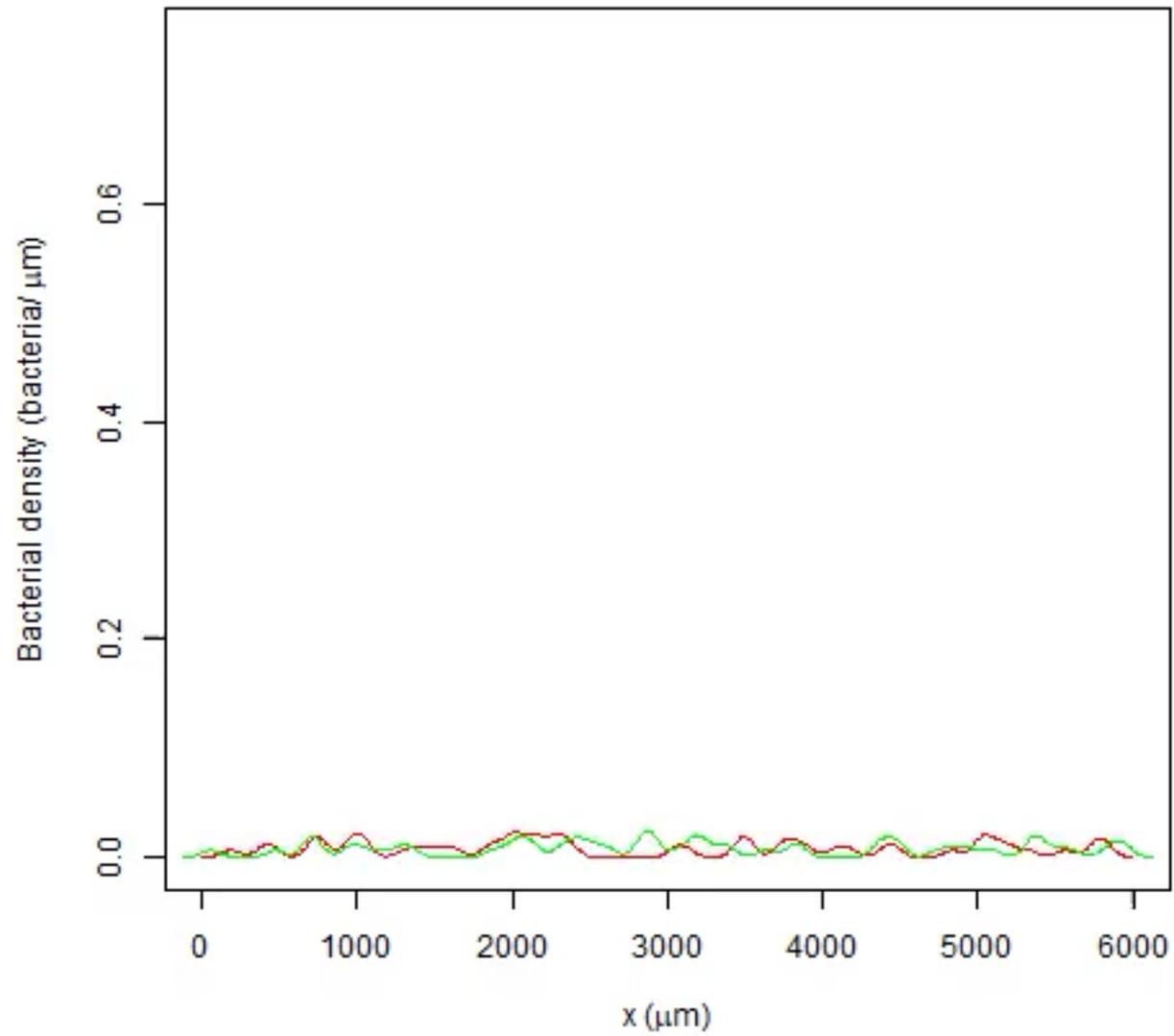


# Hypothesis to explain the subpopulations separation

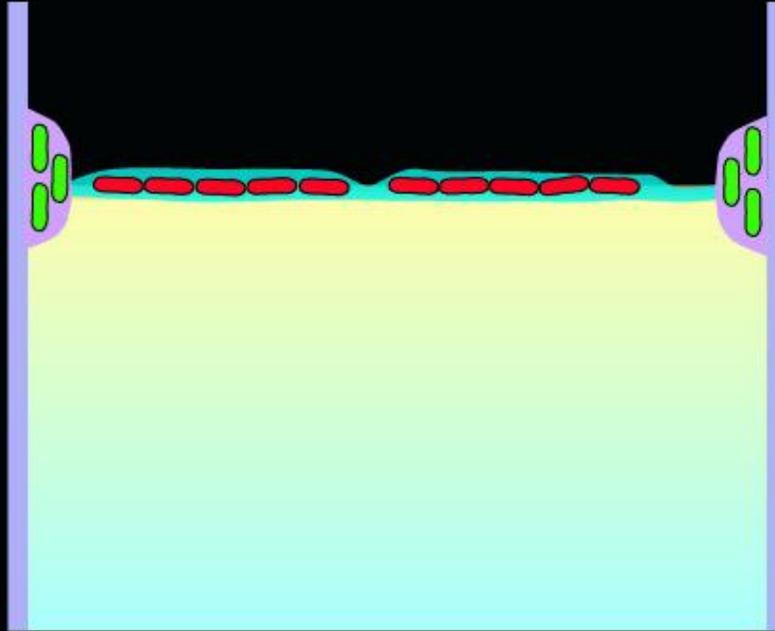


# Hypothesis to explain the mutants sorting

t = 0.00 h



# A model of Cps and Eps roles in biofilm formation



# ACKNOWLEDGEMENTS



**INRAE MICALIS**

Racha MAJED

Nay El KHOURY

Stéphane PERCHAT

Didier LERECLUS

LBE

Elie LE QUEMENER



**University of OSLO**

Ole Andreas OKSTAD



**University of Vienna**

Monika EHLING-SCHULZ