



## LOOKING FOR QUORUM SENSING QUENCHERS: A PROMISING THERAPEUTIC APPROACH AGAINST BACTERIAL INFECTION

Subproject of « Diagnosis and control of bacterial pathogen  
agent of pre- and post-harvest rice and potato in  
Madagascar »

Presented by Tsiry RASAMIRAVAKA, MD

Project promoters : Pr Mondher El Jaziri, Pr Pierre Duez



Financial support: PIC project



# Host lab

- Laboratoire de biotechnologie végétale 
  - Expertise in molecular biology, plant and microbial biotechnology
  - Lead project to promote technology for sustainable development of developing country (Burkina faso, Madagascar, ...)
- Global aims and vision:
  - Valorization and preservation of floral biodiversity
  - Consolidation of international collaboration (partnership)
  - Economic development

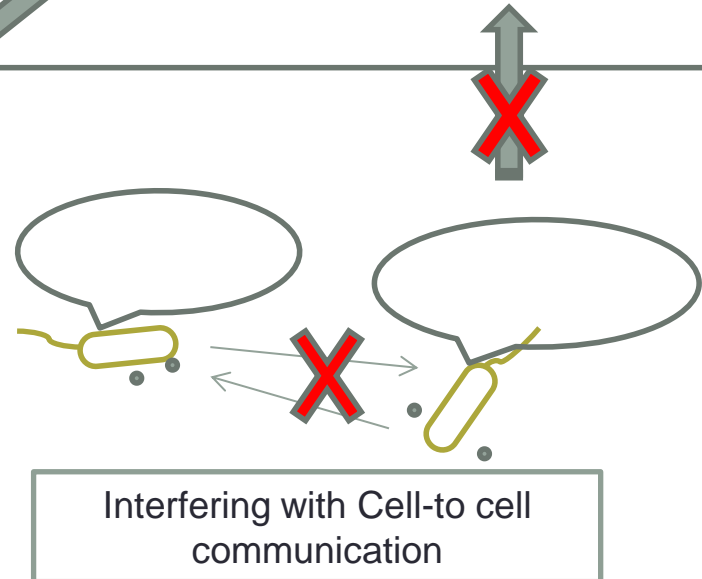
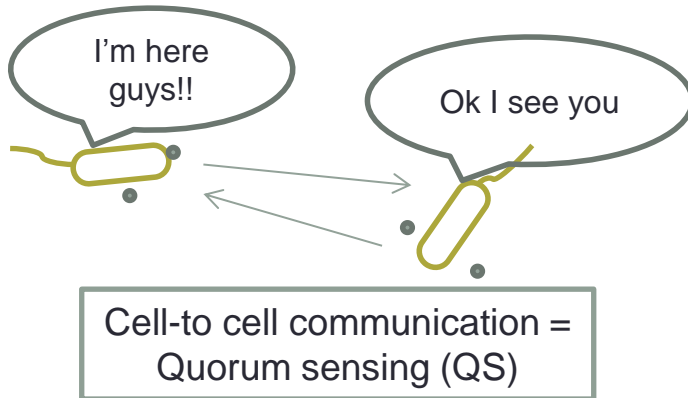
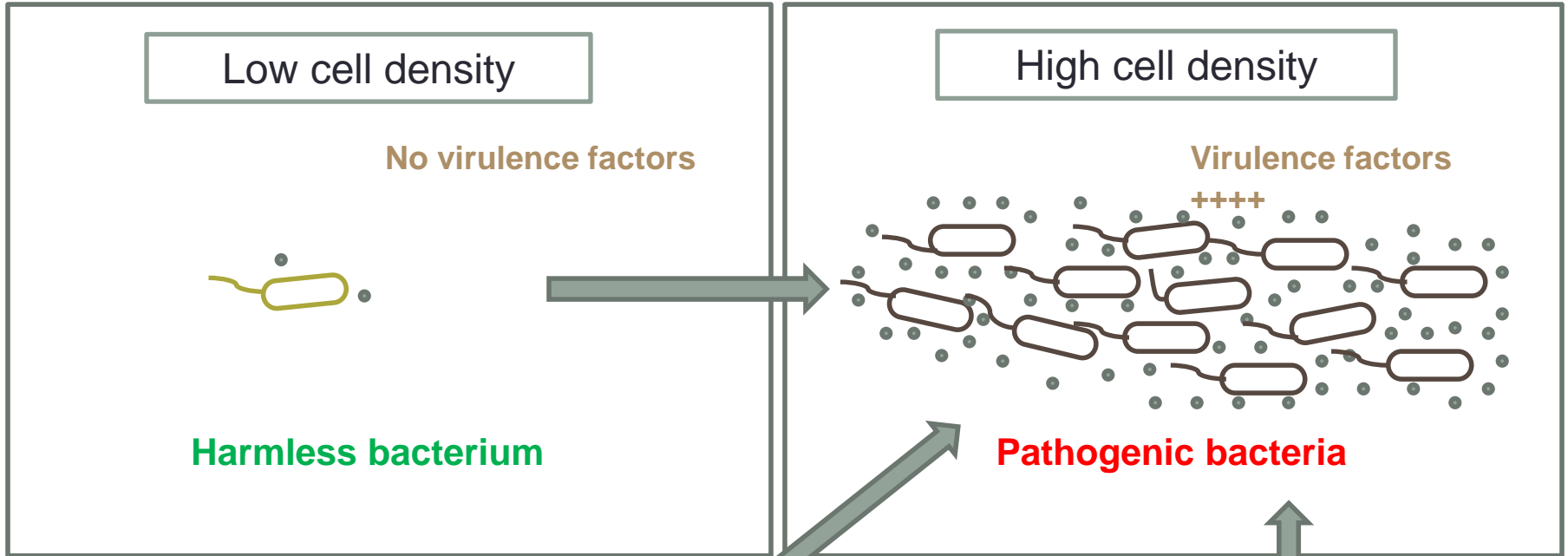
# The project

- PIC project : “Diagnosis and control of bacterial pathogen agent of pre- and post-harvest rice and potato in Madagascar”
- **Subproject : “Looking for Quorum Sensing Quenchers : A promising therapeutic approach against bacterial infection”**
- Specific aims of this project :
  - Implementation of specialized lab (technology transfer)
    - In phytopathogen diagnosis
    - In the screening of active compound (antibacterial activity and/or anti quorum sensing)
  - Reserchear formation

# Problems and challenges

- Why searching for an alternative struggle against bacterial infection?
  - Antibacterial molecules are facing limitations and drawbacks
    - Create a selective pressure (multidrug resistant bacteria)
    - No effect on produced toxins
    - Not appropriate the treatment of infected plant
- One promising approach is to prevent bacterium to become pathogenic

Nonpathogenic bacteria → pathogenic bacteria

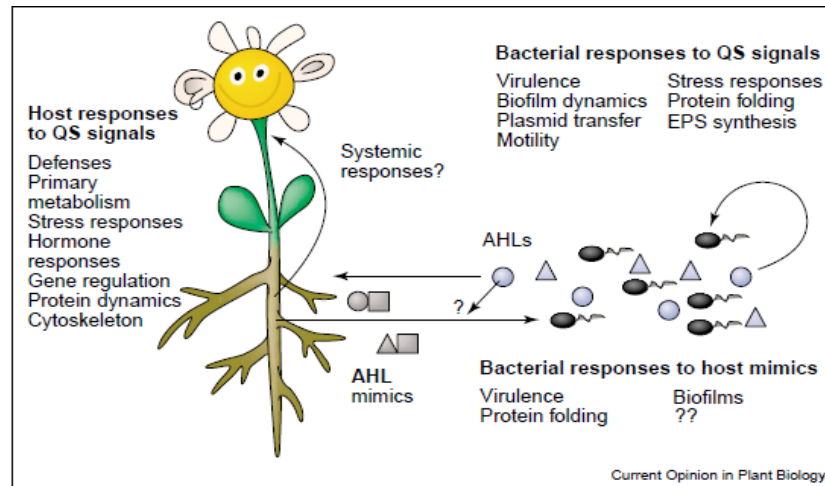


# Approach

- Inhibition of virulence factor expression of bacteria without killing them
  - Give the necessary time for immune defense to destroy the pathogenic bacteria
  - Avoid selective pressure

# Approach

- According to scientific literature, eukaryotes, including algae and higher plants, produce several compounds that interfere with bacterial quorum sensing (Bjarnsholt et al, 2005; Vandeputte et al., 2010)



- So we reasonably expect to find active compounds from Malagasy plants that impaired with bacterial QS

# Results

- Malagasy endemic plant give promising results
  - Identification of Catechin as One of the Flavonoids from *Combretum albiflorum* Bark Extract That Reduces the Production of Quorum-Sensing-Controlled Virulence Factors in *Pseudomonas aeruginosa* PAO1 (Vandeputte et al., 2010 Applied And Environmental Microbiology)
  - Endemic Malagasy *Dalbergia* species inhibit quorum sensing in *Pseudomonas aeruginosa* PAO1 (Rasamiravaka et al., 2013 Microbiology)
- → Investigation of other Malagasy plants represents a promising trail in the perspective of finding new anti-QS compounds



# Results

- Contributions of this partnership for my local lab and my university ?
  - Lab equipment for advanced research
  - International visibility → opening collaboration with other laboratory and organization

	Before partnership	During partnership
publications	1	4 published 4 expected

# Results

- Contributions of this partnership for my local lab and my university
  - Help establish a screening platform lab of Malagasy (endemic) plant in order to find new molecules
    - Madagascar present a very huge floral biodiversity (about 80 % endemic species among 18000 estimated flora)
    - Sustainability of this anti-QS compound screen lab

# Results

- Contributions of my research for my country!
  - Scientific valorisation of endemic flora
  - New scientific argument for preservation of malagasy endemic plant (unknown activity of medicinal plant)
  - Scientific expertise to lead research
  - Fundamental scientific data for improvement of struggle against bacterial infection

# Conclusion

- Projects
  - Crucial for the development of advanced research in developing country
    - Advanced scientific data is more useful for north university
  - Help to the establishment of good partnership
    - Improve scientific data exchange

# Project partners

- ULB/LBV (Belgium partners)
  - Olivier Vandeputte
  - Mondher El jaziri
  - Pierre Duez
- UA/LBM/IMRA (Malagasy partners)
  - Tsiry Rasamiravaka
  - Christian Rabemanantsoa
  - Abel Andriantsimahavandy
  - Andry Rasamindrakotroka