



From animal to plant ecosystems and vice versa

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From animal to plant ecosystems and vice versa ?

Isabelle Virlogeux-Payant

INRA, UMR1282 Infectiology and Public Health
« Signaling, Bacterial Carriage and Virulence » team

Matthieu Barret

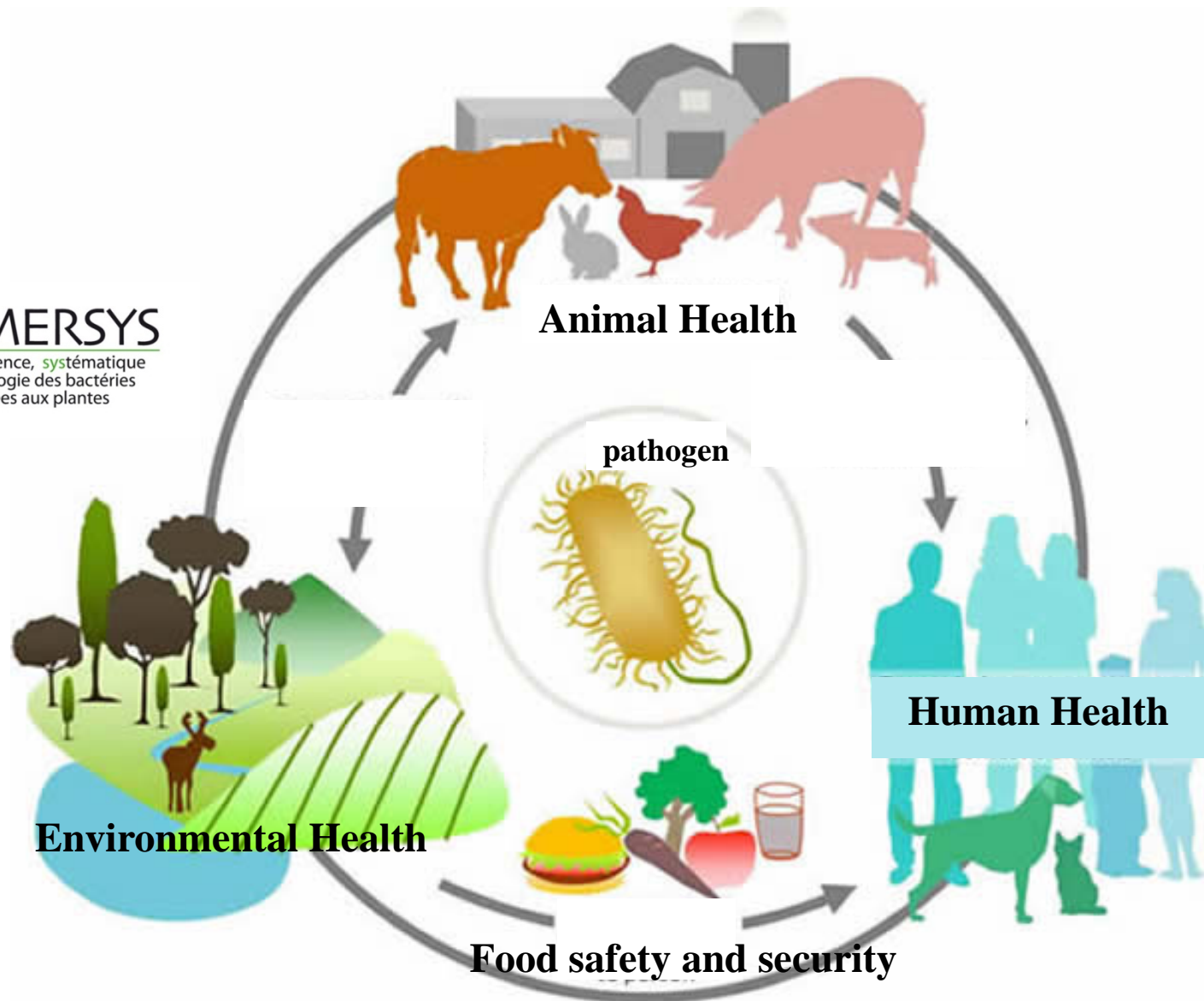
IRHS, Research Institute of Horticulture and Seeds
Emergence, systematics and ecology of plant-associated bacteria

One Health concept

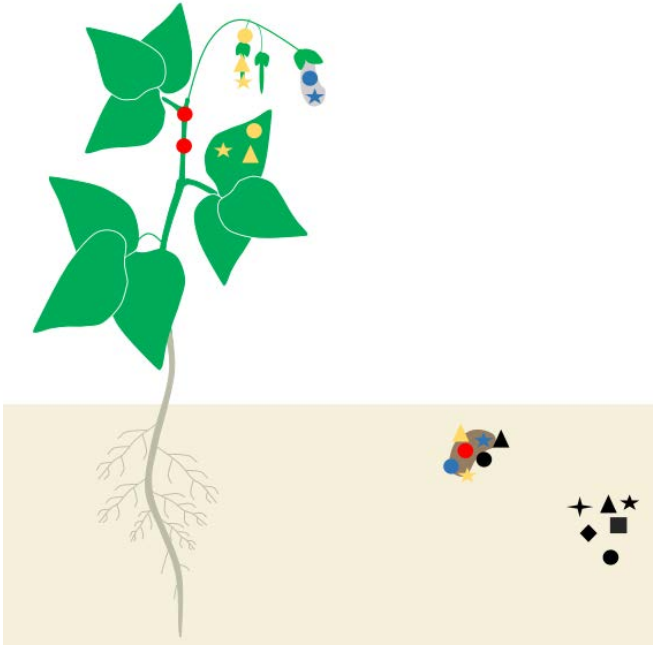


EMERSYS

Emergence, systématique
et écologie des bactéries
associées aux plantes



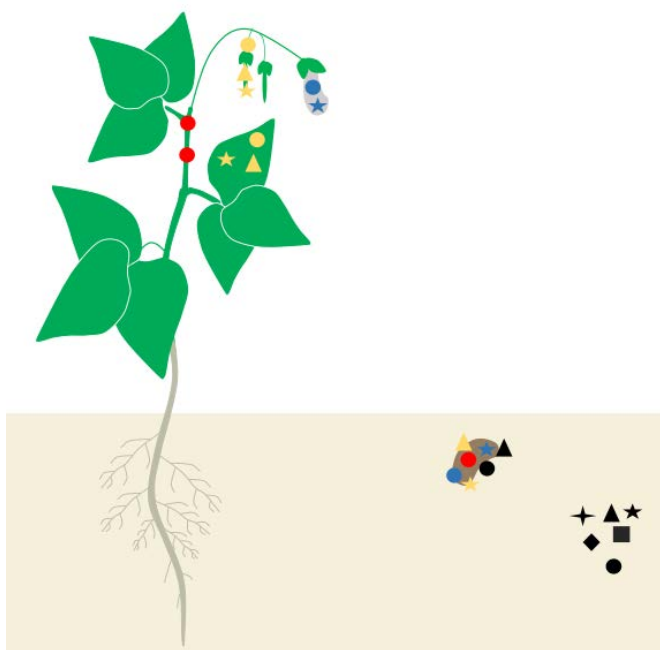
❖ Understand biological/ecological processes involved in seed transmission of microbes



- Pathogen-centric approach (*Xanthomonas*)
 - Seed transmission pathways (systemic, floral)
 - Bacterial determinants (T3SS, adhesins, ...) involved in transmission
- Seed-associated microbial communities (various plant sp.)
 - Ecological processes involved in assembly of seed microbiota
 - Dynamics of seed microbiota during germination and emergence of seedling

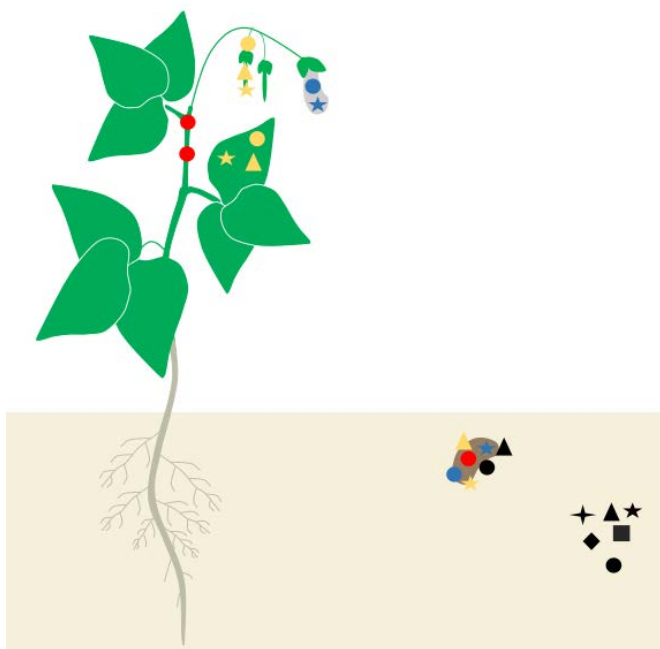
❖ Goal : understand Resistance/resilience of seed microbiota in order to control seed-transmitted pathogens

❖ Skills



- **Microbial Ecology**
 - **Barcoding** (16S rRNA gene, ITS1, *gyrB*)
 - **Metagenomics** (taxonomic classif of reads, gene-centric, binning)
- **Taxonomy**
 - **Strain collection** (CIRM-CFBP : 7000 bacterial strains)
 - **Phylogeny/Phylogenomics/Pop. genomics**
- **Phytopathology** (plant-bacterial interactions)
 - **Greenhouses and growth chamber (S2-S3)**
 - **Plant phenotyping facility (Phenotics) → impact of plant pathogen on various host plants**

❖ Interest in COST HuPlant control



- Response of the seed microbiota to invasion by HPMO (WG1)
- Seed transmission pathways of HPMO
- Taxonomic classification of HPMO (WG2)

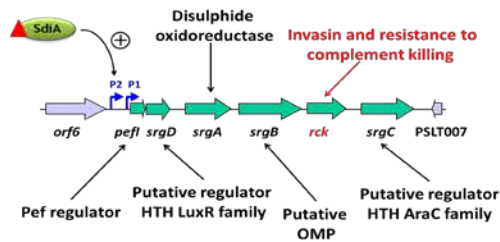
Characterization of
virulence factors and
their regulation

I. Virlogeux-Payant,
O. Grépinet

New invasion
factors

Adhesion, invasion
and survival
mechanisms into
eukaryotic cells

A. Wiedemann
S. Holbert



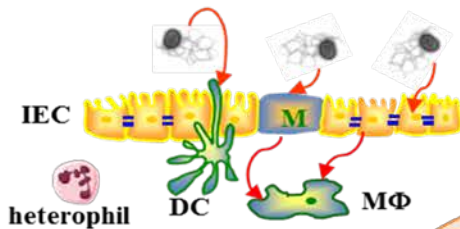
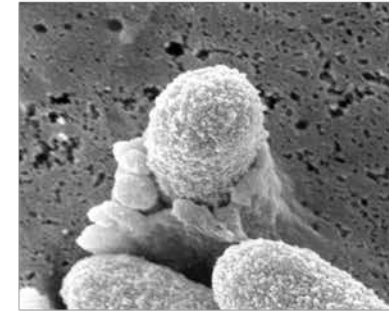
Salmonella:

Mechanisms of virulence and carrier state

Depending of the host and the serotype, *Salmonella* can induce:

- Typhoid fever: more than 27 millions people in the world
- Gastroenteritis: about 94 millions of human cases worldwide
- Carrier state: main source of human contamination via contaminated food (poultry, pig).

Pathogenesis key step: host cell invasion

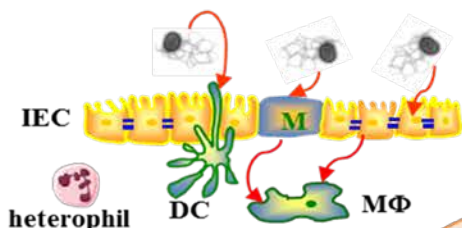
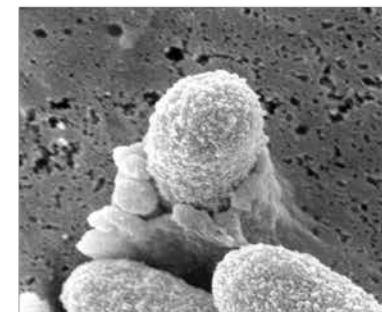
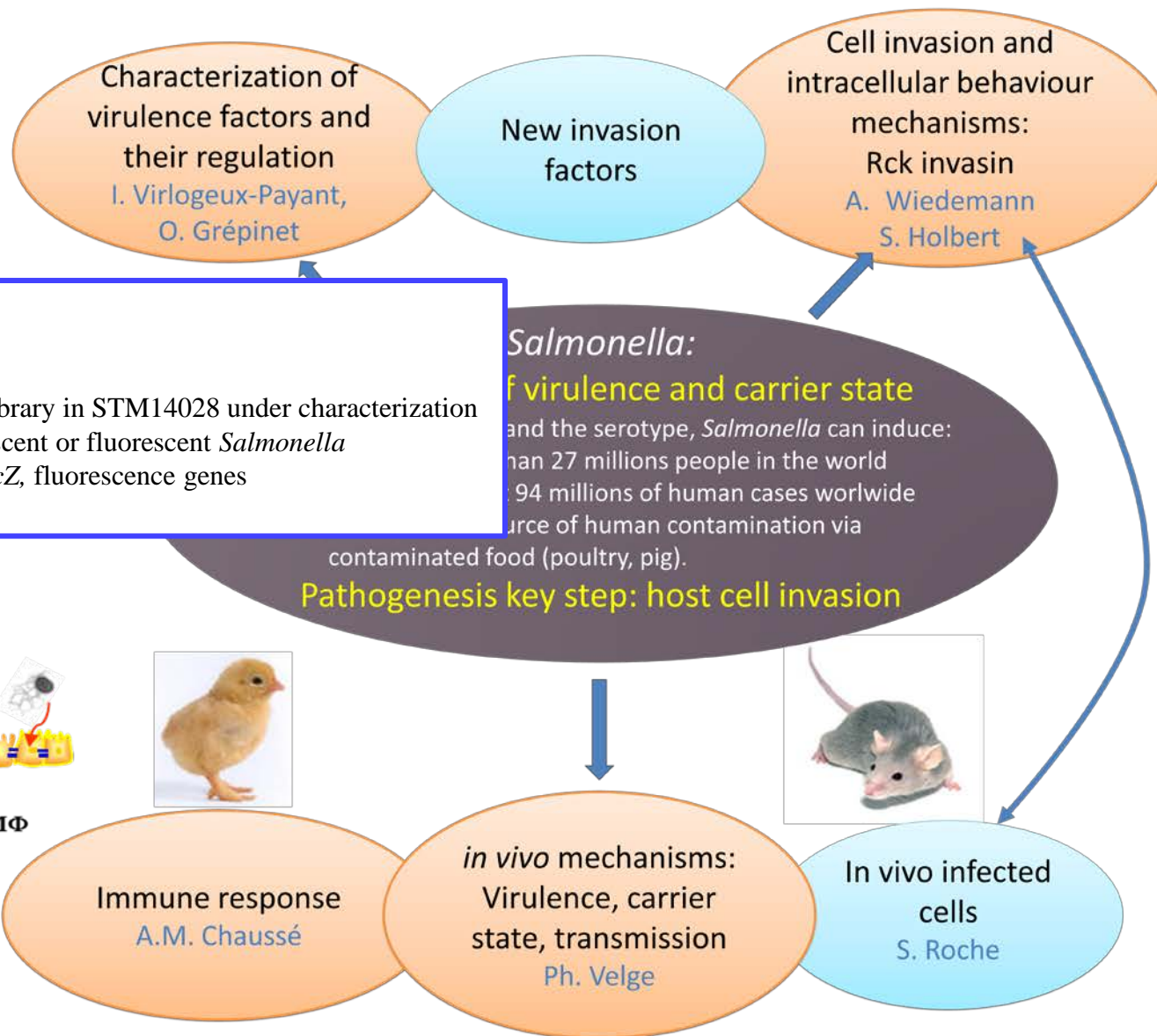


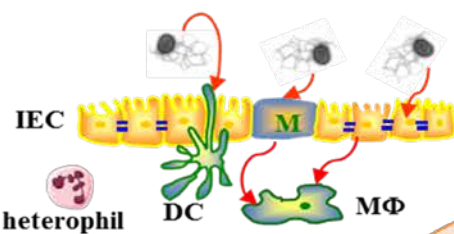
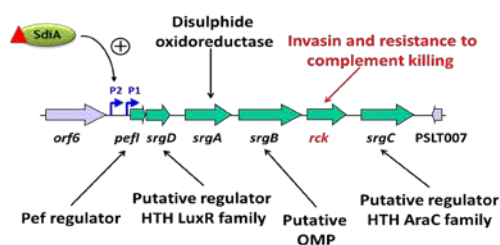
Immune response
A.M. Chaussé

in vivo mechanisms:
Virulence, carrier
state, transmission
Ph. Velge

In vivo infected
cells
S. Roche

Bacterial genetics





Characterization of virulence factors and their regulation
I. Virlogeux-Payant,
O. Grépinet

New invasion factors

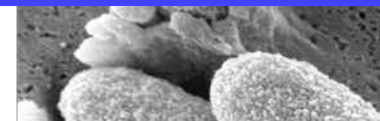
Cell invasion and intracellular behaviour mechanisms:
Rck invasin
A. Wiedemann
S. Holbert

Mechanisms of virulence

- Depending of the host and the sero
- Typhoid fever: more than 27 million
 - Gastroenteritis: about 94 millions of human cases worldwide
 - Carrier state: main source of human contamination via contaminated food (poultry, pig).

Pathogenesis key step: host cell invasion

- In vitro cell models for adhesion, invasion, immune response studies
- Confocal, electron, Correlative high resolution microscopy
- siRNA
- Cell signaling
- Development of organoid, PCTS models



Immune response
A.M. Chaussé

in vivo mechanisms:
Virulence, carrier state, transmission
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In vivo infected cells
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