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# Development of a new *Caenorhabditis elegans* test for an easier evaluation of *Staphylococcus lugdunensis* virulence



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## *Staphylococcus lugdunensis*

- gram positive bacteria, Coagulase Negative *Staphylococcus*
- skin commensal but true pathogen (lethal endocarditis, abscesses...)
- tolerance to glycopeptides

→ Study of AtL, the major autolysin of *S. lugdunensis*

**Autolysin** : enzyme hydrolysing the bacterial peptidoglycan

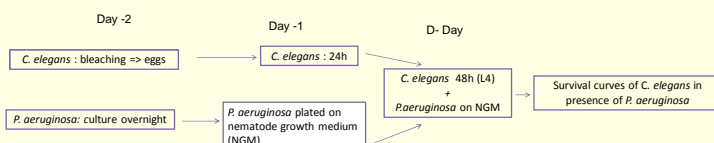
### Functions of autolysins :

- **Physiological functions** :
  - **growth** : hydrolysis of the peptidoglycan bonds => insertion of new units
  - **cellular division** : hydrolysis of the septal peptidoglycan
- **Involvement in the bacterial answer to cell wall antibiotics**

→ **Implication in virulence**

## *Caenorhabditis elegans*:

The nematode *Caenorhabditis elegans* is a simple model host for studying the relationship between the animal innate immune system and a variety of bacterial pathogens. Extensive genetic and molecular tools are available in *C. elegans*, facilitating an in-depth analysis of pathogen virulence factors.



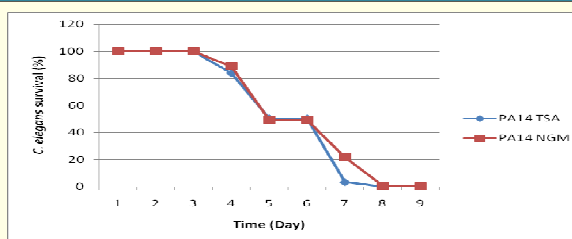
*C. elegans* model already used to evaluate *P. aeruginosa* virulence

In this study : validation of this model for *S. lugdunensis* in order to study the role of the autolysin AtL in pathogenicity

## Validation of the medium

*S. lugdunensis* grows on Trypticase Soja Agar (TSA) plates but not on classical nematode growth medium (NGM)

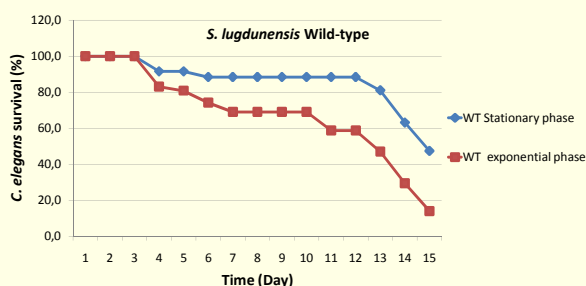
→ Validation of TSA plates for *C. elegans* with *P. aeruginosa* PA14 bacteria



Same survival curves for *C. elegans* in contact with PA14 grown in TSA medium (blue curve) or in NGM medium (red curve)

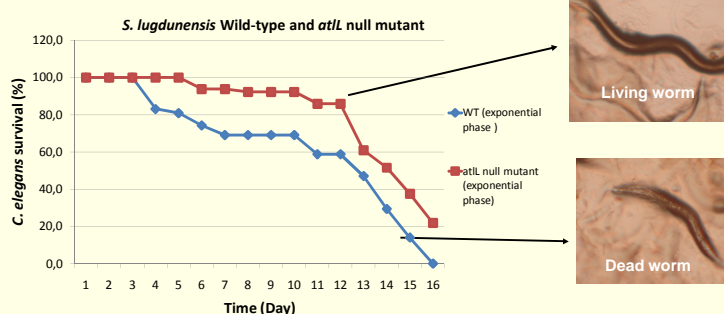
→ Validation of the use of TSA for studying *C. elegans* survival.

## Validation of *S. lugdunensis* growth phase and first results



Bacteria harvested in the middle of exponential growth phase kill more rapidly *C. elegans* than after an overnight culture.

→ Validation of the exponential phase of growth for studying *S. lugdunensis* virulence against *C. elegans*.



After 12 days ;

- 40 % of worms in contact with *S. lugdunensis* wild type strain died (blue curve)
- 10 % of *C. elegans* in contact with the *atL* null mutant strain died (red curve).

## Conclusion

These results suggest that *C. elegans* could represent a suitable tool to carry out study of *S. lugdunensis* virulence and that AtL expressed during the exponential growth phase could be involved in *S. lugdunensis* virulence.