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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

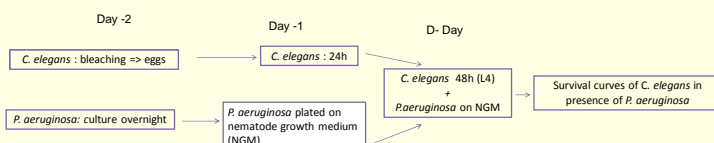
Functions of autolysins :

- **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.



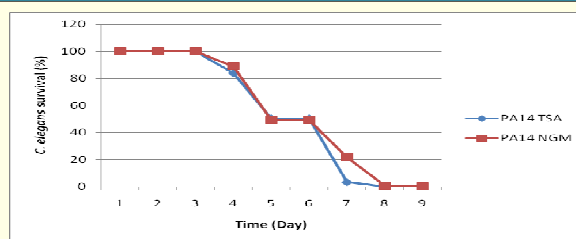
C. elegans model already used to evaluate *P. aeruginosa* virulence

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)

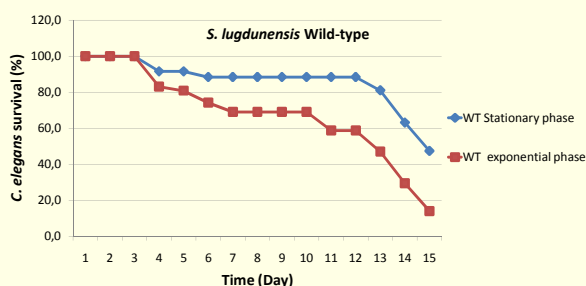
→ Validation of TSA plates for *C. elegans* with *P. aeruginosa* PA14 bacteria



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.

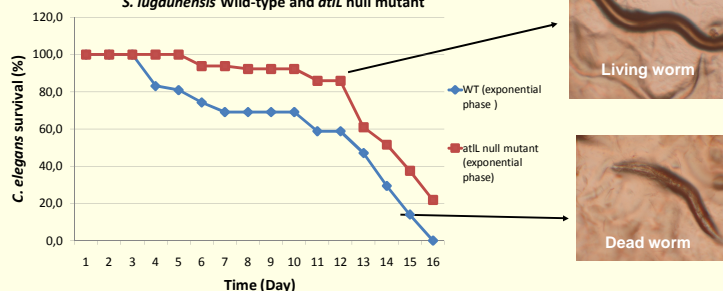
Validation of *S. lugdunensis* growth phase and first results



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*.

S. lugdunensis Wild-type and *atL* null mutant



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.