

<b>Title</b>	Metabolic modelling of the interaction between pathogenic bacteria and tissue models in Necrotizing Soft Tissue Infections
<b>Group</b>	Systems and Synthetic Biology
<b>Project type</b>	thesis
<b>Credits</b>	36
<b>Supervisor(s)</b>	Dr. Edoardo Saccenti (SSB), Maria Suarez-Diez (SSB)
<b>Examiner(s)</b>	Dr. Edoardo Saccenti, TBD
<b>Contact info</b>	edoardo.saccenti@wur.nl
<b>Begin date</b>	Open

**Used skills:** Statistics and programming; Relating results to existing or novel microbiology knowledge

**Requirements:** Ability to program in MATLAB, R or Python and (basic) statistics and microbiology knowledge as well are desired skills.

**Description:** Necrotizing soft tissue infections are devastating infection characterized by rapidly spreading and uncontrolled growth of bacterial pathogen; this type of infection is usually associated with amputation and high mortality. Why this happens is still unknown as mostly unknown are the mechanisms underlying the establishing of high pathogenicity. NSTI infection can be studied by using tissue models mimicking skin or muscle which are infected with bacteria isolated from patients and studying the behaviour of the bacteria under different conditions. Under which conditions the bacteria grow well? When not? Unfortunately, it is not possible to perform countless experiments to test a large number of conditions. However, this can be done *in silico*, i.e., through computational modelling of the bacterial metabolism

The aim of this project is to establish computational models that can help us to 1) understand which characteristics of different tissue models are linked to good or worse bacterial growth and 2) suggest new experiment that can be performed in the laboratory to test hypothesis generated by mean of computation.

This project is in collaboration with the group of Prof A. Norrgby-Teglund and Mattias Svenson from the Karolinska Institute in Stockholm.

## References

Kabimoldayev, I., A. D. Nguyen, L. Yang, S. Park, E. Y. Lee and D. Kim (2018). "Basics of genome-scale metabolic modeling and applications on C1-utilization." FEMS Microbiology Letters **365**(20).

Nawijn, F., F. Hietbrink, A. B. Peitzman and L. P. H. Leenen (2021). "Necrotizing Soft Tissue Infections, the Challenge Remains." Frontiers in Surgery **8**(395).

