



## Analysis of phage encapsulated RNA

**Supervisors:** Maria Suarez-Diez

**Examinors.** Maria Suarez-Diez

**Contacts:** [maria.suarezdiez@wur.nl](mailto:maria.suarezdiez@wur.nl) [Robert1.smith@wur.nl](mailto:Robert1.smith@wur.nl)

**Type of thesis:** Computational

**Required competences:** R or Python programming skills.

Basic Bioinformatics skills (Bioinformation technology /Adv. Bioinformatics )

**Acquired competences:** Omics data analysis and interpretation to analyse host-pathogen interaction. Statistical analysis of large datasets. Pipeline development.

**Date:** by mutual agreement

## Description

The content of the viral envelope is currently considered to only include the viral genome. However, our collaborators at the Delft Technical University have isolated and sequenced non-genomic RNA from bacteriophage capsids, demonstrating the encapsulation of RNA in addition to the viral genome.

Encapsulation of RNA within the capsid could allow for the transfer of RNA from the original host into a newly infected host, which could potentially have major effects for the host physiology and phage infection process.

Current data is available from two bacteriophages (and their host) and new datasets will become available in the near future. At SSB we have developed a pipeline for the annotation of RNA originating from bacteriophages and their bacterial hosts. This pipeline has suggested a major role for host-derived tRNA-derived stress-induced RNA (tiRNA).

tiRNA are an RNA species generally associated with the cellular stress response that have only recently been discovered. They have been associated to modulation of stress response but they have not been widely studied and their possible role during phage invasion remains unclear (Xu 2018; Shen 2018). In addition, the datasets have not yet been fully analyzed or explored. The main research question pertains the role of these encapsulated RNA fragments during phage infection and the mechanisms leading to selective recruitment.



## References

- Li, S., Xu, Z. & Sheng, J. tRNA-Derived Small RNA: A Novel Regulatory Small Non-Coding RNA. *Genes* 9, 246 (2018).
- Shen, Y. et al. Transfer RNA-derived fragments and tRNA halves: biogenesis, biological functions and their roles in diseases. *J Mol Med* 96, 1167–1176 (2018).