

Title: RNA biology at the phage-bacteria interface.

Promotor: Dr Ewelina Małecka

Institute: International Institute of Molecular and Cell Biology in Warsaw

Laboratory: Laboratory of Prokaryotic Gene Regulation

www: <https://shorturl.at/IUluS>

Project description:

Acinetobacter baumannii is a major public health threat because it is resistant to many antibiotics and can easily survive in hospitals. Treatment options are limited, and infections often lead to high mortality. For this reason, the WHO lists it as a top priority for developing new antibiotics. One promising direction is the study of bacteriophages, which are viruses that infect bacteria, and the molecular strategies they use to take control of bacterial cells. A central part of this work focuses on RNA binding proteins from both the bacterium, such as the RNA chaperone Hfq, and from phages, including a Ro60 homolog that may help send host RNA to degradation pathways. By examining how these proteins work during infection, we hope to identify new mechanisms that could be used to fight antibiotic resistant strains.

Aim:

The goal of the project is to elucidate the molecular mechanisms by which RBPs mediate phage-host interactions in *Acinetobacter baumannii*, with a focus on the bacterial RBP Hfq and a phage-encoded Ro60 homolog. To achieve this, we will employ a combination of transcriptomic, biochemical, and biophysical approaches. We will identify RNA and protein interaction partners of both Hfq and Ro60 under normal and phage-infected conditions. Additionally, *in vitro* assays will be conducted to dissect the RNA-binding specificity, dynamics, and functional roles of these proteins. Together, these methods will provide a comprehensive view of RBP-mediated regulation during phage infection.

Requirements:

- Master's degree in biology, biochemistry, or related fields.
- Solid knowledge of fundamental molecular biology and biochemistry.
- Hands-on laboratory experience and familiarity with basic molecular biology techniques.
- Previous experience working with phages and/or RNA or protein biochemistry is an advantage.
- Proficiency in spoken and written English.
- Strong interpersonal skills, initiative, and good organizational abilities.
- Willingness to learn and take on new challenges, strong analytical thinking skills, and the ability to work independently.

Number of positions available: 2

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