A position for PhD student

The project in the OPUS program of National Science Centre.

Description of the project. Noncoding RNA (sRNA) enable bacteria to adapt to changing environmental conditions, they participate in the regulation of cellular metabolism and in the interactions with the host organisms during infection, and they also control bacterial virulence. The correct functioning of sRNAs is dependent on RNA-binding proteins. In Gram-positive bacteria this role is performed by such chaperone proteins as Hfq [1-3], and FinO-domain proteins [4, 5]. On the other hand, much less is known about proteins that perform this role in Gram-positive bacteria. Recent studies showed that this role may be played by KH-domain proteins, named KhpA and KhpB, which are present in many Gram-positive bacteria [6]. In several species, including *Streptococcus pneumoniae*, it was discovered that these proteins recognize, and strongly bind numerous RNA molecules, as well as participate in the regulation of cellular division. The aim of the studies in this project is to learn how KhpA and KhpB proteins recognize RNA molecules and what is the contribution of these interactions to the regulation of gene expression in *S. pneumoniae* bacteria.

The research tasks of the PhD student will be focused on explaining how KhpA and KhpB proteins bind to regulatory RNAs. For that purpose such biochemical methods will be used as secondary structure probing and footprinting of complexes of RNA molecules with proteins.

PhD studies: take place in the PhD School of AMU in the Section of Natural Sciences. Information on the recruitment procedures is available on the webpage: http://snp.home.amu.edu.pl/

Conditions:

Time of participation in the project: 12 months

Beginning: October 1st 2025

Remuneration: scientific scholarship (5000 PLN/month)

How to apply?

The application should be sent to mol@amu.edu.pl by September 15th, 2025. The application should include a cover letter, scientific CV, and diploma of completion of MSc studies. The planned competition outcome date is June 20, 2024. The status of doctoral student at the doctoral school from October 2025 is required.

The application should include a declaration of consent to the processing of personal data.

If you have any questions, please contact me at the following e-mail address: mol@amu.edu.pl.

Literature

1. Małecka E.M., Stróżecka J., Sobańska D. and Olejniczak M. “Structure of bacterial regulatory RNAs determines their performance in competition for the chaperone protein Hfq.” Biochemistry (2015), 54, 1157-70
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2. Wróblewska Z, Olejniczak M. “Hfq assists small RNAs in binding to the coding sequence of *ompD* mRNA and in rearranging its structure”, RNA (2016), 22(7):979-94
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3. Kwiatkowska J, Wroblewska Z, Johnson KA, Olejniczak M. „The binding of Class II sRNA MgrR to two different sites on matchmaker protein Hfq enables efficient competition for Hfq and annealing to regulated mRNAs.”, RNA (2018), 24(12):1761-1784
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4. Olejniczak M, Storz G. “*ProQ/FinO-domain proteins: Another ubiquitous family of RNA matchmakers?*” *Molecular Microbiology***.** (2017), 104(6):905-915.
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5. Ewa M. Stein, Joanna Kwiatkowska, Maciej M. Basczok, Chandra M. Gravel, Katherine E. Berry, Mikołaj Olejniczak „Determinants of RNA recognition by the FinO domain of the Escherichia coli ProQ protein”, *Nucleic Acids Research* (2020),
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6. Olejniczak M., Jiang X, Basczok MM, Storz G. KH domain proteins: Another family of bacterial RNA matchmakers? *Molecular Microbiology* 117(1):10-19 (2022)
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