THE 67TH INTERNATIONAL

OPEN READINGS

CONFERENCE FOR STUDENTS OF PHYSICS AND NATURAL SCIENCES

BOOK OF ABSTRACTS | 2024

Vilnius University

VILNIUS UNIVERSITY PRESS

Editors:

Martynas Keršys
Rimantas Naina
Vincentas Adomaitis
Emilijus Maskvytis

Cover and Interior Design:

Goda Grybauskaitė

Vilnius University Press
9 Saulėtekio Av., III Building, LT-10222 Vilnius
info@leidykla.vu.lt, www.leidykla.vu.lt/en/
www.knygynas.vu.lt, www.journals.vu.lt

Bibliographic information is available
on the Lithuanian Integral Library Information System (LIBIS) portal www.ibiblioteka.lt
ISBN 978-609-07-1051-7 (PDF)

INHIBITION OF CRISPR-CAS DEFENCE BY ANTI-CRISPR PROTEINS

Melita Graužinytė[1], Tomas Šinkūnas[1]

[1]Department of Protein-DNA Interactions, Institute of Biotechnology, Life Sciences Center, Vilnius University
melita.grauzinyte@gmc.stud.vu.lt

Bacteriophages and bacteria are in a constant evolutionary arms race, developing a variety of attack, defence and counter-defence tactics. In the face of phage attacks, bacteria have evolved multiple defensive mechanisms, one of which is the CRISPR-Cas system. This system encodes a ribonucleoprotein complex that destroys the invading phages by targeting their genetic material.[1] To evade this defence strategy, phages employ anti-CRISPR (Acr) proteins that disrupt the functionality of the CRISPR-Cas system, typically by interfering with its DNA-binding or hydrolytic functions.[2] CRISPR-Cas systems are used as invaluable tools for genome editing.[3] The ability of Acr proteins to modify the actions of CRISPR-Cas opens up new possibilities for their biotechnological applications.[4] More than 100 Acr families have been identified, but the molecular mechanisms are only understood for a limited number of these proteins.[4]

In this study, we aim to elucidate the inhibition mechanisms of the type I-F CRISPR-Cas system by small AcrIF proteins. By combining *in vivo*, structural and biochemical methods, we analyse the molecular interplay between the components of the system and the AcrIF proteins.

[1] Ishino, Y., Krupovic, M., Forterre, P. (2018). History of CRISPR Cas from Encounter with a Mysterious Repeated Sequence to Genome Editing Technology. Journal of Bacteriology, 200(7).
[2] Bondy Denomy, J., Pawluk, A., Maxwell, K. L., Davidson, A. R. (2013). Bacteriophage genes that inactivate the CRISPR Cas bacterial immune system. Nature, 493(7432), 429.
[3] Ran, F. A., Hsu, P. D., Wright, J., Agarwala, V., Scott, D. A., Zhang, F. (2013). Genome engineering using the CRISPR Cas9 system. Nature Protocols, 8(11), Article 11.
[4] Kraus, C., Sontheimer, E. J. (2023). Applications of AntiCRISPR Proteins in Genome Editing and Biotechnology. Journal of Molecular Biology, 435(13), 168120.