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)

FUNCTIONAL ANALYSIS OF ANTIVIRAL BREX PROTEINS

Aistė Petrauskaitė[1], Tomas Šinkūnas[1]

[1]Vilnius University
aiste.petrauskaite@gmc.stud.vu.lt

Bacteriophages are the most abundant biological entity in the biosphere, and they are responsible for the destruction of 20-40 % of bacterial cells every day [1]. This evolutionary pressure drives the emergence of diverse bacterial defence systems, one of which is the BREX (Bacteriophage Exclusion). This system is present in about 10 % of known prokaryotic genomes, yet its detailed defence mechanism remains to be elucidated [2]. Our study focuses on the type I BREX (BREX1) system, which is encoded by a cluster of six genes: *brxA-brxB-brxC-pglZ-brxL-pglX*. This system methylates host genomic DNA at specific sequences, thereby protecting it from autoimmunity. The non-methylated DNA of bacteriophages triggers BREX1, which blocks phage proliferation (Fig. 1).

We have previously shown that deletion of certain BREX1 genes results in cytotoxicity [3]. This suggests that some BREX1 proteins are involved in the autoregulation of the immune response, while others may act as effectors that interfere with the vital process of the cell. Here, we are analysing different compositions of BREX proteins to find a link to their function in the cell.

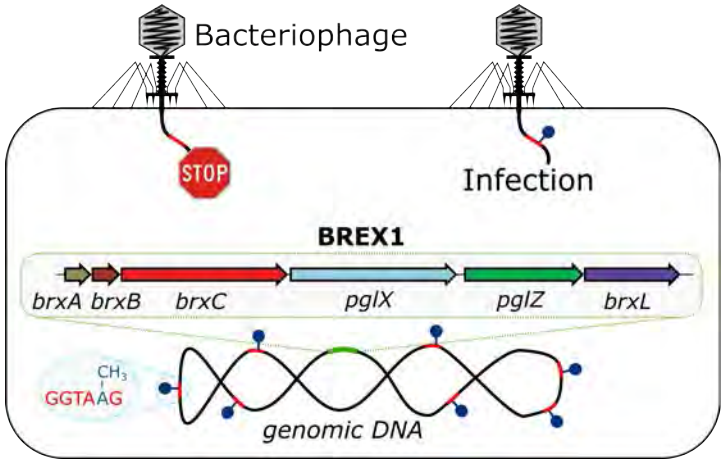

Fig. 1. The BREX1 defence system protects bacteria from bacteriophage infection.

[1] L.-C. Fortier, O. Sekulovic, Importance of prophages to evolution and virulence of bacterial pathogens
[2] T. Goldfarb et al., BREX is a novel phage resistance system widespread in microbial genomes
[3] J. Gordeeva et al., BREX system of Escherichia coli distinguishes self from non-self by methylation of a specific DNA site