PURIFICATION AND ACTIVITY OFTHE CHIMERIC SEPTU ANTI-VIRAL DEFENSE SYSTEM

Marija Duchovskyte[1], Dalia Smalakyte[1], Gintautas Tamulaitis[1]

[1]Institute of Biotechnology, Life Sciences Center, Vilnius University, Lithuania
marija.duchovskyte@chgf.stud.vu.lt

In order to withstand frequent bacteriophages' attacks, prokaryotes have developed multiple sophisticated defense mechanisms. For instance, CRISPR-Cas provides immunity to bacteria and archaea by recalling past phage infections, and restriction-modification (RM) systems target specific viral genomic sequences [1]. Given the enormous diversity of viruses, it is likely that more different bacterial defense systems exist than previously described [2]. Over the past few years, systematic analyses of prokaryotic genomes followed by experimental validation have uncovered numerous previously unknown anti-phage defense systems [3]. Here, we focus on a recently discovered anti-viral defense system called Septu.

The Septu defense system operates using two proteins: putative ATPase PtuA and HNH nuclease PtuB [3]. In previous experiments, we were unable to purify both the ATPase and the nuclease belonging to the same Septu system from *B. thuringiensis* or *B. weihenstephanensis*. Thus, in this study we present the chimeric Septu system composed of *B. thuringiensis* PtuA and *B. weihenstephanensis* PtuB. We evaluated its activity against *E. coli* phages and tested various nucleic acids as substrates *in vitro*.

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[2] L. Gao, et al. Diverse enzymatic activities mediate antiviral immunity in prokaryotes. Science 369(6507), 1077-1084 (2020)
[3] S. Doron, et al. Systematic discovery of antiphage defense systems in the microbial pangenome. Science 359(6379) (2018)