ATP nucleosidases are conserved immune effectors in Prokaryotes and Eukaryotes

Francois Rousset*[1]

[1]Department of Molecular Genetics, Weizmann Institute of Science – Israël

Résumé

The billion-year-old coevolution between bacteria and phages has led to the emergence of an arsenal of defense strategies to overcome phage infection. Among them, the CBASS family of anti-phage systems involves the production of cyclic nucleotide messengers upon infection, which bind and activate CBASS immune effectors. While several CBASS effectors have been characterized, such as nucleases and phospholipases, the molecular function of others remains unknown. Here, we report that some CBASS effectors act as ATP nucleosidases, breaking down ATP molecules into adenine and ribose-triphosphate during phage infection. Using a phylogenetic approach, we found that ATP nucleosidases are mobilized by additional defense systems, including a novel one we term Detocs. Finally, we show that this defense strategy is also manifested in the innate immune system of Eukaryotes. Taken together, our findings establish that ATP nucleosidases are immune effectors across the tree of life.

Mots-Clés: immunity, CBASS, anti, phage defense

*Intervenant