

In depth characterization of a microbial toxin delivery system - the extracellular contractile injection system

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Laufzeit:

Bacteria live in complex communities where they often compete with other organisms for nutrients and space. To inhibit or kill their competitors, they evolved nanoweapons, called extracellular contractile injection systems (eCIS), which are phage-like structures that mediate cell-cell contact and serve as toxin delivery machinery. These nanodevices are present in many bacteria and harbour great potential for the application as nano injection systems in medical, agricultural and industrial settings, but we know only little about how these systems evolved and function. In this interdisciplinary project, a strong collaboration between the groups (Leibniz Universität Hannover and Hebrew University of Jerusalem) provides a unique possibility to provide mechanistic understanding of eCIS functions. They will decipher the role of these nanostructures in *Streptomyces* bacteria which are important antibiotic producers that live in soil, where they compete with many other microbes for resources. The researchers will demonstrate that eCIS can efficiently kill insects that destroy crops which can serve as the basis for the development of new biological pesticides. Finally, they want to develop a tool based on artificial intelligence to discover new toxins that are being injected by eCIS. In summary, the study will shed light on a fascinating but poorly studied bacterial nanoweapon, and the resulting knowledge may be translated to agricultural and possibly medical applications.

Projektbeteiligte

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