CeMMP Centre for Cryo-electron Microscopy of Membrane Proteins

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Dr. Zeytuni is an assistant professor in the department of Anatomy and Cell Biology at McGill University. Her lab studies protein machineries facilitating transport across biological membranes. Dr. Zeytuni obtained her B.Sc. in Marine Biology and Biotechnology from the Ben-Gurion University of the Negev, Israel. She performed her M.Sc. and Ph.D. studies with Prof. Raz Zarivach at the Ben-Gurion University of the Negev. Later, Dr. Zeytuni joined Prof. Natalie Strynadka at the University of British Columbia, Canada for her postdoctoral studies. Dr. Zeytuni has been awarded with prestigious fellowships and grants during her studies including the Banting fellowship, EMBO long-term fellowship, L'Oréal-UNESCO for Women in Science fellowship and others. The Zeytuni lab studies bacterial secretions systems and membrane transportation. Bacterial secretion systems are essential membrane embedded protein machineries, enabling bacteria to obtain nutrients, communicate, protect against biological and chemical agents, as well as facilitate disease through the delivery of virulence factors.

Structural insights into the cytotoxic peptides ATP-driven exporter essential to pathogenicity of drug resistant Staphylococcal aureus by hybrid approaches

Staphylococcus aureus is a major human pathogen that has acquired an alarming broad-spectrum resistance to many of the commonly used antibiotics including beta-lactams such as penicillin. S. au\reus often causes hospital- and community- associated infections responsible for significant morbidity and death. Staphylococci infections are mediated trough a large array of secreted toxins including the phenol-soluble modulins (PSMs). PSMs are amphipathic, α-helical peptides with pronounced surfactant-like properties that have multiple key roles in pathogenesis, including cytolysis of red and white blood cells, abscess formation, biofilm development and trigger receptor-mediated inflammatory response. A specialized ATP-binding cassette (ABC) transport system exports PSMs to the extracellular environment and is essential for bacterial growth by providing an immunity against self-expressed PSMs. Here, we present the structural characterization of the PSM transporter determined by high-resolution single-particle cryo-EM and X-ray crystallography accompanied with functional characterization in vivo. The observed alternations between different transport stages provide crucial mechanistic insights and sets the foundation for novel therapeutics design.