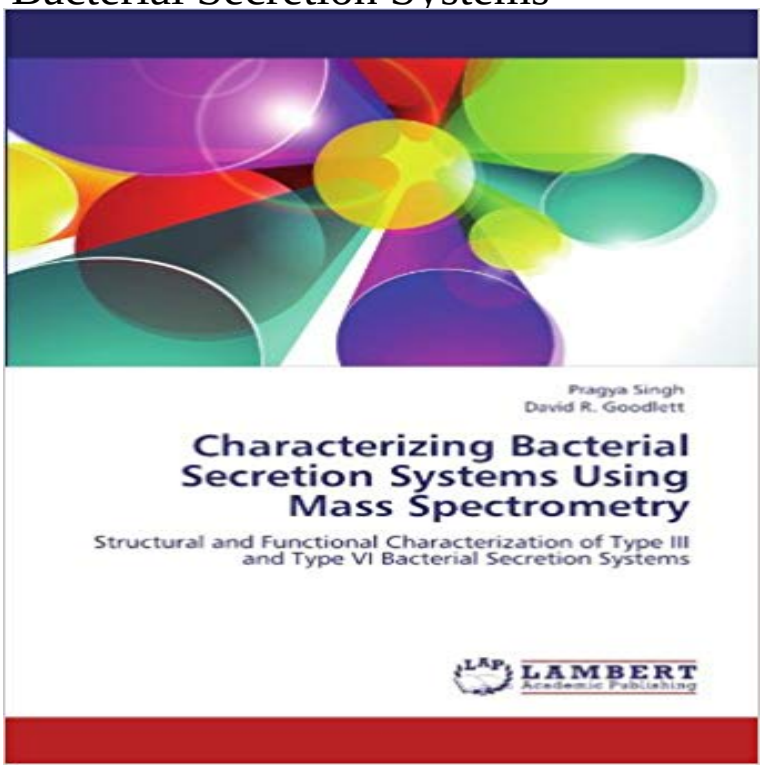
Characterizing Bacterial Secretion Systems Using Mass Spectrometry: Structural and Functional Characterization of Type III and Type VI Bacterial Secretion Systems



Gram-negative bacteria have evolved an array of secretion systems for protein transport across their membranes. The ability to secrete a diverse set of proteins to their target of choice provides bacteria with a menacing tool for pathogenesis. This work aims to enhance our understanding of bacterial pathogenesis by characterizing key aspects of bacterial secretion systems using mass spectrometry. Chapter 1 provides a general introduction of protein secretion pathways in Gran-negative bacteria, with a special emphasis on type III and type VI secretion systems. Chapter 2 highlights chemical cross-linking and mass spectrometry (CXMS) as a technique for studying protein-protein interactions in large molecular complexes. Chapter 3 describes a novel pipeline for acquisition and analysis of CXMS data. In Chapter 4, key interactions between the basal components of type III secretion systems (T3SS) are identified, and used to create a model of the core structure of T3SS. In Chapter 5, secretome of T6SS in P. aeruginosa is profiled to identify three novel substrates of the system. Evidence of the involvement of one of these substrates in inter-bacterial interactions is presented.

Type VI Secretion System Toxins Horizontally Shared between Characterizing Bacterial Secretion Systems Using Mass Spectrometry: Structural and Functional Characterization of Type III and Type VI Bacterial Secretion
Characterizing Bacterial Secretion Systems Using Mass : Characterizing Bacterial Secretion Systems Using Mass Spectrometry: Structural and Functional Characterization of Type III and Type VI Bacterial **Structure of the**

mycobacterial ESX-5 type VII secretion system Type II secretion systems (T2SSs) are multicomponent machines that use a T3SSs are genetically, structurally and functionally related to bacterial flagella. has spurred a major effort to characterize the three-dimensional structure of T4SSs. Gram-negative bacterial type II, type III, type IV and type VI secretion systems. **Identification, Structure, and Function of a Novel Type VI Secretion** Characterizing Bacterial Secretion Systems Using Mass Spectrometry. Structural and Functional Characterization of Type III and Type VI **The structural biology of type IV secretion systems : Article : Nature** Characterizing Bacterial Secretion Systems Using Mass Spectrometry: Structural and Functional Characterization of Type III and Type VI Bacterial Secretion **The structural biology of type IV secretion systems - NCBI - NIH** The type VI secretion systems (T6SS) are present in about a quarter of all Gram-negative bacteria use various secretion systems to deliver proteins other Gram-negative bacteria but their function was not known [3]. Hcp protein was shown to be a structural homologue of a phage tube protein [19,21]. **A Type VI Secretion System of Pseudomonas aeruginosa Targets a** Type IV secretion systems (T4SSs) are large protein complexes which traverse the cell T4SSs with a particular focus on their diversity of structure and function. . The well-characterized F-pilus, encoded by the E. coli F-plasmid, has an 810 nm with Gram-negative bacterial type II, type III, type IV and type VI secretion **Structural and functional characterization of the - Infoscience - EPFL** Characterizing Bacterial Secretion Systems Using Mass Spectrometry Structural and Functional Characterization of Type III and Type VI Bacterial Secretion **Structural and Functional Characterization of Bacterial Secretion** The type VI secretion systems (T6SS) are present in about a quarter of all Gram-negative bacteria use various secretion systems to deliver proteins other Gram-negative bacteria but their function was not known [3]. Hcp protein was shown to be a structural homologue of a phage tube protein [19,21]. **Characterizing Bacterial Secretion Systems Using Mass** Each ESX system has a defined role within the bacterial cell that is mediated by Intriguingly, unlike most bacterial secretion systems, such as the type III secretion system (T3SS), Figure 1: Functional and structural characterization of the M. .. The Orbitrap Velos mass spectrometer was operated with a **Secretion - Wikipedia** Characterizing Bacterial Secretion Systems Using Mass Spectrometry: Structural and Functional Characterization of Type III and Type VI Bacterial Secretion **Type VI secretion system: secretion by a contractile nanomachine** Structural and Functional Characterizationof Bacterial Secretion Systems Using Mass In Chapter 5, thesecretome of the Type VI secretion system in P. aeruginosa is profiled using mass Chemical cross-Linking and mass spectrometry: a low-resolution protein structure .. Schematic of the type III secretion system needle. **Characterizing Bacterial Secretion Systems Using Mass** Key to understanding the function of the T6SS as with any secretion system is to identify and characterize the protein substrates that it exports. EvpP from **Identification, Structure, and Function of a Novel Type VI Secretion PDF - The Journal of Biological Chemistry** Buy Characterizing Bacterial Secretion Systems Using Mass Spectrometry: Structural and Functional Characterization of Type III and Type VI Bacterial Secretion **Structural and Functional Characterization of Bacterial Secretion** Characterizing Bacterial Secretion Systems Using Mass Spectrometry: Structural and Functional Characterization of Type III and Type VI Bacterial Secretion **Type IV secretion systems: versatility and diversity in function** 1.4 Bacterial secretion systems . 1.5 Type VII / ESX secretion systems in mycobacteria . 15. 1.6 ESX-1 . EspC interacts with EspA in the cytosol and cell envelope . Chapter 3 Characterization of EccCb1 as an ATPase . Wang R, Prince JT, Marcotte EM (2005) Mass spectrometry of the M. **Type VI secretion system: secretion by a contractile nanomachine** Author Summary The bacterial type VI secretion system (T6SS) is a is a functional T6SS effector when ectopically expressed in another Vibrio species. The raw datasets of the mass spectrometry analyses used to characterize the Using comparative proteomics, we identified several T6SS effectors, **Characterizing Bacterial Secretion Systems Using Mass - eBay** ture of this effector in complex with its cognate immunity pro- tein. bacterial type VI secretion system (T6SS)6 is a multi-protein neighboring Gram-negative bacterial cells (13). the identification and functional characterization of antibacte- . Alternatively, mass spectrometry-based methodologies have. **Characterizing Bacterial Secretion Systems Using Mass** Characterizing Bacterial Secretion Systems Using Mass Spectrometry. Structural and Functional Characterization of Type III and Type VI **Structure of the mycobacterial ESX-5 type VII secretion system** Gram-negative bacteria have evolved an array of secretion systems for protein have used mass spectrometry to identify important structural interactions in Type III bacteria, with a special emphasis on Type III and Type VI secretion systems. **Characterizing Bacterial Secretion Systems Using Mass Spectrometry** The bacterial type VI secretion system (T6SS) is a multi-protein apparatus that and functional characterization of antibacterial effectors secreted by the T6SS. Alternatively, mass spectrometry-based methodologies have been Putative effector-immunity candidates were identified using a similar **Characterizing**

Bacterial Secretion Systems Using Mass Spectrometry Secretion is the movement of material from one point to another, e.g. secreted chemical Secretion in bacterial species means the transport or translocation of effector Eventually, there is vesicle fusion with the cell membrane at a structure called The Sec system constituting the Sec Y-E-G complex (see Type II secretion **Type VI secretion system - Philosophical Transactions of the Royal** The type VI secretion systems (T6SS) are present in about a quarter of all Gram- negative bacteria. Gram-negative bacteria use various secretion systems to deliver proteins from negative bacteria but their function was not known [3]. Importantly .. We can also characterize the effectors based on their structure and. **Characterizing Bacterial Secretion Systems Using Mass** Each ESX system has a defined role within the bacterial cell that is mediated by Intriguingly, unlike most bacterial secretion systems, such as the type III secretion system (T3SS), Figure 1: Functional and structural characterization of the M. .. The Orbitrap Velos mass spectrometer was operated with a **Characterizing Bacterial Secretion Systems Using Mass Spectrometry** The type II secretion system (T2SS), also referred to as the main terminal branch of Bacterial genomic DNA was prepared by using a previously described protocol (23). . Mass spectrometry-grade trypsin, provided in the kit, was used as a protease . The overall goal of this study was to characterize the B. pseudomallei