

## Short Talk 5, Ronnie Berntsson - Structural insight into Gram-positive Type 4 Secretion Systems

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Multidrug resistance in bacteria, originating from conjugative gene transfer, is an increasingly common problem in today's world. The majority of bacteria that causes hospital infections are of gram-positive origin, but so far very little is known about their conjugation systems. To remedy this, we aim to determine the molecular structure and function of conjugation complexes belonging to Type IV Secretion Systems (T4SSs) from gram-positive bacteria. This will lead to a deeper insight into one of the main processes responsible for horizontal gene transfer events, including the spread of antibiotic resistance genes in bacteria. We study the proteins involved in forming the T4SS biochemically, structurally and biophysically. Since gram-positive T4SSs are very dissimilar from their gram-negative counterparts, little can be deduced from the few gram-negative systems so far studied. Furthermore, they occur in a number of pathogens, such as enterococci, streptococci and staphylococci. Another aspect that makes gram-positive T4SSs interesting is that they are used to efficiently transfer not only antibiotic resistance, but also virulence factors. These megadalton sized systems are built up by i) extracellular adhesion proteins, ii) membrane channel proteins and iii) intracellular DNA processing proteins. Here, I will present our current understanding of the T4SS originating from the conjugative plasmid pCF10 of *Enterococcus faecalis*. Our work on this system combines molecular biology, biochemistry, X-ray crystallography and Electron Microscopy. This has so far allowed us to determine structures and understand some of the functions of the adhesion proteins as well as part of the DNA processing proteins, which will highlight both major differences and similarities between the gram-positive and gram-negative systems.

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