Poster Presentation

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Structural studies on the Clostridium perfringens conjugation system

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Conjugation is the mechanism by which two bacteria share genetic information. This process relies on the direct transfer of mobile genetic element via a trans-membrane channel between the donor and the recipient. Although this mechanism has been extensively studied in gram-negative organism, very little in known on how this process takes place in their gram-positive counterpart. To address this important question in bacterial evolution, we use the tetracycline resistance plasmid pCW3 from Clostridium perfringens as study model. The pCW3 plasmid encodes 11 proteins necessary for the assembly the C. perfingens conjugation system. Here, I will focus on the relaxosome complex, which is the starting point of DNA transfer. We identified two protein (IntP and TcpK) involved in the processing of the DNA. Sequence analysis revealed that IntP was a potential Tyrosine recombinase and TcpK, directly upstream of IntP was identified a potential accessory protein of the relaxosome. We cloned, expressed and purified IntP and TcpK. These proteins were then subject to biochemical and biophysical characterizations. I will first present why these two proteins are required for efficient conjugative transfer and how they contribute to DNA processing. Then I will present the crystal structure of TcpK and discuss its interaction with IntP and other components of pCW3 apparatus. This study brings a further insight into this important mechanism of DNA transfer in Gram-positive bacteria.

Keywords: conjugation, T4SS, DNA exchange