Summary of publication No. (4)

Title: Regulation of T3SS synthesis, assembly and secretion in *Pseudomonas aeruginosa*

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Abstract

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T3SS is an important virulence factor of *Pseudomonas aeruginosa* and has a central role in the infection process. However, the functional regulation of the T3SS by environmental signals is poorly understood. In our lab, we use fluorescence microscopy to study protein kinetics in real-time in live cells. In *P. aeruginosa,* results have shown that T3SS appears as bright foci at the cell membrane with no specific arrangement. In addition, T3SS is tightly controlled as it appears under a limited time period with the highest intensity at 3 h then disappears. Surprisingly, only 2.5% of the all assembled T3SS in the population

have detectable ExoS synthesis. While T3SS assembly and ExoS synthesis increased under high salt concentration, they unexpectedly were not affected by different cyclic di-GMP levels. On the other hand, T3SS itself has an effect on the cyclic di-GMP levels inside the cell. Data have shown that despite T3SS in *P. aeruginosa* and *Yersinia enterocolitica* belong to the same the group, the two systems differentiate greatly in activity and regulation. We can conclude that every T3SS is unique and thus further studies are needed to elucidate the functional regulation of each system to better help effective inhibitor design.

Keywords: *Pseudomonas aeruginosa* · T3SS · Fluorescence microscopy · Cyclic di-GMP

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