

Regulation of cell shape in bacteria

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Abstract:

The cell shape of bacteria is physically determined by their cell walls. The cell wall is a covalent meshwork of long sugar strands and peptides that is the load-bearing component of the cell envelope. It resists high mechanical stress due to the osmotic turgor pressure. During growth the cell has to cleave existing cell wall and insert new cell-wall material enzymatically to expand its cell envelope. In many rod-like bacteria macroscopic cell shape is maintained with high accuracy. Yet, it is unclear how the different enzymes required for cell-wall expansion are spatially and temporally orchestrated to accurately maintain macroscopic cell shape and yet react flexibly to physiological signals that lead to changes of cell shape. I will describe recent advances towards understanding how bacteria expand their cell walls and how they maintain cell shape using sub-cellular fluorescence microscopy of the bacterial cytoskeleton and cell-wall expanding enzymes in the model system *Escherichia coli*.

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