Peptidoglycan Biosynthesis In Bacteria

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Abstract
Almost all bacterial cells are encased by a peptidoglycan (PG) cell wall. This PG layer provides mechanical support against osmotic pressure, determines the cell shape, and serves as a scaffold for many virulence factors. PG is comprised of glycan chains and peptide cross-bridges. The matrix is synthesized by penicillin binding proteins (PBPs) and SEDS proteins. These and other enzymes in the PG synthesis pathway are targets of many clinically relevant antibiotics, such as penicillin, fosfomycin and vancomycin. In fact, approximately half of the antibiotics prescribed today are inhibitors of PG synthesis. In this seminar, I will give a general overview of recent advances in our understanding of cell wall assembly. The discussion will include the identification of the “flippase” that transports PG precursors across cell membrane, and the discovery of the SEDS proteins as a new class of cell wall polymerase. In addition, I will discuss the mechanism by which beta lactam antibiotics inhibit the PBPs, and how this inhibition impacts bacterial physiology to promote cell death.

Selected Publications for Reference


