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Structure, Dynamics and Regulation of Bacterial Cell Wall. Implications in Antibiotics Resistance

Tuesday, 6 September 2022 15:00 (45 minutes)

The bacterial cell wall is an essential gigantic macromolecule that defines the shape of the bacterium and enables the bacterium to resist lysis as a result of its high intracellular osmotic pressure. The main component of cell wall is peptidoglycan (PG) that consists of repeating linear polymers of N-acetylglucosamine (NAG) and N-acetylmuramic acid (NAM) linked together via short oligopeptide chains. Because the cell wall is structurally specific of bacteria, the steps involved in regulation of cell-wall biosynthesis are the targets of numerous antibiotics, including the β-lactams that represent >50% of the available contemporary antibiotic arsenal. The interplay between bacterial cell-wall integrity and the summoning forth of resistance mechanisms to deactivate cell-wall-targeting antibiotics involves exquisite orchestration among cell-wall synthesis and remodeling machineries. In this talk we will present a multidimensional dissection (structural, biochemical, biophysical and pre-clinical) of some essential bacterial processes pivoting around the bacterial cell wall. These processes are of the outmost relevance in both fundamental and applied sides. Unveiling the molecular basis of these mechanisms paves the way to identification of new drug targets and to develop antimicrobial drugs effective against multidrug-resistant clinical strains and with new modes of action that make the development of resistance less likely.

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No

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