Structural Insights For B-Lactam Antibiotics

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Antibiotic resistance has emerged as a global threat to modern healthcare systems and has nullified many commonly used antibiotics. β-Lactam antibiotics are among the most successful and occupy approximately two-thirds of the prescription antibiotic market. They inhibit the synthesis of the peptidoglycan layer in the bacterial cell wall by mimicking the D- Ala-D-Ala in the pentapeptide crosslinking neighboring glycan chains. To date, various β- lactam antibiotics have been developed to increase the spectrum of activity and evade drug resistance. This review emphasizes the three-dimensional structural characteristics of β- lactam antibiotics regarding the overall scaffold, working mechanism, chemical diversity, and hydrolysis mechanism by β-lactamases. The structural insight into various β-lactams will provide an in-depth understanding of the antibacterial efficacy and susceptibility to drug resistance in multidrug-resistant bacteria and help to develop better β-lactam antibiotics and inhibitors.