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Amide derivatives of vancomycin to overcome antibiotics resistance

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Glycopeptide antibiotics were once considered as drug of choice of serious gram positive infections. These antibiotics interrupt bacterial cell wall synthesis to exert their antibacterial effects. They pose higher barrier for drug resistance development, as they target non-protein components of bacterial cell wall. However, these antibiotics are increasingly becoming less effective due to emergence of resistant strains. To address this issue, modification of glycopeptide antibiotics to enhance their activity is therefore a useful strategy to develop new compounds against drug-resistant strains. We explored an underutilized reactive site on the glycopeptide antibiotics and developed a simple yet highly efficient scheme to synthesize various analogs. Using this scheme, the C-terminal carboxyl group of vancomycin was reacted with amine compounds to yield carboxamide analogs some of which with improved antibacterial activity upto 100 times. Usually multiple chemical reactions are needed to prepare antibiotic analogs. Our single-step scheme provides a simple yet efficient methodology to develop potent analogs of vancomycin. Different analogs are synthesized by reacting series of diamines with vancomycin.

Biography

Dr. Ahmad Hussen Tareq has expertise in developing peptide based antibacterial agents to overcome antibiotic resistance. He focused on synthesis and modification of potent glycopeptide antibiotics like vancomycin and teixobactin to overcome bacterial drug resistance. He worked on the diverse chain of antibiotic drug development, from lead discovery, drug development, chemical modification, *In vivo/In vitro* testing, pharmacological analysis to pre-clinical trials. In the above mentioned projects, he utilized carboxamide bond formation to develop simple and highly efficient methodology for vancomycin analog synthesis. As extension of his work, he developed method for synthesis of Teixobactin analogs. These next generation antibiotics can significantly help in our fight against bacterial drug resistance.

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