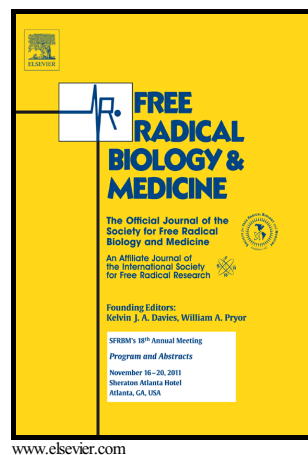


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Coordination and redox interactions of β -lactam antibiotics with Cu^{2+} in physiological settings and the impact on antibacterial activity

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Abstract

An increase in the copper pool in body fluids has been related to a number of pathological conditions, including infections. Copper ions may affect antibiotics via the formation of coordination bonds and/or redox reactions. Herein, we analyzed the interactions of Cu^{2+} with eight β -lactam antibiotics using UV-Vis spectrophotometry, EPR spectroscopy, and electrochemical methods. Penicillin G did not show any detectable interactions with Cu^{2+} . Ampicillin, amoxicillin and cephalexin formed stable colored complexes with octahedral coordination environment of Cu^{2+} with tetragonal distortion, and primary amine group as the site of coordinate bond formation. These β -lactams increased the solubility of Cu^{2+} in the phosphate buffer. Ceftazidime and Cu^{2+} formed a complex with a similar geometry and gave rise to an

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