



Antibiotics

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Antibiotic Resistance in a One Health Context

Edited by: Pedro A. Jiménez Gómez and Marina Robas Mora

Antibiotic resistance is one of the greatest global health challenges of the twenty-first century, affecting human, animal, and environmental health and threatening modern medicine. The emergence and spread of antimicrobial resistance are driven by complex interactions among clinical settings, agricultural systems, food production, wildlife, environmental reservoirs, and human activities. Understanding antibiotic resistance thus requires an integrated One Health perspective that considers the interconnectedness of these sectors.

This Reprint presents recent advances in antibiotic resistance research across environmental, agricultural, nutritional, veterinary, and clinical contexts. Key topics include the ecology of resistance genes and resistant microorganisms, the role of microbiomes and resistomes as resistance reservoirs, horizontal gene transfer, the impact of contaminants such as heavy metals and biocides, and the contribution of human activities to resistance dissemination. This Reprint also covers innovative surveillance strategies, molecular and omics-based approaches, risk assessment frameworks, and interventions to mitigate resistance spread across ecosystems. By integrating multidisciplinary perspectives, this Reprint highlights current challenges and emerging opportunities for addressing antibiotic resistance through collaborative research, evidence-based policies, and sustainable practices. It offers an updated overview of resistance mechanisms, drivers, and consequences, reinforcing the importance of One Health approaches for safeguarding public, animal, and environmental health.



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