Drug Resistance: Common Issues in Infectious Diseases and Cancer [†]

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Abstract: Antimicrobial and anticancer drug resistance represent two of the main global challenges for public health, requiring immediate practical solutions, but also the advancement of knowledge for better understanding the origins of drug resistance in prokaryotic and eukaryotic cells and the evolutionary processes leading to the occurrence of adaptive phenotypes in response to the selective pressure of the chemotherapeutic agent. The purpose of this talk is to present some of the analogies between the antimicrobial and anticancer drug resistance, starting from common targets and mechanisms of action, similar mechanisms of resistance (e.g., increased drug efflux, drug inactivation, target alteration, persister cells' selection, protection of bacterial communities/malignant tissue by an extracellular matrix, etc.) in bacterial communities and malignant tissues, with a focus on the collective stress response triggered by the chemotherapeutic agent involving complex intercellular communication processes, as well as with the surrounding microenvironment. The common themes in antimicrobial and anticancer drug resistance recommend the utility of bacterial experimental models for unraveling the mechanisms that facilitate the evolution and adaptation of malignant cells to antineoplastic drugs.

Keywords: microbial biofilms; stress response; persister cells; mutator phenotypes.

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Conflicts of Interest

The authors declare no conflict of interest.