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2.

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Autore	Busi Siddhardha
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Altri autori (Persone)	PattnaikSubhaswaraj PrasadRam
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Nota di contenuto	Section I An Introduction to Biofilms and Omics -- Introduction to Microbial biofilms -- Microbial Biofilms and Resistome: Concept and Applications -- Fundamentals and Application of Omics in Microbiology -- Microbiomes and biofilms: Fundamentals and Translational Applications -- Section II Omics in Biofilm Research -- Genomic insights in Biofilm research -- Proteomics and their Applications in Biofilm Research -- Transcriptomics in understanding the Biofilm Dynamics and inhibition -- Metabolomics approaches in understanding the biofilm and its inhibitors -- Metagenomics in understanding the microbial biofilms and Therapeutic Intervention -- Phenomics and microbial biofilms -- Comparative genomics in understanding microbial biofilms -- Lipidomics in understanding microbial biofilms -- Culturomics and biofilms -- Section III Omics as Diagnostic and Therapeutic tools -- Omics in the diagnosis/identification of biofilms -- Omics in Diagnosis and Therapeutics of Polymicrobial biofilms --

Systems biology/Computational systems biology and biofilm -- Synthetic biology and Biofilms -- Omics-based Therapeutics against Biofilm Mechanics.

Sommario/riassunto

The increased incidence of microorganisms' selective pressure to traditional antibiotics has led to the emergence of multi-drug resistance (MDR) phenomena and has become a global health issue with a catastrophic influence on millions of lives, as well as the global economy. The inherent tendency of pathogenic microorganisms to infer MDR could be attributed to their ability to form recalcitrant biofilm matrices. The biofilm matrix not only advocates chronic nosocomial infections, but also critically provides protection against environmental stress including antibiotic therapies. Biofilm-mediated MDR has posed a serious challenge to human well-being. Henceforth, it is important to understand the pathophysiology of biofilms and the concomitant development of diagnostic & therapeutic modalities to counteract biofilm-mediated chronic infections. The lack of understanding on biofilm biology has a critical negative influence on diagnostic and therapeutic efforts. Therefore, it is imperative to discover the right course of action to understand biofilm mechanics. The advent of Omics-based approaches has provided a holistic realization to understand biofilm ecology with special reference to the pathophysiological interactions of antibiotic-resistant genes, protein-protein interactions, and response-based interactions with therapeutic agents upon infection. The inherent ability of several Omics-based approaches has provided a comprehensive understanding of biofilm dynamics at various levels of organization such as genes, mRNA, proteins, and their regulation. Omics-based tools such as metagenomics, transcriptomics, proteomics, metabolomics, etc. have provided a new horizon to understand and tackle the biofilm-mediated antibiotic resistance. The integrated approach to consider multi-Omics tools (e.g. genomics, transcriptomics, proteomics, lipidomics, metabolomics, etc.) has further improved our understanding of the mechanisms associated with biofilm resistome profile. The applications of transcriptomics, proteomics, and metabolomics profiles of biofilm matrices could provide new dimensions in relation to the characteristic properties of different ARGs, their relative expression profiles, and their metabolic intervention in biofilm mechanics. Also, advanced integrated Phenomics, Lipidomics, and Culturomics approaches could provide novel avenues to understand the diverse range of biofilm phenotypes, their macromolecular reorganization profiles, and molecular tools for identification of microbial species in the complex biofilm microenvironment. Based on the advancement in omics-based tools, “Omics Approaches in Biofilm Research: Perspectives and Applications” integrates the current knowledge of biofilm microenvironment and innovative strategies to address biofilm mediated drug resistance. This work provides a comprehensive platform to enhance our knowledge, diagnosis and strategies to mitigate biofilms and associated diseases.