

Resistance mechanisms in bacterial biofilm formations - Review Article

Nikiforos Rodis¹, Vasiliki Kalouda Tsapadikou¹, Charalampos Potsios², Panagiota Xaplanteri³

¹Student in fifth year, Medical School, Democritus University of Thrace

²Department of Internal Medicine, University General Hospital of Patras

³Department of Microbiology, University General Hospital of Patras

Abstract

The purpose of this review article was to present the mechanisms that cause the emergence of resistance to antimicrobial therapy in bacterial biofilms. Biofilm-producing bacteria cause chronic and persistent infections as they develop into joint prostheses, intravenous catheters and stents, endotracheal tubes and cardiovascular devices. The problem is enormous as it results in increased hospitalization costs, multiple surgeries and prolonged antibiotic intake. The mechanisms of resistance of bacterial biofilms differ from those of planktonic cells. They include: host defense bypass mechanisms, glycocalyx and extracellular polymeric substances (EPS), enzyme-mediated resistance to antibiotics, cell heterogeneity in metabolism and growth rate, Quorum Sensing (QS, Cell to cell signaling), persister cells, genetic adaptation and mutations, efflux pumps, adverse environmental conditions, outer membrane structure, bacteriophages, interactions between different types of bacteria in polymicrobial biofilms. What mechanism or combination of mechanisms will be used depends on the type of microorganism and therefore analysis and further elucidation of their function can help in finding ways to deal with the serious infections caused by biofilms.

Management, Hellenic Open University in 2018. She has worked in the following positions:

- Senior Assistant, Department of Microbiology, University General Hospital of Patras, Patras, Greece, 29/9/2015-today
- Part time Assistant Professor, School of Rehabilitation Sciences, University of Patras, Greece, 2019-today
- Part time Lecturer/Assistant Professor, School of Sciences of Health and Care, Technological Educational Institute of Western Greece, Patras, 2007-2019

He has published more than 20 papers.

Presenting author details

Full name: Panagiota Xaplanteri

Contact number: +30 6932914660

Biography

Panagiota Xaplanteri has graduated from Medical School, Patras University in 1999 and acquired the medical specialty of Biopathology (Laboratory Medicine) in 2007. She has completed her PhD in 2008 from Medical School, Patras University, Greece and her MSc in Health Care