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Virulence Factors of Gram negative Bacteria Related to Ocular Infections

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Abstract

Many Gram-negative bacteria have been implicated in ocular infections causing severe vision impairment. The aim of this study is to list the virulence factors of the main gram-negative ocular pathogens. Data were extracted from PubMed and Google Scholar. Virulence factors of N. gonorrhoeae: pili, opacity proteins, lipooligosaccharide, sialylation, outer membrane porin PorB, IgA extracellular proteases, reduction modifiable protein. Virulence factors of Pseudomonas aeruginosa: Slime-glycolipoprotein, flagella, type IV pili, Quorum Sensing in biofilms. Virulence factors of Chlamydia trachomatis: The inoculation of the bacterium triggers an outburst of inflammatory response in the conjunctiva. The result is the replacement of the loose Type I stromal collagen of the area by compact Type V collagen that leads to trachomatous scarring of conjunctiva and severe vision impairment. Virulence factors of Bartonella Species: Bartonella targets and enters in the CD34+ cells, mainly erythrocytes and endothelial cells, where it survives in a vacuole protected from host defense mechanisms. The first step of pathogenesis is proinflammatory and autocrine activation and proliferation of the endothelial cell, which leads to inhibition of apoptosis. The second step is paracrine activation of macrophages and epithelial cells. Other virulence factors are the outer membrane proteins, TFSS transport systems, and the LPS which is atypical. It is a weak stimulus and antagonizes Toll Like Receptor 4. Gram negative bacteria provoke direct tissue damage and interact mainly with components of the innate immunity. The outcome of the battle is abolishment of the blood-ocular barrier and enhanced recruitment of inflammatory cells. For biofilm forming bacteria like P. aeruginosa, comprehension of their communication, survival and attack of host tissues is always a challenge. The enlightenment of the mechanisms of infection caused by these pathogens is crucial in diagnosis and treatment as they remain major causes of vision impairment.

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 Management, Hellenic Open University in 2018. She has worked in the following positions: Head of Microbiology Department, General Hospital of Eastern Achaia, Greece, 2020-today, Senior Assistant, Department of Microbiology, University General Hospital of Patras, Greece, 2015-2020, Part time Assistant Professor, School of Rehabilitation Sciences, University of Patras, Greece, 2019-2020, Part time Lecturer/Assistant Professor, School of Sciences of Health and Care, Technological Educational Institute of Western Greece, Patras, Greece, 2007-2019. She has published more than 20 papers.