

# Structural and physiological implications of bacterial cell in antibiotic resistance mechanisms [Implicancias estructurales y fisiológicas de la célula bacteriana en los mecanismos de resistencia antibiótica]

Troncoso C.

Pavez M.

Santos A.

Salazar R.

Barrientos Díaz L.

The high adaptability of bacteria to hostile environments has favored antibacterial resistance development, impacting hospital and community healthcare worldwide. It has also affected disease control, limited therapeutic options and raised morbidity-mortality rate. This resistance ability is mediated by structural and physiological factors of bacteria acting at both extracellular and cellular levels. The ability of bacterial populations in biofilm formation and regulation of cellular signal quorum sensing at the extracellular level, allows for the evasion of antibiotic action. At a cellular level, the performance and behavior of the cell wall and cell membrane is emphasized, mainly by regulating the expression of inlet channels or porins and/or expulsion pumps preventing access to, or inducing the outflow of antibiotics. Other mechanisms integrate modification of drug activity by hydrolysis or modification of the active site of the drug. Further into intracellular level, bacteria can change the oxidation/reduction processes; modify the target sites of the antibiotic and inactivate transfer groups. Bacteria can also modify the ribosomal subunits affecting the antibiotics which inhibit protein synthesis, and cause modifications of gene expression and genetic code that regulate the above mechanism. These may also generate adaptive changes and resistance to drugs and disinfectants. The aim of the present review is to describe the structural and physiological implications of bacterial cell in the mechanisms of antibiotic resistance. The study also considered the structural and physiological organization involved in the main mechanisms of antibiotic resistance in bacteria relevant to clinical healthcare. © 2017, Universidad de la Frontera. All rights

reserved.

Antibiotics

Bacterial cell

Resistance