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Antibiotic susceptibility in bacteria

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The term "antibiotic susceptibility in bacteria" encompasses broad and varied aspects of interactions between bacteria and antibiotics. The most evident ones include permeability of the bacterial cell wall to antibiotics and the affinity of specific bacterial targets to these molecules. Natural or acquired resistances to antibiotics in bacteria may result from bacterial cell wall impermeability and efflux systems, bacterial target modifications and/or enzymatic inactivation of antibiotics. A high number of antibiotic resistance genetic determinants (ARGD) have been characterized in most bacterial species, especially in human and animal pathogens. Moreover, our current knowledge on genetic variability in bacteria, including gene mutations and horizontal gene transfers (HGT), well explains rapid emergence and spread of novel resistance mechanisms inactivating old and new antibiotics. Because of the frequent association and complexity of ARGDs, routine evaluation of the antibiotic susceptibilities of bacteria now often necessitates combining phenotypic (antibiogram) and molecular (PCR) approaches. It should be emphasized, however, that the primary goal of antibiotic susceptibility determination is to guide the physician toward the most appropriate antibiotic therapy for infected patients. In vitro data are not always predictive of the *in vivo* efficacy of antibiotics, including bacterial starvation and/or latency, bacterial biofilms formation, intracellular behaviour of some pathogens, mechanisms for *in vivo* selection of antibiotic resistances, and the potential interactions between antibiotics and the host immune defenses.

Biography

Max Maurin has completed his M.D. at the age of 27 years from Aix-Marseille II University School of Medicine and his Ph.D. at the age of 30 years from Paris VII University. Since 2002, he manages the clinical microbiology laboratory of Grenoble university Hospital, and co-manages the research team "Genomics and Evolution of Microorganisms" (LAPM, CNRS/UJF, UMR5163). He is also involved in the management of the French Reference Centre for *Francisella*. His main research topic is the phenotypic and genetic characterization of antibiotic resistances in bacteria, especially in zoonotic pathogens. He has published 78 original articles in peer-reviewed journals.

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