

Horizontal Gene Transfer in Microorganisms



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There is a growing awareness that horizontal gene transfer (HGT) is a highly significant phenomenon amongst single-celled organisms. The evolution of bacteria and archaea most often results from the acquisition of new genes through horizontal transfer rather than by modification of vertically inherited genes. Horizontal or lateral gene transfer is a major factor in the spread of bacterial antibiotic resistance and other adaptive traits of microorganisms and is particularly significant in microbial communities. HGT may also play a substantial role in the emergence of novel infections and opportunistic pathogens.

Under the expert guidance of the editor, M. Pilar Francino, expert authors from around the world have contributed novel work and comprehensive, up-to-date reviews on the most topical aspects of horizontal gene transfer in microorganisms. Topics include: gene survival in emergent genomes, evolution of prokaryotic pangenomes, horizontal transfer of host-adaptability systems, barriers to horizontal gene transfer, evolution of horizontally transferred genes, lateral gene transfer in natural ecosystems, maintenance of plasmids among bacteria, mobile genetic elements in metagenomes, and the evolution of antibiotic resistance genes.

Aimed primarily at research scientists, graduate students and other experts, this book is a major resource for anyone interested in horizontal gene transfer, microbial evolution or antibiotic resistance in bacteria. A recommended book for all microbiology laboratories.

Chapter 1. Gene Survival in Emergent Genomes. *M. Pilar Francino*

Chapter 2. Evolution of Prokaryotic Pangenomes. *Florent Lassalle and Vincent Daubin*

Chapter 3. Horizontal Transfer of Host-adaptability Systems in Bacteria. *Eva C. Berglund and A. Carolin Frank*

Chapter 4. Barriers to Horizontal Gene Transfer: Fuzzy and Evolvable Boundaries. *Fernando González-Candelas and M. Pilar Francino*

Chapter 5. The Evolution of Horizontally Transferred Genes: a Model for Prokaryotes. *Iñaki Comas and Fernando González-Candelas*

Chapter 6. The Extent and Regulation of Lateral Gene Transfer in Natural Microbial Ecosystems. *Rustam I. Aminov*

Chapter 7. What Maintains Plasmids Among Bacteria?. *Francisco Dionisio, Teresa Nogueira, Luís M. Carvalho, Helena Mendes-Soares, Sílvia C. M. Mendonça, Iolanda Domingues, Bernardino Moreira and Ana M. Reis*

Chapter 8. Identification of Mobile Genetic Elements in Metagenomes. *Peter Mullany and Adam P. Roberts*

Chapter 9. Horizontal Gene Transfer and Recombination in the Evolution of Antibiotic Resistance Genes. *Miriam Barlow, Jared Caywood, Serena Lai, Joshua Finley and Chad Swanlund*

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Horizontal gene transfer is the primary driver in the diversification of the pathway leading to several ecophysiolegically differentiated Vibrionaceae populations adapted to different physical forms of alginate. Pathway architecture is predictive of function and ecology, underscoring that horizontal gene transfer without extensive regulatory changes can rapidly assemble fully functional pathways in microbes. View full-text. Conference Paper. These plant viruses can exist either freely or in association with soil-inhabiting vector organisms such as nematodes or other microorganisms. Other viruses can infect microorganisms in the soil and thus affect soil microbial functioning. The exposure of environmental microorganisms to this mixture stimulates the fix of horizontal gene transfer (HGT) events, disseminating genetic resistance elements in several strains and species, increasing the microorganism's abundance and penetration in new niches and hosts [13]. Considering that infections caused by bacteria of the genus *Aeromonas* are often difficult to eradicate due to their intrinsic resistance to β -lactam antibiotics such as ampicillin (especially, *A. media* and *A. caviae* are sensitive to this antibiotic).