PRESENTS AN INTEGRATED VIEW OF THE EXPRESSION OF BACTERIAL GENETIC INFORMATION, GENOME ARCHITECTURE AND FUNCTION, AND BACTERIAL PHYSIOLOGY AND PATHOGENESIS

This book blends information from the very latest research on bacterial chromosome and nucleoid architecture, whole-genome analysis, cell signaling, and gene expression control with well-known gene regulation paradigms from model organisms (including pathogens) to give readers a picture of how information flows from the environment to the gene, modulating its expression and influencing the competitive fitness of the microbe.

Structure and Function of the Bacterial Genome explores the governance of the expression of the genes that make a bacterium what it is and updates the basics of gene expression control with information about transcription promoter structure and function, the role of DNA as a regulatory factor (in addition to its role as a carrier of genetic information), small RNAs, RNAs that sense chemical signals, ribosomes and translation, posttranslational modification of proteins, and protein secretion. It looks at the forces driving the conservation and the evolution of the dynamic genome and offers chapters that cover DNA replication, DNA repair, plasmid biology, recombination, transposition, the roles of repetitive DNA sequences, horizontal gene transfer, the defense of the genome by CRISPR-Cas, restriction enzymes, Argonaute proteins, and BREX systems. The book finishes with a chapter that gives an integrated overview of genome structure and function.

- Blends knowledge of gene regulatory mechanisms with a consideration of nucleoid structure and dynamics
- Offers a 'DNA-centric' approach to considering transcription control
- Views horizontal gene transfer from a gene regulation perspective
- Assesses the opportunities and limitations of designing synthetic microbes or rewiring existing ones

Structure and Function of the Bacterial Genome is an ideal book for graduate and undergraduate students studying microbial cell biology, bacterial pathogenesis, gene regulation, and molecular microbiology. It will also appeal to principal investigators conducting research on these and related topics and researchers in synthetic biology and other arms of biotechnology.

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