Plasmids

Current Research and Future Trends

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Plasmids are fascinating entities which can replicate autonomously in bacterial, archaeal and eukaryotic cells. They profit from the cellular environment of the host but can also carry a rich diversity of genes which can be beneficial for the host. Plasmids confer the ability to degrade organic compounds and to fix nitrogen. In addition plasmids carry antibiotic resistance genes and their spread in pathogenic bacteria is of great medical importance. Plasmids are used in molecular studies of various organisms with ramifications in synthetic biology, medicine, ecology and evolution as well as basic research in molecular and structural biology.

Written by acknowledged experts in the field, this volume provides an up to date treatment of the structure, function and application of plasmids with a particular emphasis on current and future trends. The book is aimed primarily at research scientists, graduate students and professional scientists but will also be of great interest to all molecular biologists and microbiologists involved in research or teaching.

Chapters include a historical perspective on *E. coli* plasmids and the scientific background of the plasmids used routinely in laboratories to clone genes and to express proteins; an overview on the plasmids of archaea and eukarya; bioinformatic tools; horizontal gene transfer and the process of DNA transfer. Two entire chapters are devoted to the important medical applications of plasmids, including the correction of gene defects and vaccines to treat cancer or infectious diseases.

An essential book for all molecular biology laboratories.

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