
Preface

Plasmids are autonomously replicating extrachromosomal DNA molecules that are stably inherited and can be present at many copies per cell. These features, coupled to the ease with which plasmids can be manipulated to carry fragments of foreign DNA, have led to their exploitation as one of the critical workhorses of modern molecular biology.

E. coli Plasmid Vectors focuses on the manipulation of plasmids in *Escherichia coli*. The well-characterized genetics of this bacterium have established its role as the universal cloning host, and recombinant DNA manipulation is almost exclusively performed in this organism. Despite the astonishing advances in molecular biology technologies and applications witnessed in the last decade, the ability to clone a DNA fragment of interest into a recombinant plasmid vector, and to maintain and manipulate it in an *E. coli* host, remains the foundation of many genetic analyses.

E. coli Plasmid Vectors introduces relevant aspects of plasmid biology and describes the development of plasmid vectors. It also provides advice on choosing the right vector and a suitable host strain. The middle segment covers methods that are required to clone DNA into plasmid vectors, transform *E. coli*, and analyze recombinant clones. Protocols for the construction and screening of libraries are included, as well as specific techniques required for specialized cloning vehicles, such as cosmids, bacterial artificial chromosomes (BACs), λ vectors, and phagemids. The final section gives protocols for a variety of commonly used downstream applications. The value of *E. coli*-derived plasmid vectors in providing the means to study diverse organisms is evident from chapters describing the mutagenesis of foreign genes for reintroduction into the homologous host, the production of recombinant proteins, and the uses of reporter genes.

Commercial kits dominate many of these areas of molecular biology. Where pertinent, chapters include overviews of the methods that underpin these kits, give specific protocols for representative techniques, and include practical advice and tips for troubleshooting problems. In doing so, *E. coli Plasmid Vectors* provides not only a basic guide for those new to the field, but also a valuable resource for more experienced researchers.

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<http://www.springer.com/978-1-58829-151-6>

E. coli Plasmid Vectors
Methods and Applications
Casali, N.; Preston, A. (Eds.)
2003, XII, 316 p., Hardcover
ISBN: 978-1-58829-151-6
A product of Humana Press