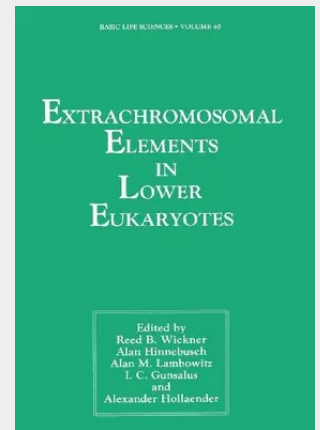


Extrachromosomal Elements in Lower Eukaryotes

Reed B. Wickner Section on Genetics of Simple Eukaryotes Laboratory of Biochemical Pharmacology National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases Bethesda, Maryland 20892 While most genes are chromosomal, the nonchromosomal genes have played a disproportionate role in molecular biology, in part because of their easy accessibility and in part because they represent the most mobile portion of a cell's genome. This is particularly evident in prokaryotes, where plasmids and phages have been the central objects of study. The lower eukaryotes, including fungi and yeasts, protozoa, slime molds, algae, and other single-celled nucleated species, have long had an important role in genetic research. They have recently gained dramatic popularity with the development of transformation methods for *Saccharomyces*, *Neurospora*, *Schizosaccharomyces*, *Dictyostelium*, and others of this group. The realization that *Saccharomyces* has oncogenes, RNA tumor viruses, estrogens, a polypeptide sex hormone with close homology to human lactate dehydrogenase, intervening sequences, and all the mitotic, mitochondrial, and other structures typical of so-called "higher" eukaryotic organisms has confirmed the use of such organisms as model systems. Their use in biotechnology also shows great promise.

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