REPLICATION, INCOMPATIBILITY, PARTITION
The DNA sequence of a 5-kb region of P1 which encodes sufficient information for stable plasmid maintenance has been determined. This region can be divided into two functionally independent units - one for plasmid replication and the other for partitioning the daughter plasmids to daughter cells.

The unit containing the replication function is 1.5 kb long and includes an origin within a 245-bp segment, the coding sequence for a 32-kd essential protein, RepA, and a 0.3-kb nonessential incompatibility locus, incA. This locus is responsible for the low copy number of the P1 miniplasmid and consists of nine 19-bp repeated sequences. Five similar 19-bp repeats also occur in the origin region (incC). The structural similarities of these two loci suggest that they accomplish their respective functions by related mechanisms.

The partitioning functions are determined by an adjacent 3-kb segment. This region includes the open reading frames for two partitioning proteins, ParA and ParB, and a region, incB, which serves as a "centromere" for partitioning. There are similarities in DNA sequence between the incB locus and the promoter region for parA. These similarities may represent Par protein binding sites that are important for the partitioning process and for autoregulation of the par operon.

Research sponsored by the National Cancer Institute, DHHS, under contract No. NO1-CO-23909 with Litton Bionetics, Inc.