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HIROTA, Y., Genetics Department, Stanford University, Stanford, California: Mutants of the F factor in Escherichia coli K-12. -- A contagious plasmid F which occurs in the wild type strain K-12 confers the capacity to act as σ^{\uparrow} in sexual conjugation on strains of Escherichia coli (Lederberg, Cavalli, and Lederberg). Recently, Adelberg and Burns (these abstracts) found a mutant of F termed F' which conveys the Hfr character (High frequency of recombination). On the basis of this finding, we have isolated distinctive F' mutants from old broth cultures of several Hfr strains. The F' mutants were detected by the conversion of F- strains with which they were incubated. Each F' mutant controls a characteristic pattern of transfer of loci from the σ^{\uparrow} chromosome in the linkage sequence similar to that of the original Hfr from which was derived. Like standard F+ the new F' can be disinfectated by acridine treatment (Hirota and Iijima) and passed to other F- strains. ---- These results suggested that the F' factor is split off from the Hfr locus and liberated into the cytoplasm. Although free of the chromosomal site, it still determines transfer of the chromosome with high frequency, the point of chromosome breakage, and controls the sequence of oriented transfer of genes of the donor chromosome during conjugation. Its specificity might be from the retention of a chromosome segment of a chromosome segment of the Hfr parent from which the F' originates. Double infection as well as mutual exclusion have been observed in combination of nonidentical F factors.

Added note: XXX F' is used in this abstract as a class term for F mutants of which F^2 (Adelberg and Burns) is an example. F' (F-prime) should not be confused with F^1 (F-one) as they use to denote the wild type F factor. The notation is being rectified.