LEDERBERG, ESTHER M., University of Wisconsin, Madison, Wis.--Pleiotropy for maltose fermentation and phage resistance in Escherichia coli K-12.--Two loci, Mal_1 and Lp_2, have been independently described. Mal_1 controls maltose fermentation; Lp_2 determines resistance to virulent lambda mutants. Both were known to be linked to S (streptomycin) and usually hemizygous in otherwise heterozygous diploids. Recent evidence suggests that both effects are apparently pleiotropic manifestations of a single locus: 1) Existing stocks are either $Mal_1^-Lp_2^r$ or $Mal_1^+Lp_2^s$. 2) When these cultures were crossed, $Mal^+Lp_2^r$ and $Mal^-Lp_2^s$ crossover recombinants were absent despite extensive tests. 3) On EMB maltose agar $Mal^-Lp_2^r$ colonies gave Mal^+ reversions which proved to be Lp_2^s. In turn, $Mal^-Lp_2^r$ reappeared among the resistant survivors after exposure to the phage, lambda-2. This mutation cycle was repeated several times in a number of stocks. Occasionally mutants resistant to lambda-2 were maltose-positive. These were tested by crosses with $Mal_1^-Lp_2^r$ and ascribed to mutation at any of several other loci. Genetically distinctive maltose-negative mutants have been found with unaltered phage susceptibility. The pleiotropy has also been noted in a second, probably non-allelic mutant phenotypically identical with $Mal_1^-Lp_2^r$ at 37^0 and $Mal_1^+Lp_2^s$ at 30^0. The dual effects are therefore associated at two loci, and separated at others. All the Mal- mutants ferment glucose, and are presumably blocked in the single amylomaltase enzyme. Preliminary attempts to uncover the possible physiological basis of the correlation have been unsuccessful. The addition of either maltose or amylose to the medium had no influence on the phage reaction.

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