

Copy of a printed diagram referenced as "Genetic map of the "lac" segment of the Esch. Coli chromosome"

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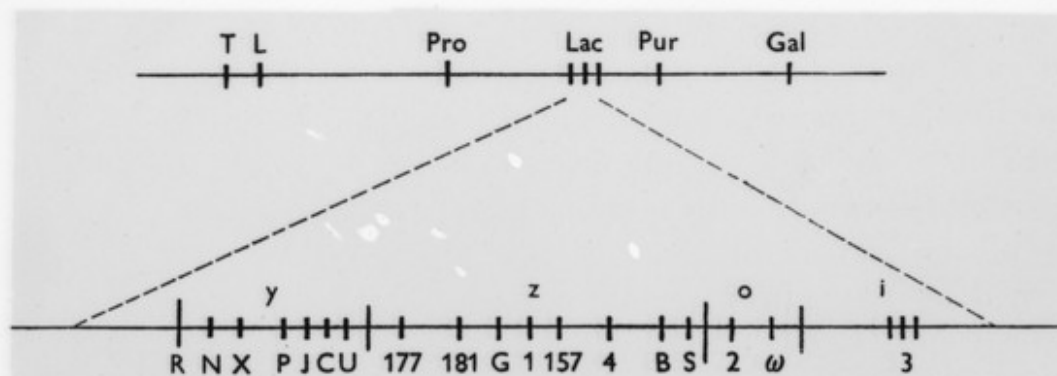


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by the study of mutations of the molecular properties of the enzyme. The structural genes for galactoside-transacetylase and galactoside-permease have been identified (with less certainty) as adjacent to the galactosidase (z) gene.

(2) Many 'constitutive' regulator mutants have been studied. They all 'map' outside of the structural genes. They all affect simultaneously, and to the same extent, galactosidase, galactoside-transacetylase, and galactoside-permease. These mutations do not detectably affect the properties of the enzymes. The constitutive allele is recessive to wild-type.

The following table summarizes the mapping of these and some other



Genetic map of the 'Lac' segment of the *Esch. coli* chromosome. All the mutations which affect specifically the synthesis of β -galactosidase, galactoside-transacetylase and galactoside-permease, have been found to map in the so-called 'Lac' segment of the chromosome. The position of this segment (whose length corresponds approximately to $\frac{1}{500}$ th of the total linkage group) is shown on the upper line. The lower line represents an enlargement of the Lac segment, showing its division into four determinants: y and z = structural genes, o = operator of the y-z group, i = regulator gene. The vertical lines indicate the order of a number of mutations within each determinant.

be made:

- (1) This allele should be *dominant* towards wild-type: in diploid, bearing the wild-type chromosome, it should block the synthesis of the enzymes (see Fig. 7).
- (2) The mutant organisms should regain the ability to synthesize the two enzymes by achieving the 'constitutive' state, i.e. by inactivation of the regulator gene.