Smith, B. R. The effect of the recombination-I gene on histidine-5.

The recombination-1 gene described by Jessop and Catcheside (1965, Heredity 20: 237) controls the frequency of recombination between pairs of histidinc-I alleles in such a way that crosses bearing the dominant allele rec-1$^+$ in one or both parents give frequencies of prototrophic recombinants that are around 15 times smaller than those in crosses homozygous for the recessive allele rec-1. The recombination-1 gene does not control recombination at the amination locus (Cotcheside 1966 Australian J. Biol. Sci. 19: 1039) indicating thot its effect is locus specific. Since rec-1 is linked to the am, hist-1 region of linkage group V, its effect on the hist-5 gene in linkage group IV could be easily tested.

Initial tests measured recombination between the hist-5 alleles K553 and K512. The hist-5 (K553); rec-1$^+$ a stock was isolated from the wild type Em a, rec-1$^+$ and crossed with a K512 A isolate of unknown rec-1 constitution. The frequency of prototrophic recombinonts in the progeny was 8.3 per 10^5 ascospores. A single stock of K553a ond one of K512a of unknown rec-1 constitution were crossed to the wild type EmA, rec-1, and ten K553a and ten K512 A stocks were isolated from the progeny of these crosses. Each of these ten K553a isolates was crossed with each of the ten K512A isolates, and the frequency of histidine prototrophic recombinants in the progeny was estimated. The probability that at least one of these 100 crosses is homozygous for rec-1 is 0.9% if both parental stocks crossed to EmA rec-1 were rec-1$^+$ and higher if one or both were rec-1. Recombination frequencies in the 100 crosses ranged from $5.4/10^5$ to $12.7/10^5$ ascospores. It con be confidently assumed therefore that recombination-I does not control recombination between K553 ond K512 or that if it does then its effect is only very slight.

Exactly parallel tests were made to detect the effect of rec-1 differences on recombination between the hist-5 alleles K548 and K268 and also between K540 and K268. In these cases the probabilities that crosses homozygous for the rec-1 allele ware examined ore 0.875 and 0.625, respectively. In no case was the frequency of recombination in the test crosses more than double that of the cross bearing rec-1$^+$ in at least one parent. Thus the probability that rec-1 controls recombination at the hist-5 locus is very small.

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