

May 4, 1949.

Dear Max,

I have checked 5-239 and -240. They are identical, and :

B(#)⁺ M# T# L# B₁# Lac# Xyl- Mtl- Gal- V_{1c}^r V₁^s

This class (Lac# others-, prototroph) is the most common segregant from H-168. Therefore, its origin from one division of ~~abbx~~ -59 is not certain proof of two-strand crossing-over. It would be interesting to find a rare segregant and see whether it were accompanied by a more common type as a sib, which would indicate 4 strands. This is assuming diploid that 59 is a uni-nucleate cell which underwent reduction, and that 119 undergoes second division to give two identical segregants. Of course, the lethality of -120 might not be meaningful. Quite the most interesting thing that has come up is your comment on the predictability of the survival of certain cells, which, of course, strongly supports the genetic interpretation of the ratios that have come out.

Lately I have been trying to map Mal more adequately, because of its peculiarity in the heterozygotes. The results I got were that Mal was linked to M (methionine) but neither to B₁ on one side, nor Lac on the other. I think that this may turn out to be the key to the situation, not that there is a branched chromosome, but that I am dealing with a translocation heterozygote. "Het" would be a factor which increases the rate of unequal disjunctions of the translocation cross giving a 3:1 disjunction:

A crossover between M and TL would give the possibility of a balanced prototroph complement, if there is alternate segregation. If there were an unequal disjunction, so that the X-Mal# arm went to one pole, and the other arms to the other, we have the makings of a heterozygote which would, however, be ~~deficient~~ hemizygous for the factors on the Mal-X arm. This theory needs some more going over, but is so far the best explanation of the available facts. But J.F.Crow and I have just finished working it up, so it may have many defects. If this is true, there is some hope of getting normally segregating heterozygotes from the right outcrosses.

I am afraid that I've had some very bad luck in recovering heterozygotes from complete medium. In the first place, I've lost H-168 for the time being because I relied on a nutrient agar slant of it, and threw out the EMS plate I had also been storing it on. Secondly, I haven't been able to get anything but segregants out of the cultures which you sent me. I had much better luck the first time with the slant cultures you made directly from EMS Lac, rather than with the agar-solidified cultures ~~in the same way~~. If you've gotten them out, I wonder if you could send me transfers of the reisolated 243-246 in the 5- (4-24-49) series. I think I'll be able to recover H-168, but I thought I'd better warn you. I couldn't get anything but - and # out of 196, 204, and 53 also, so they too were probably heterozygous. Sometimes Mal heterozygotes have the appearance you described, but they should be easily verified on Xyl EMB.

Sincerely,