THE NUTRITIONAL INFLUENCES ON INDUCED CHROMOSOME BREAKAGE AND RECOMBINATION IN DROSOPHILA MELANOGASTER

by

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Summary

The present study was concerned with two aspects of nutritional influences on induced recessive lethal mutations, crossing over and rearrangements. In one, the chemical mutagen was given as food, in the other, the nutritional conditions were tested for a modifying effect on mutations that had been induced by the injection of alkylating agents.

A. Formaldehyde applied to larvae in the food

1. Attached -X ($\hat{XXY}$) females were reared as larvae on formaldehyde-food and tested for second chromosome (autosomal) recessive lethal mutations in four 3-day broods. In each brood the lethal frequency was at spontaneous mutation level = females with Y-chromosomes being as recalcitrant to the mutagenic action of formaldehyde-food as normal females. Therefore, it was concluded that the Y-chromosome was not involved in the differential response of the sexes to formaldehyde-food mutagenesis.

2. XYY and XY larvae were reared on formaldehyde-food and the emerging adults were tested for sex-linked lethal mutations in four 3-day broods. The same lethal frequency was obtained in the spermatocytes of both types of male. The striking activity of the Y-chromosome in spermatocytes, as detected cytologically in the formation of lampbrush loops, does not seem, therefore, to be involved in the preferential sensitivity of early spermatocytes to treatment.

3. In an X-ray experiment carried out for comparison, 4000r gave similar sex-linked lethal frequencies in the mature sperms of XY and XYY males; this is in contrast to the observations of Kershner (1949) who obtained a 50% reduction of the sex-linked lethal frequency by an extra Y-chromosome in the male. It was concluded, therefore that the effect of an extra

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