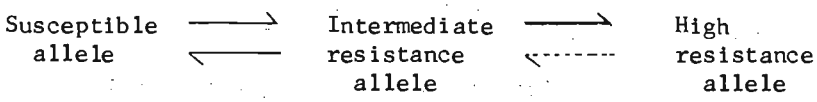
Kikkawa, H. Osaka University, Osaka, Japan. Induction of a parathion-susceptible gene from its resistance allele in D. melanogaster.

As reported in DIS 34: 89, and Botyu-Kagaku (Scientific Pest Control) 29: 37-42, 1964, a parathion-resistance gene (2-64.5) could be induced from its susceptible allele with the treatment of X-ray. In this case, the mutation took place via an unstable intermediate allele as shown in the following process:



However, the step indicated by a dotted line, i.e., the step from a high resistance allele to an intermediate one has not yet been examined. Namely, the question remains whether a high resistance gene mutates to a susceptible one via an intermediate allele, or mutates directly to a susceptible one in one step.

In order to examine this point, males of the Hikone strain which showed the highest resistance to parathion in our laboratory were treated with X-ray (2000 R), and mated to susceptible females carrying two visible markers, cn and bw. The F1 instar larvae were reared in a medium containing 3 mM phenylthiourea (PTU). As shown in DIS 34: 89, flies having a high parathion-resistance gene in homozygous or heterozygous state are unable to survive in such a medium because of the negatively correlating effect between an insecticide like parathion and PTU. However, if the mutation from a high resistance gene involved in the Hikone chromosome to a susceptible allele had been induced by the X-ray treatment, such a fly would survive even in the medium containing PTU.

In this way, we could obtain 7 adult flies from 5510 larvae tested. Two substrains derived from those 7 survivors showed intermediate resistance to parathion. Of interest is the fact that the intermediate resistance gene involved in these substrains is also unstable and often mutates to a complete susceptible allele spontaneously. The reason why the mutation from a high resistance gene to a susceptible one and vice versa takes place via an intermediate one is now being investigated.

Masterson, J. Iowa State University, Ames, Iowa. A method for procuring certain X-Y duplications.

A breeding method was devised in order to facilitate the recovery of duplications of the y-sc region on the Y-chromosome. It was thought that, if a "double lethal female" could be obtained which had in at least one of its X-chromosomes a deficiency for this region, this would make it easier to select for duplications on the Y. The following breeding program was therefore set up:

1,v,car/Muller-5 X y^{3p},In S,sc^{S1}; sc^{19i}/Cy

1,v,car/y^{3p},In S,sc^{S1} ; sc^{19i}/Cy X X•Y(y,v,f)/Y (irradiated 4,000 r)

Score for y,sc+ males

These males were tested against various markers on the distal portion of the X-chromosome and their Y was found to carry the wild-type alleles for su-v, su-w^a(su-apr), ac, sc but not pn. This duplication was also found to be allelic to yellow. Since the irradiated X•Y chromosome carried y,v,f, it is presumed that the resulting duplication carries the mutant allele, yellow.

Utilizing the symbolism of Bridges and Brehme (1944) this X-Y duplication is designated Dp (1;Y) 1E. Another duplication using the same method was found and named Dp (1;Y) 2E. The two duplications are similar but not identical. (See descriptions under New Mutants).

Theoretically any sex-linked lethal could be covered by an insertion of a piece of the X into the Y. It has been found, however, that only areas on the X near the proximal and distal ends can be utilized. A possible explanation would be that in these areas only two breaks in the X•Y chromosome would be needed to give a 1;Y Duplication. To get a 1;Y Duplication covering loci near the vermilion locus, four breaks would be necessary.