Matsudaira, Y. and T. Yamasaki. Rikkyo University, Tokyo, Japan. Dose-frequency relationship of two types of lethal mutation induced by X-rays in Drosophila.

We reported that for the visible loci of Drosophila, the X-ray induced frequency of fractional-body mutation is well above that of the whole-body mutation in the low dose treatment, whereas in the high dose the relation is reversed (1964 and 1967). In this report, the dose-frequency relationship for two types of lethal mutation [fractional-(gonadal) and whole-(complete) lethal] induced by X-rays will be presented.

Adult males of Oregon-R stock were irradiated with 500, 1000 and 2000R of X-rays, and mated to virgin females from Muller-5 stock. In the F_1 generation from these cultures, pair mating was carried out. In the F_2, the whole-lethal mutations were examined (F_2 test). From each F_1 line, one pair of F_2 was sampled, and their offspring were tested for the lethal (F_3 test). In the F_2 sampling, if the sampled female is of the fractional-lethal carrying line origin, there is equal probability that it is either lethal free or a lethal carrying one. Therefore, 50% of the fractional-lethal mutations must be discarded in the sampling. Consequently, in order to obtain the induced frequency of the fractionals, the observed frequency should be doubled.

The results are summarized in the table below. In the dose region used in this experiment, fractional-lethal mutations did not appear to be induced at a higher rate than whole

Number of fractional- and whole-lethal mutation induced by X-rays.

Dose of X-rays (R)	Total number of chromosomes examined	Number of lethals observed	Classification of lethal type Number and frequency, %	
			Whole	Fractional
500	for F_2 test 5822 for F_3 test 5265	69 98	69(1.19)	29(0.55x2=1.10)
1000	for F_2 test 1079 for F_3 test 1052	20 28	20(1.85)	8(0.76x2=1.52)
2000	for F_2 test 1030 for F_3 test 975	39 47	39(3.79)	8(0.82x2=1.64)

lethals. However, as has been reported, the frequency of fractionals at 0 dose may be higher than that of whole ones from the data of Epler (1966), and others. These results are not contradictory in their general tendency to the results of visible mutations, although quantitatively there is some discrepancy.

Ehrlich, E. University of Oregon, Eugene Oregon. An X chromosome balancer having three scute regions.

Matings of y w spl sn(1)/Muller-5 virgins with "scuteless"/T(Y;1)1E, y sc^+ (Masterson, DIS 43: 161, 1968) males give Muller-5/T(Y;1)1E, y sc^+ male progeny with a greatly reduced frequency. Since the Ins(1)sc^{S1} S sc^8, B w^a chromosome carries a duplication for the scute region, these males possess in their genomes three scute regions.

A non-lethal-bearing X chromosome balancer which can be rendered lethal in males by the presence of a particular Y chromosome is a useful genetic tool. Therefore it seemed advantageous to determine whether or not four scute regions in a male have a lethal effect, and the following synthesis was undertaken.

Virgin females, Ins(1)sc^{S1} S sc^8, w^a/T(Y;1)1E were subjected to approximately 3000 r of X irradiation and subsequently mated to yellow males. The resulting exceptional w^a males were mated individually to both y f:=/Y and y f:=/T(Y;1)1E virgins. Those lines were selected in which the first females produced w^a male progeny but the second gave none.

In the lines thus selected, it appears that the synthesized chromosomes are sc^{S1} S w^a sc^8 ·y sc^+ in composition, and that four scute regions in males do indeed have a lethal effect.