larval feeding, might have a preferential effect on the second chromosome. This assumption received further general support from experiments in which DNA was injected into adult *Drosophila* males[13,14], where it was found to produce autosomal *Minutes*, but no sex-linked recessive lethal mutations.

On the basis of these observations, Mathew[15] has studied the effect of DNA on *Drosophila* larvae reared on a yeast–sugar medium supplemented with 10 per cent (and later with 13 per cent) calf-thymus DNA. In keeping with the findings of previous workers, he found that the sex-chromosome was refractory to the treatment. However, he did observe a pronounced mutagenic effect on the second chromosome, both in the induction of F_1 complete recessive lethals and in F_1 recessive lethal-mosaics[15].

The experiments reported here (Tables 2 and 3) support Mathew's observations that calf-thymus DNA is mutagenic towards the second chromosome of *Drosophila* larvae, in the production of both complete and delayed recessive lethal mutations. However, our experiments show that the sex-chromosome is not refractory to the mutagenic activity of calf-thymus DNA; indeed, it appears to be equally as sensitive as the second chromosome. (Since the second chromosome has approximately twice the genetic material as the sex-chromosome, the spontaneous and induced mutation rates on the second chromosome are expected to show about twice the rate of the sex-chromosome.)

To explain the variance of our DNA-induced sex-linked recessive lethal mutation rates with those of other workers, we might suggest that our more refined culturing technique allows the detection of the slight mutagenic effect which is produced on the sex-chromosome.

Irradiated DNA. Tables 2 and 3 show that the irradiation of calf-thymus DNA, prior to its addition to the larval treatment medium, does not produce a significant increase in mutation over that of the unirradiated DNA. These experiments thus lend no support to Parkash's observations[4,5] that irradiated DNA produces a significant increase in mutation when fed to *Drosophila melanogaster* larvae.

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Lack of Mutagenic Effect of Irradiated *Drosophila* Medium

The possibility that irradiated food may be mutagenic gains great importance from the widespread use of radiation for the preservation of food. Stone *et al.*[1] have found increased mutation frequencies in *Staphylococcus aureus* which had been cultured in ultra-violet-treated medium. More recently, there have been reports[2–5] on cytological abnormalities in plant roots that had been kept in X-rayed culture fluid. Recent experiments on *Drosophila*[6] have indicated that the incidence of sex-linked recessive lethals and visible mutations may be enhanced by feeding the larvae on irradiated medium. In view of the practical importance of this possibility, a large-scale experiment was carried out to test the genetic effects of irradiated food on *Drosophila melanogaster*.

Bottles with basic medium containing water, glucose, agar, yeast and propionic acid in the proportion of 100 : 10 : 3 : 10 : 0·4 in g were irradiated from a cobalt-60 source at the Atomic Energy Establishment, Trombay, Bombay. Two doses of 150,000 and 300,000 rads were given at a dose rate of 25,000 rads/min. Control bottles were made up in the same way. Treated and control bottles were stocked with 10 young males and 20 virgin females of the wild-type Oregon-*K* strain. When sufficient eggs had been laid, the parents were discarded. The emerging males, which had undergone their development on irradiated medium, were divided into two groups. In one group, the males were mated with virgin females of genotype *y sc^{Se} In* 49 *sc^{8}*; *bw*; *st* and the progeny was scored for recessive sex-linked lethals and translocations. In the second group, the males were mated with virgin females of an attached-*X* strain and the progeny was scored for sex-linked visible mutations and large deletions. In both groups, the test was extended over four broods of three days each. Table 1 summarizes the results.

Table 1

Dose (rads)	Sex-linked lethals	Trans-locations	Sex-linked visibles	Large deletions
0	9/2971 = 0·3%	0/3560	—	—
150,000	10/3532 = 0·25%	0/4031	0/49,056	0/46,871
300,000	8/3766 = 0·21%	0/4160	0/45,300	0/48,014

Clearly, irradiated medium in these experiments had not produced any genetical effects. It is difficult to account for the difference between our results and those obtained by Swaminathan[6]. The strain of males used, the composition of the medium and the radiation dose in our first experiment were the same as in Swaminathan's experiments; in the second experiment, we used an even higher dose of radiation. As regards sex-linked lethals, the difference between our results and those of Swaminathan is only on the borderline of significance for the treated series (χ^2 about 4 for 1*DF*); the main difference lies in the control rate, which in Swaminathan's experiments was unusually low for the Oregon-*K* strain. Much more striking is the complete absence of visibles in our experiment as compared with the high frequency of visibles reported by Swaminathan. However, most of Swaminathan's visibles were not tested genetically and may have been phenotypic changes; moreover, it is not clear whether the visible changes in the F_2 of the sex-linked lethal tests occurred in the proportions expected if they had been due to the presence of chromosomes from the irradiated P_1 males. Without further tests, the claim that irradiated medium produces genetic changes of any kind in *Drosophila* does not seem justified.

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