signs of F indicates a tendency for heterozygote excess among living flies. This hypothesis was tested by computing heterogeneity Chi-squares for each locus as shown below. The Pgm locus clearly shows the effects of selection, and there is a suggestion of an effect at the Odh locus. These two loci are linked (5.8 map units) on chromosome III; however, the Est 6 locus shows no such effect even though it is closely linked (7.4 map units) to the Pgm locus.

	Mdh	Adh	Odh	Est 6	αGpdh	Pgm	Total
Chi-square	0.86	3.45	5.65+	0.66	2.07	9.09‡	21.78*
DF	2	2	2	2	2	2	12

* $p < 0.05$ ‡ $p < 0.025$ + $p = 0.059$

Biochemical studies of the in vitro thermal stability of the major alleles at the Adh (Clarke et al., Biochem. Genet. 11:141), Est 6 (Cochrane, Nature 263:131) and αGpdh loci (Miller et al., Biochem. Genet. 13:175) show that the S electromorphs at the Adh and Est 6 loci are more stable. Although the shifts in gene frequencies apparent in the above data are not significant, they do agree with predictions from biochemical studies. Supported by NIH grant GM23706.

Robertson, A. Institute of Genetics, Edinburgh University, Scotland. Quantitative variation on the fourth chromosome of D. melanogaster.

Following earlier indications (Madalena and Robertson, Genetical Research 24:113), I investigated the effect of different fourth chromosomes from lines selected for high and low sternopleural score (averaging 48 and 8 bristles, respectively) differed in mean score for different bristles as indicated in the table. In the background of the high selected line, there are indications that the difference in sternopleural score between the two selected homozygotes is more than ten bristles. The low chromosome is almost completely recessive in score to the high and is apparently rare in the base population. Fourth chromosomes from four other low sternopleural lines each had a distinct pattern of scores for the three types of bristles. Differences were also found in female abdomen pattern and one chromosome apparently carried the lost mutant "scutenick".

Source of fourth chromosome	Sternopleural	Abdominal (fifth only)	Ocellar
high	13.2	16.2	6.5
low	11.3	13.0	4.1
unselected	13.1	15.7	6.3

Romans, P. Univ. of California, San Diego, La Jolla, California. Gene conversion in mei-9^a, a crossover defective mutant in D. melanogaster.

In D. melanogaster females homozygous for mutant alleles at the mei-9 locus, crossing over is reduced uniformly in all genetic intervals studied (to about 8% of the wild type map in mei-9^a). From these data it has been inferred that the wild type product of the locus functions directly in the process of exchange (Baker and Carpenter, 1972). Analysis of mutants at this locus has shown that the wild type product is also required for normal mitotic chromosome stability in males and females (Baker et al., 1976, 1978; Gatti, 1979), for repair replication (Nguyen and Boyd, 1977), and for excision repair (Boyd et al., 1976). To probe the function of this gene further, and to investigate the relationship between crossing over and intragenic recombination, I have examined the ability of females homozygous for mei-9^a to carry out intragenic recombination.

Recombination with the rosy (ry) locus was assessed using the purine selection system (see Chovnik et al., 1977 for review). The crosses were as indicated in the table. When parents were removed from bottles after 3 days of egg laying, the developing zygotes were treated with 0.8 ml 0.185% (w/v) aqueous purine added to the food, or with 0.8 ml deionized distilled water.

Table 1. Production of ry^+ recombinants by wild type and mei-9^a females

♀ Parent	♂ Parent	Total Zygotes	X ND per ovum	Total ry^+ recombinants	Rate ry^+ recombinants	Recombination event: X-over	conv $ry^{5(502)}$	conv ry^{41}
Experiment I:								
$\frac{y}{y}$; $\frac{ry^5}{cu\ kar\ ry^{41}\ 126}$	$\frac{+}{Y}$; $\frac{MKRS^1}{In(3R)P_{18}{}^2}$	--	--	10	~1/22,000[3]	2	3	4
$\frac{y\ mei\text{-}9^a}{y\ mei\text{-}9^a}$; $\frac{ry^5}{cu\ kar\ ry^{41}\ 126}$	$\frac{+}{Y}$; $\frac{MKRS}{In(3R)P_{18}}$	--	--	13	~1/24,000[3]	0	6	2
Experiment II:								
$\frac{y}{y}$; $\frac{ry^{502}\ e^s\ ro}{cu\ kar\ ry^{41}\ 126}$	$\frac{+}{Y}$; $\frac{MKRS}{kar\ Df(3R)ry^{75}}$	1.47×10^6	0.11%	22	1/67,000	10	5	7
$\frac{y\ mei\text{-}9^a}{y\ mei\text{-}9^a}$; $\frac{ry^{502}\ e^s\ ro}{cu\ kar\ ry^{41}\ 126}$	$\frac{+}{Y}$; $\frac{MKRS}{kar\ Df(3R)ry^{75}}$	0.51×10^6	25.8%	15	1/34,000	1	8	3

1. MKRS = Tp MKRS, M(3)S34 kar ry^2 Sb
2. $In(3R)P_{18}$ = $In(3R)P_{18}$, Ubx ry^{41} kar, e^4
3. Rates based on complete adult counts from only a portion of the control bottles

Counts of adults emerging from water treated bottles (about 10% of the total) were used to estimate the total population of zygotes yielding ry^+ recombinants. X-chromosome non-disjunction rates were also obtained from these counts, and were close to previously established values for wild type and mei-9^a females.

The data in the table indicate that intragenic recombination occurs in mei-9^a females at or above wild type rates. From analysis of flanking marker combinations in the ry^+ recombinant chromosomes it may be inferred (for rationale see Chovnick et al., 1971) that in mei-9^a, most of the recombination events are gene conversions. Indeed, only one crossover was recovered among the 20 ry^+ recombinants tested. Thus, the mei-9^a defect results in a reduction of intragenic crossing over, but not of gene conversion. Several of the ry^+ recombinant progeny of mei-9^a females (4 of 8 from ry^5/ry^{41} crosses, 1 of 12 from ry^{502}/ry^{41} crosses) transmitted ry to their offspring. This is inferred to be the result of post-meiotic segregation of ry and ry^+ in the first mitotic division of the embryo since 2 of the 5 recombinants that transmitted ry to offspring transmitted ry and ry^+ maternally derived chromosomes. Since many mal^+-mal XDH^+-XDH^- mosaic flies do not survive purine treatment although heterozygotes do (see accompanying note), the data presented here are consistent with the hypothesis that gene conversion is actually increased above wild type levels in mei-9^a females.

Current molecular models of recombination (Meselson and Radding, 1975) suggest that gene conversion and crossing over are alternative fates of a heteroduplex DNA intermediate. The reduction in crossing over and concomitant increase in gene conversion observed in mei-9^a females are not inconsistent with these models. Since a high level of post-meiotic segregation is not a feature of recombination at the ry locus or any other locus that has been tested in mei-9^+ flies, these results also suggest that the mei-9^+ excision repair function may be an important agent of excising base pair mismatch from heteroduplex DNA formed during gene conversion in Drosophila.

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Romans, P. Univ. of California, San Diego, La Jolla, California. Effects of purine selection on survival of Drosophila mosaic for Xanthine Dehydrogenase (XDH) activity.

In certain crosses rosy mosaic flies (post meiotic segregants) appear to be produced by recombination (see previous report). Since the recombinants recovered were selected for under conditions of purine treatment which result in death of XDH^- (ry) individuals, and survival of XDH^+/XDH^- (ry^+/ry) heterozygotes, it is of interest to know how well mosaics which have some tissues heterozygous XDH^+/XDH^- and the rest XDH^- survive the treatment to be scored as recombinants. The following experiment was performed to answer this question.

y f^{36a} mal females were crossed to R(1)2 w^{vc}/y^+.Y males to generate mosaic zygotes of the required kind: maroonlike flies, like rosy flies, lack detectable XDH activity (for review, see Dickinson and Sullivan, 1975). The following breeding protocol was followed in order that numbers of zygotes of the various genotypic classes in purine and water treated (control) cultures should be nearly identical. In order to insure healthy culture conditions and minimize culture dependent effects of purine, large numbers of rosy flies were allowed to lay eggs in bottles used for the crosses for about six hours prior to introduction of the experimental parents. Then a three-day brood was collected from each set of parents and treated with either 0.8 ml deionized distilled water or 0.8 ml of 0.165% (w/v) aqueous purine at the time the parents were removed from the bottles. Three additional broods were obtained in exactly the same way. Half the cultures begun on a particular day received the purine treatments in broods 1 and 3, water in 2 and 4, and the other half, the reverse.