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Chromosome mosaics induced in ring-X by ethyl methane sulfonate and by X-rays in D. melanogaster.

Chromosomal mosaics were produced by inducing breakage of a ring-X chromosome. When this resulted in the loss of the ring chromosome during one of the early cleavage stages of the zygote, an XX/XO gynandromorph was formed. In some cases the chromosome was repaired or altered without breakage, resulting in a point mutation rather than chromosome loss. The markers w, m, f, and B were used so that the extent of mosaicism could be observed to distinguish point mutations from gynandromorphs.

Table 1. EMS-induced mosaics and their transmissibility.

Transmissibility	Gynandromorphs	Point mutations $w^+ \rightarrow w$	$B \rightarrow B^+$	$m^+ \rightarrow m$
died	1	1	1	0
nontransmissible	0	4	1	1
sterile	5	0	0	0
transmissible	0	0	1	0
lethal	0	0	2	0
total	6	5	5	1

In the first series X^{c2} y B males were fed ethyl methane sulfonate (0.0125M EMS in 2% sucrose) for 24 hours. They were then mated to w m f virgin females and progeny were examined for mosaics (Table 1). The mosaics obtained from among 4787 total progeny consisted of 6 gynandromorphs (0.1%) and 11 point mutations (0.2%). The data suggest that EMS produces more chemical alterations or repaired breaks on the ring-X chromosome, resulting in point mutations, than unrestituted breaks or aneucentric rings leading to loss and gynandromorphism.

In the second series X^{c2} y B males were exposed to X-rays (2500R) and then mated to w m f virgin females. As in the previous series, the progeny were examined for mosaics (see Table 2). The mosaics obtained from among 920 total progeny consisted of 5 gynandromorphs (0.5%) and 1 point mutation (0.1%). These X-ray results are consistent with the expectation that breakage of the ring-X chromosome is more likely to occur, producing gynandromorphs, than the induction of point mutations.

Table 2. X-ray induced mosaics and their transmissibility.

Transmissibility	Gynandromorphs	Point mutations $w^+ \rightarrow w$
nontransmissible	3	0
sterile	2	1
total	5	1

The distribution of the 11 gynandromorphs obtained is shown in Table 3. Note that in none of these 11 cases was there mosaicism for all five of the phenotypic characteristics used. Most of the gynandromorphs were genital male or female in phenotype and their sterility is probably due to incompatible head tissue of the opposite sex. The fertility of three gynandromorphs, one with an apparently male head and female genitalia, suggests that her head ganglial tissue was female or that males were successful in overcoming her behavioral barriers to reproduction. In two of the three fer-

tile gynandromorphs, only the w m f chromosome (male tissue) entered the gonads. In those two cases the genitalia of the gynandromorphs was male.

Table 3. Distribution of affected tissue in gynandromorphs

mutagen used	fertile(F) or sterile(S)	eye color R	eye color L	bristles	wing	sex comb P=present A=absent R	sex comb P=present A=absent L	abdomen
EMS	S	B+ w^{mos}	B w^{+}	f^{+}	m^{+}	A	A	♀-like
EMS	died	B^{+} w^{mos}	B w^{+}	f^{mos}	m^{mos}	P	A	♂
EMS	S	B^{+} w	B^{+} w	f^{mos}	m^{mos}	P	A	♀
EMS	S	B w^{+}	B w^{+}	f^{mos}	m^{mos}	A	P	♂
EMS	S	B w^{+}	B w^{+}	f^{+}	m^{+}	A	A	♂
EMS	S	B w^{+}	B w^{+}	f^{+}	m^{+}	A	A	♂
X-ray	F*	B^{+} w	B w^{+}	f	m	P	P	♂
X-ray	F*	B^{+} w	B^{+}w	f^{+}	m^{+}	P	A	♂
X-ray	S	B w^{+}	B w^{+}	f^{+}	m^{mos}	P	A	♂
X-ray	S	B w^{+}	B w^{+}	f	m	P	P	♂
X-ray	F**	B^{+} w	B^{+} w	f^{+}	m^{+}	A	A	♀

*=non-transmitted, only (w m f) progeny obtained

**=non-transmitted, (y B) and (w m f) progeny obtained

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D. melanogaster can taste amino acids.

Some progress has been made in the genetics of taste perception in Drosophila (Isono and Kikuchi 1974a; Falk and Atida 1975). Like other dipterans, the taste-bristle of Drosophila contains 4 chemosensory cells (Falk et al. 1976). One of these is the sugar receptor which reacts specifically with certain sugars. In larger flies such as fleshfly and blowfly, Shiraish and Kuwabara (1970) showed 6 of 19 L-type amino acids could electrophysiologically stimulate the sugar receptor of these flies but there have been no data on Drosophila. In this report we show that D. melanogaster can also taste certain amino acids dissolved in pH-adjusted phosphate buffer.

A petri dish with 4 glass rings in it was employed for behavioral assay (Isono and Kikuchi 1974b). Two of the 4 rings were filled with 5 x 10^{-2}M amino acid dissolved in 1/15M phosphate buffer (pH 7.0), while the other 2 were filled with phosphate buffer only. Each solu-