Janning, W. University of Muenster, Germany. Distribution of aldehyde oxidase activity in imaginal disks of Drosophila melanogaster.

In Drosophila, little is known about genetic mosaicism in the internal organs of the imago and in larval structures, due to the lack of suitable marker genes. Recently it was found that aldehyde oxidase can be used as a cell marker for Malpighian tubules, the gut and the inner genitalia of the imago (Janning, 1972 and in preparation). By the use of the mutant gene maroonlike on the X-chromosome, mosaic tissues in gynandromorphs can be detected in organs or organ parts which show aldehyde oxidase activity in the wild type. The tissue distribution of aldehyde oxidase activity in larvae and adults has been described by Dickinson (1971). In imaginal disks he found "moderate to heavy activity". For studies concerned with imaginal disks in gynandromorphs a more detailed analysis of the normal distribution pattern was necessary.

Disks of third instar wild type larvae were dissected out and inspected for aldehyde oxidase activity after appropriate staining (for the staining procedure see Courtright, 1967; Dickinson, 1970, 1971). Activity was found in all the prominent disks of both sexes. In the labial, genital and the three leg disks most of the tissue shows heavy activity with patches of low or no activity. Particularly remarkable patterns are found in the haltere, wing and eye-antennal disks. In the wing (Figure 1a) and haltere disks, stripes of activity go through

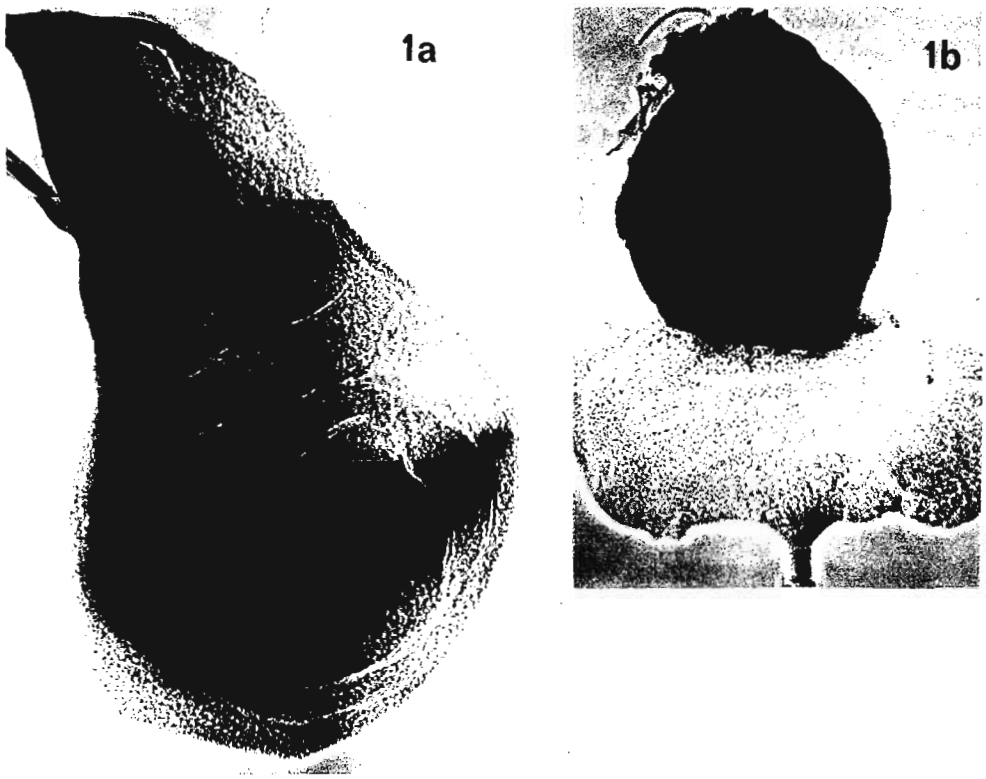

Figure 1. Distribution of aldehyde oxidase activity in imaginal disks of wild type larvae. a) Wing disk with stripes of heavy activity. b) Optic disk with aldehyde oxidase activity in the antennal part, and no activity in the eye part.

otherwise aldehyde oxidase-negative tissue. In the optic disk (Figure 1b), a sharp border separates the areas of activity and no activity. The antennal part of the disk shows heavy activity in all the tissue except for a small spot of low activity that is sometimes present near the center of the disk, whereas in the eye part no activity can be detected. This

borderline of activity in the optic disk seems to cut the disk into the antennal and eye parts. The staining patterns are highly reproducible. To rule out impermeability for certain staining components in the unstained areas, disks were injured or cut into pieces prior to the aldehyde oxidase test. The activity patterns were the same as in intact disks.

Thus at least the antennal disk can be used for studies with genetic mosaics. In gynandromorphs mosaic antennal disks have been found and are now being analysed in detail. This work was supported by the Deutsche Forschungsgemeinschaft.

References: Courtright, J.B. 1967, Genetics 57:25; Dickinson, W.J. 1970, Genetics 66: 487; _____ 1971, Develop. Biol. 26:77; Janning, W. 1972, Naturwissenschaften 59:516.

Chinnici, J.P. Virginia Commonwealth University, Richmond, Virginia. Preliminary data on the effect of mono-sodium glutamate on viability and crossing over in Drosophila melanogaster.

The effect on human health of the food additive mono-sodium glutamate (MSG) has been a topic of concern since 1968 when Schaumberg et al. first described the "Chinese Restaurant Syndrome" in man and associated it with ingestion of the flavor enhancer MSG. Evidence presented by Ghadimi et al. (1971) indicates that the symptoms of this syndrome (headache, sweating, nausea, weakness, thirst, flushing of the face, a sensation of burning or tightness, abdominal pain, and lacrimation) may be the result of "transient acetylcholinosis", since glutamic acid is readily converted to acetylcholine when excess sodium is present, the symptoms being due to the effect of the excess acetylcholine on the parasympathetic nervous system.

More serious concern about the effect of MSG on development has resulted from several reports that MSG causes lesions in the hypothalamus of the brain and/or degeneration of the retina of the eye of mice, rats, and rhesus monkies (see, for example, Olney and Sharpe, 1969; Arees and Mayer, 1970; Olney, 1971; and Burde et al., 1971). However, several other reports have failed to substantiate these findings (see, for example, Adamo and Ratner, 1970; Oser et al., 1971; and Reynolds et al., 1971), so that no clear cut conclusions may be drawn. A possible contributing factor to the effect of MSG on brain development is the finding that MSG briefly but significantly depresses glucose uptake by mice brain cells (Creasey et al., 1971).

Two brief reports on the effects of MSG on development and productivity in D. melanogaster have been published. Turner and Wright (1971) have reported that 1 and 3 percent solutions of MSG do not change the number of adults emerging from cultures. Data from Forman and Majumdar (1971) show that a 10% MSG solution reduces the number of adults emerging from cultures by 57% while the percentage of females emerging from these cultures rises from the control value of 49.95% to 60.1%. Also, flies allowed to drink a 10% MSG solution for 24 hours produced 39% fewer offspring than the controls, with the sex ratio of these offspring not being affected. I am currently studying the effect of MSG on viability, fecundity, and crossing over in D. melanogaster. Some of the preliminary data from this study are presented below.

The effect of a 10% MSG solution (10 grams of MSG added to 100 ml of a standard dextrose-yeast-agar medium) on egg to adult viability in the Oregon-R wild type strain was measured as follows. To each of 30 vials, each containing the 10% MSG supplemented media, 25 eggs were added. A similar number of eggs was added to each of 30 control vials containing media unsupplemented by MSG. The results are presented in Table 1. In the control vials, 74% of the

Table 1

Treatment	N	No. of Adults Produced $\bar{x} \pm s$	Percent male Offspring $\bar{x} \pm SE$
Control 0% MSG	30	18.73 ± 3.45	50.33 ± 2.15
10% MSG*	30	12.83** ± 3.79	51.06 ± 3.20

N = Number of vials set up, each containing 25 eggs.
* = 10 grams per 100 ml of media solution
ANALYSIS OF VARIANCE (TREATMENT VS. CONTROL)
**: $P < .01$
others not significant