DeMarinis, F. Cleveland State University, Cleveland, Ohio. A comparison of the effects of 5-bromouracil and uracil on the facet number of the Bar eye.

It has been shown that a large number of amides can increase the number of facets in the Bar eye Drosophila (DIS 41:149). In the present study it has been found that 5-bromouracil has an opposite effect. In brief, each compound tested was added to Pearl's standard formula in proportionate amounts and Bar stock eggs were deposited and permitted to complete development on it. The effect on the eye-size of males and females was determined by counting the number of facets. All tests were carried out at 25°C.

Table 1 compares the effect of uracil and 5-bromouracil on the size of the Bar eye of the males and females. Uracil increases the number of facets while its homologue, 5-bromouracil, markedly reduces the number of facets. These two compounds apparently have an antagonistic effect on the rate of facet formation.

Table 2 shows the effect of various concentrations of 5-bromouracil on facet number. It is apparent from these data that the number of facets decreases with an increased concentration of the compound. It shows a maximum effect at approximately 1% concentration level. Table 3 shows the effect of various concentrations of uracil on eye-size ♂♂ only. In this case the number of facets increases with an increase in concentration of uracil. The results listed in this table were taken from an earlier test where a lower average Bar stock was used. More detailed studies have indicated that, in general, uracil as well as other amides modifies Bar to a typical wild type eye, while 5-bromouracil modifies Bar to a typical double Bar type.

Table 4 compares the effect of other homologues of uracil. Only thymine seems to have a moderate effect in increasing the size of the eye; other homologues are either highly toxic or have no apparent effect on the eye.

It should be pointed out that while the main study of 5-bromouracil has been on its effect on the eye, many other effects were also noted. Among these the wings were noted to be markedly affected. They were smaller, stretched out and cupped under towards the ventral part of the thorax. The flies are unable to fly but creep very much like the vestigial type.

Table 5 shows the effect of various concentrations of 5-bromouracil on the proportion of abnormal-winged flies.

In general, higher concentrations of 5-bromouracil tend to produce greater proportions of abnormal-winged flies, but at the same time tend to reduce the total number of adults that emerge. Each experimental batch of media tested was initially seeded with approximately 400 eggs.

Table 1

A comparison of 0.75% uracil and 0.75% 5-bromouracil on the development of the Bar eye in ♂♂ and ♀♀ at 25°C.

	Bar ♂♂ Facet number	Bar ♀♀ Facet number
Uracil (0.75%)	265 ± 19.2	211 ± 20.0
5-bromouracil (0.75%)	47.7 ± 3.6	29.1 ± 2.7
Control	106.4 ± 4.4	75.9 ± 3.7

Table 2

The effect of 5-bromouracil on the size of the Bar eye ♂♂ and ♀♀ at 25°C.

% 5-bromouracil	Bar ♂♂ Facet number	Bar ♀♀ Facet number
0.10	68.5 ± 5.3	51.7 ± 4.5
0.25	60.6 ± 3.5	36.6 ± 3.2
0.50	-----	30.6 ± 2.9
0.75	47.7 ± 3.6	29.1 ± 2.7
1.00	-----	26.6 ± 1.6
1.25	-----	31.4 ± 3.0
1.50	-----	35.4 ± 2.4
1.75	-----	42.2 ± 3.7
2.00	-----	47.4 ± 3.3
2.25	-----	52.7 ± 4.4
Control	106.4 ± 4.4	75.9 ± 3.7

Table 3

The effect of uracil on the size of the Bar eye ♂♂ at 25°C.

% Uracil	Bar ♂♂ Facet Number
0.75	244 ± 18.1
1.50	310 ± 15.0
1.75	450 ± 13.8
2.00	575 ± 17.9
Control	88 ± 3.9

Table 4

The effects of other uracil homologues on the Bar eye ♂♂ at 25°C.

	Bar ♂♂ Facet Number
5-methyl uracil (Thymine)(0.25%)	155 ± 10.1
5-nitrouracil (2.25%)	no effect
5-aminouracil (0.10%)	highly toxic
6-methyl uracil (0.50%)	no effect
6-aminouracil (1.00%)	no effect

Table 5

The effects of 5-bromouracil on wings of fB stock at 25°C.

% 5-bromouracil	Total Number of Adults Emerged	Number With Abnormal Wings	% Abnormal Wings
0.10	235	16	6.8
0.25	141	87	61.7
0.50	16	16	100
0.75	63	62	100
1.00	19	19	↓
1.25	35	35	↓
1.50	16	16	↓
1.75	28	28	↓
2.00	13	13	↓
2.25	15	15	↓
Control	350	0	0

Rasmuson, B. University of Uppsala, Sweden. Modulation of the puff in the tip of the X-chromosome in D. m.

In a duplication of white-locus, containing the mutant ch in the distal duplicate and sp-w in the proximal one (Rasmuson: Hereditas 53), a series of salivary chromosome analyses was performed in order to determine the length of the duplication. The original ch- and sp-w stocks were analysed together with the duplication, which had occurred independently in two females, heterozygous for these marker genes. It was found that the duplication had arisen as a cross-over after unequal pairing in such a way that a segment from 3 A to 4 C was duplicated. This means that the bands 3 A 1234, including the zeste band 3 A3, which is known to pair regularly - but very seldom - with the 3 C1 band within or very close to the white-locus, also have an affinity to pair with some structure between 4 C and 4 D. The band 4 D does not seem to be duplicated. Further, the size and the shape of the puff near the tip of the X-chromosome, including the sections 2 A and 2 B, is modulated from the normal appearance found in the two original strains. In males, the puff in the duplicated chromosome is elongated in proximal direction to an ellipsoidal shape and appears to include the 3 A12 bands within its border. In a recombinant where the duplication had been eliminated, the normal shape of the puff reappeared. Thus, the duplication seems to contain some factor which induces the puffing in a region outside of the duplication what under normal conditions does not show any puffing activity. Studies are under way to investigate whether this factor is a special gene or a heterochromatic region and whether it is possible to obtain the same phenomenon with other chromosome rearrangements.