

iodine. The magnitude of the cell label has an important influence on the survival-time of the cells.

Full reports on the various aspects of this work will be published elsewhere; meanwhile the mechanism of absorption of cells from the peritoneal cavity and the application of this technique to the human subject are being investigated.

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<sup>1</sup>Crick, J., and Jackson, H., *Brit. J. Pharmacol. Chemother.*, **7**, 142 (1952); and also in the press.

### 'Sex-Ratio': a Non-Mendelian Character in *Drosophila bifasciata*

ON three independent occasions an exceptional trait has been recovered in collections from Nature of females of *D. bifasciata*: in Pavia in 1943<sup>1</sup> and 1947, and in Mergozzo (Lago Maggiore) in 1947. This trait expresses itself in an abnormal sex-ratio of offspring from females mated to any type of male. By analogy with previously described cases<sup>2</sup>, the character has been designated as 'sex-ratio'. The strain used in the experiments discussed here originated from the 1947 collection in Pavia. The behaviour of this stock can be summarized as follows.

(1) Sex-ratio females produce on an average only 0.5 per cent males, while normal females produce about 47 per cent males. The sex-ratio strain can be maintained only by crossing any females originating from sex-ratio mothers with normal males of the same species. The source of the flies used as male parents has no effect on the transmission of the abnormal sex-ratio, as shown by tests of five geographically different strains (including one of Japanese origin).

(2) The percentage of males has not varied significantly throughout five years with two important exceptions, noted below, when it was raised ten-fold.

(3) The trait is transmitted only by females (and by all of them) originating from the cross sex-ratio ♀♀ × normal ♂♂, and not by any of the rare male offspring of such a cross.

(4) Only somewhat less than half the eggs laid by sex-ratio females hatch.

The more obvious genetic explanations of the exceptional behaviour may be readily ruled out. Thus spontaneous parthenogenesis is excluded by the fact that the eggs laid by virgin sex-ratio females are infertile. Parthenogenesis induced by sperm or copulation is similarly excluded because it can be shown that in crosses between sex-ratio females and normal males with suitable markers (including a sex-linked one) the male genotype contributes to the genotype of the offspring in a regular fashion. Explanations resting on sex-linked lethals, attached X-chromosomes, and non-disjunction phenomena or chromosome aberrations can be ruled out by the fact that the above-described transmission of the trait has persisted unchanged for more than eighty-one generations, produced by mating the females of the line with normal unrelated males. It thus seems that the genetic basis of this character is of extra-chromosomal nature.

The unusual determination of the trait is further demonstrated by the fact that sex-ratio females laying eggs at the raised temperature of 26° C. produce an approximately normal sex-ratio among their off-

spring. This thermal 'cure', however, is not permanent, since when such females are returned to the normal temperature of 21° C., they revert to their original behaviour, that is, their eggs containing putative males fail to hatch. The temperature at which the male mates of the sex-ratio females under heat treatment have been reared has no effect on the sex-ratios produced. Furthermore, temperature treatment of virgin sex-ratio females is ineffective. It seems that the effect of the heat treatment is exercised in the time interval between the last hours of maturation of the eggs and the first 12-18 hours of zygote development. It is worthy of note that the two 'cases' of spontaneous 'cures' mentioned above occurred when the room temperature at which the flies were kept rose suddenly to about 25° C. (once in the summer of 1951 and once in March 1952).

The offspring of temperature-cured sex-ratio mothers differed in their behaviour according to treatment. Those originating from zygotes kept at 26° C. only prior to pupation produced 17-19 per cent males in their progeny, irrespective of the length of the treatment (1-12 days). Those kept at 26° C. until after emergence produced 39 per cent males. It would thus appear that a second temperature-sensitive period exists during the pupal stage.

These results were obtained from mass cultures. Experiments on single fly cultures from treated females showed that the percentage figures quoted resulted from variable behaviour of individual females: some produced normal sex-ratios, some behaved in the manner typical for the sex-ratio strain, and others gave intermediate results. Grand-daughters of treated females continued to segregate, that is, normal, intermediate and sex-ratio females were recovered from all three categories. Only one case of an apparently permanent cure was observed, which in the fifth generation is still producing offspring with a normal sex-ratio.

These observations suggest that a genetic unit, possibly carried in the cytoplasm, exists in sex-ratio females and is transmitted only through eggs. This unit is responsible for the early death of XY zygotes, when present in a threshold concentration. High temperature inhibits or partially inactivates it, thus decreasing the probability of its presence in XY zygotes in amounts above the threshold. The complete data will be presented in another publication.

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<sup>1</sup>Buzzati-Traverso, A., D.I.S. No. 14, 49 (1941).

<sup>2</sup>Morgan, Th., Bridges, C. B., and Sturtevant, A. H., *Bibliograph. Genetica*, **2**, 1 (1925).

### A 'Rex' Mutant in the Cat

IN the house-mouse, five genes are known with much the same action on the fur: shortening the guard-hairs, curling the whiskers, and making the baby coat (sometimes the adult too) wavy<sup>1</sup>. Three recessive genes in the rabbit, rex-1, rex-2, and rex-3, affect guard-hairs and whiskers as in the mouse mutants; the fur is not wavy, however, but is short and plush-like. There are also similar mutants in the rat<sup>2</sup>.

A similar 'rex' type of mutant has now turned up in the cat (see accompanying photograph). The fur of affected kittens is wavy; later it becomes very woolly to the touch, just like a young rex rabbit. The adult hair is curly but has the velvet texture of