

No. of males	Male age (days)	F ₁ scored	dp mutants	Frequency (%)
36	2	7156	40	0.56 ± .03
23	27	5050	54	1.07 ± .04

the increased susceptibility to EMS mutagenesis by aged males is unknown, but may be due to depressed error-free repair functions which normally deteriorate with age.

Kaidanov, L.Z. and E. Hugoto. Dept. of Genetics & Selection, Leningrad State University, USSR. Studies on genetic possibilities of inbred stocks of *Drosophila*.

This work was aimed at discovering genetic consequences of long-term selection on sexual activity. The concentration of mutations to viability has been studied for selected stocks of flies. We used the following stocks: LA (low activity) and HA (high activity), produced from the former by reverse selection. Both of these have been maintained by closed inbreeding during about 300 generations. After 261 generations lateral branches were founded, which were selected for increasing a number of abdomen bristles. In contrast to HA the LA selection was very effective. There were also some differences between the stocks. The rate of LA and its lateral branches' semi- and sublethal mutations was higher (55-65% for 2 chromosome). When the selection of LA was stopped, the result was gradual clearing of the stock from mutation load. There was no equal distribution of harmful mutations among the LA genome; they have been concentrated in chromosome 2. The reasons for their accumulation were artificial selection and increased rate of spontaneous mutations (Gorbunova and Kaidanov 1975; Kaidanov 1979). The latter probably also was a result of previous selection. The mutable loci have been localized (Kaidanov 1979).

References: Gorbunova, V.N. and L.Z. Kaidanov 1975, *Genetika* (Russ) 11:9; Kaidanov, L.Z. 1979, *Z. ob. biol.* (Russ) 40:6.

Kaplin, V. and L. Korochkin. Institute of Cytology & Genetics, Novosibirsk, USSR. Histochemistry of the tissue distribution of some enzymes during the development of *D. melanogaster*.

Using histochemical methods we investigated the tissue distribution of some enzymes at the different stages of development in *D. melanogaster*. Two stocks, Canton S and In(3LR)D/Sb with the complicate inversion on the 3rd chromosome, have

been investigated. Embryonic material was synchronized according to Delcour (1969). Two special methods of preparation of sections for the histochemical staining were elaborated by us.

First method: (1) Washing of eggs in some portions of distilled water. (2) Treatment by 2.5% glutaraldehyde prepared using Hanks solution with the addition of a substrate for a corresponding enzyme, at 4°C.

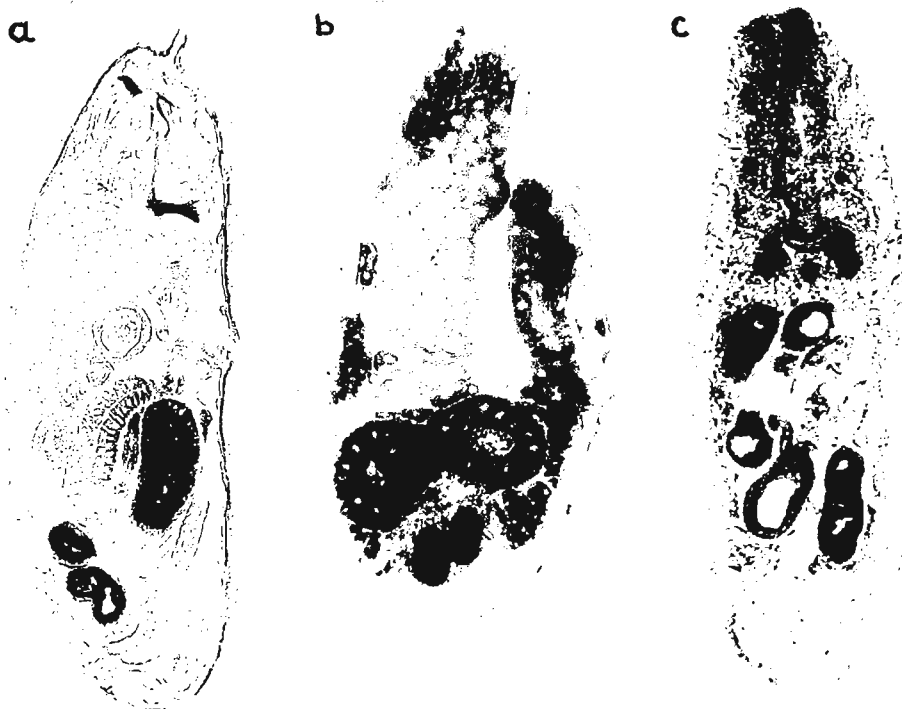


Fig. 1. Sections which were stained histochemically. (a) Alkaline phosphatase; embryo 22 h. (b) Esterase; embryo 22 h. (c) Malic acid; embryo 24 h.

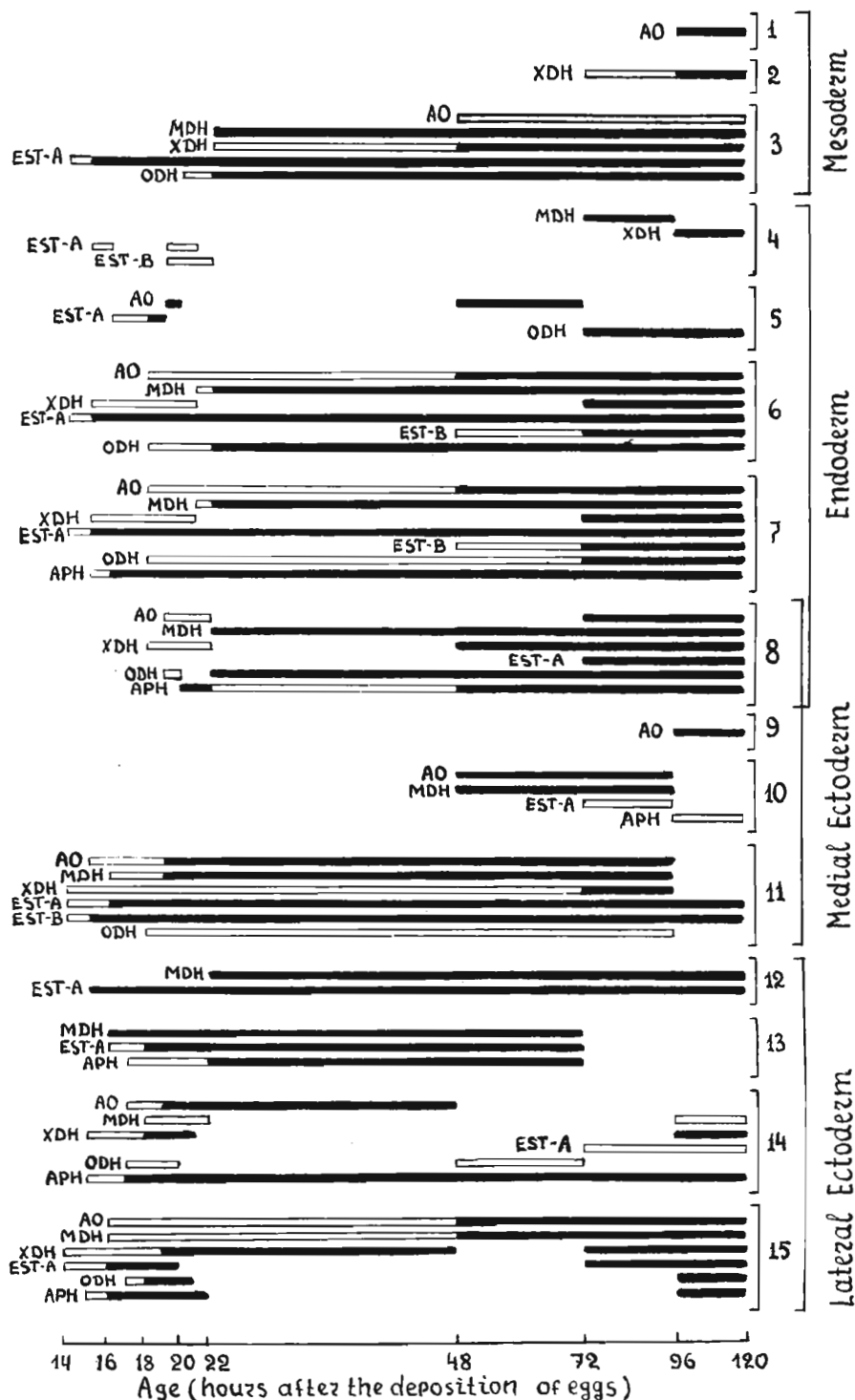


Fig. 2. Results of histochemical investigations of some enzymes in *D. melanogaster*, stock Canton-S. , the first finding of the activity; , the beginning of the increase of histochemical reaction; APH, alkaline phosphatase; EST-A, esterase, α -naphthyl acetate used as substrate; EST-B, esterase, β -naphthyl acetate used as substrate; ODH, octanol dehydrogenase; XDH, xanthine dehydrogenase; MDH, malic enzyme; AO, aldehyde oxidase. 1-aorta, 2-muscles, 3-fat body, 4-cardia, 5-gastric caeca, 6-ventriculus, 7-midintestine, 8-Malpighian tubules, 9-esophagus, 10-hypopharynx, 11-ganglion, 12-oenocytes, 13-spiracles, 14-salivary glands, 15-hypoderm.

(3) Egg membranes are pierced by a fine needle; fixation 2 h at 4°C. (4) Chorion and yolk membranes are removed by special needle. (5) Washing in cold Hanks solution for 1 h at 4°C. (6) Incubation in the solution for histochemical staining, 5-30 minutes. (7) Hanks solution 30 min. at 4°C. (8) Alcohols (40, 70, 96, 100%) 5 min. in each concentration at 4°C. Alcohol + acetone (1:1), 10 min.; acetone, 10 min. (9) Araldite:acetone 1:3, 2 h; 1:1, 2 h; 3:1, 2 h. Araldite, 15 h. (10) Polymerization of araldite for 1 day at 43°C and 2 days at 60°C. (11) Preparation of sections. This method was used mainly for the staining of histological sections by the usual histological and cytological technique.

Second method (mainly for the histochemical investigations): (1) Washing of eggs (50-100) in some portions of distilled water. (2,3) Same as in the first method. (4) Hanks solution, 30 min. at 4°C. (5) Impregnation by solution of polyacryl amide gel. The solution is prepared by the mixture of 5 parts solution A and 3 parts solution B. Solution A: acryl amide 30 g, bisacryl amide 1 g, TEMED 0.25 ml, Tris-acetic buffer 0.05M, pH 8.2, 10 ml, distilled water 60 ml. Solution B: 2% ammonium persulfate 20 ml, distilled water 15 ml. (6) Polymerization 20-30 min. (7) Freezing of the gel slabs with eggs. (8) Preparation of sections (5-10 micron) in the cryostat. (9) Histochemical staining. We used histochemical methods according to Pearse (1960) and Burstone (1962). Aldehyde oxidase was detected according to Dickinson (1970).

The quality of our histochemical technique is illustrated in Fig. 1a,b,c. Designated on Fig. 2 are the periods of development when some enzymes are detected in the different tissues for the first time and a time when the increase of enzymatic activity is established histochemically. It was shown that alkaline phosphatase has been detected rather early during development (12-14 h of embryogenesis) before histochemical finding of the activity of most other enzymes investigated by us. Traces of aldehyde oxidase can be seen at the earliest stages of development. This activity is a result of the presence of the maternal products in the eggs. Then the activity of aldehyde oxidase in the embryos decreases. The increase of this activity and correspondingly the intense histochemical reaction is established rather late during development (1st-2nd instar larvae).

The increase of histochemical reaction of NADP-dependent malic enzyme takes place before the corresponding increase in activity of aldehyde oxidase. There is some similarity of the histochemical pattern between the organs which are developed from the same embryonic anlagen. It was established that two chains of enzymes are sequentially expressed during development: (1) Alkaline phosphatase → esterase → octanol dehydrogenase → xanthine dehydrogenase. (2) Malic acid → aldehyde oxidase. It is possible that there is a correlation between the sequence of phenotypic expression of some enzymes and the sequence of distribution of genes coded for the corresponding enzymes (Korochkin 1978).

The histochemical pattern in the developing embryos and larvae of the stock with the inversion In(3LR)D/Sb has in general some similarity to the same in Canton-S but there are also some differences in the periods of the first histochemical detection of enzymes in the different tissues.

References: Burstone, M. 1962, Enzyme histochemistry and its application in the study of neoplasms, Academic Press, New York-London; Delcour, J. 1969, DIS 44:133; Dickinson, W. 1970, Genetics 66:487; Korochkin, L. 1978, 13 Internat. Embryol. Conf. Berlin, p. 26; Pearse, A. 1960, Histochemistry J. and Churchill Ltd., London.

Kaurov, B.A. Institute of Medical Genetics, AMS USSR, Moscow, USSR. To the definition of the notion "field of gene activity".

Studying the features of manifestation of mutations that changed the number of bristles on the body of *Drosophila*, Rokizky (1929) established that in any given mutation the reduction or addition of bristles extended over a definite region of the body. This region of visible gene effect was defined "field of gene activity" (Rokizky 1929). In this work special attention was given to the topographic features of gene manifestation, not to explanations concerning the reasons for gene behavior. This question was not well studied and its discussion confined to phenotypic gene manifestation. However, lately the data on the interaction of genes have been obtained which permit the attachment of new importance to this notion.

Studying the interaction of homoeotic mutations *Ns* and *ss^a* (transforms antennae to legs of mesothoracic type) with mutation *sn* (twists bristles), as well as homoeotic mutation *pb* (transforms oral lobes of proboscis to legs of prothoracic type) with "antenna" mutations