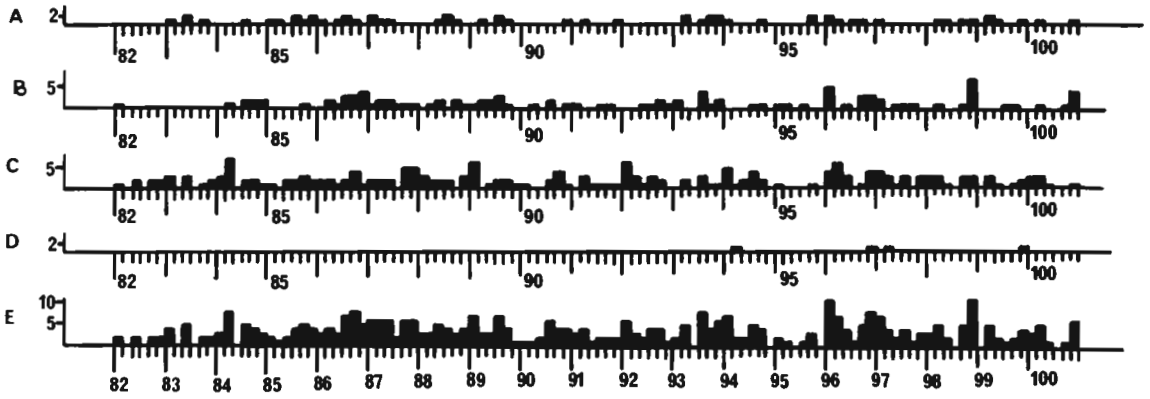

Fig. 5. A=inversions induced, B=inversions spontaneous, C=translocations induced, D=translocations spontaneous, E=sum of A-D plus deficiencies, duplications and transpositions, indicated in Table 1.

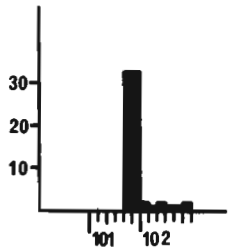

Fig. 6. Sum of all breaks.

Nikoshkov, A.B. and V.T. Kakpakov. Institute of General Genetics, Moscow, USSR.

Dosage compensation of sex-linked genes in established cell lines of D. melanogaster.

Established cultures of Drosophila cells which are homogeneous from caryological point of view and have different ratio between sex chromosomes and autosomes represent an advantageous model for the study of dosage compensation.

We measured the activity of two enzymes, 6-phosphogluconate dehydrogenase (Luccheci and Rawls, Jr. 1973) and fumarase (Pipkin et al. 1977), determined by sex-linked structural genes Pgd (1-0.64) and Fuh (1-19.9) and α-glycerophosphate dehydrogenase (Luccheci and Rawls, Jr. 1973), determined by autosomal structural gene α-Gpdh (2-20.5) in cell cultures with different ratio between sex chromosomes and autosomes (see Table 1).

Table 1. Ratio of fumarase and α-glycerophosphate dehydrogenase activity in cell lines of D. melanogaster.

Cell lines		Passage	Caryotype	X:A	Fumarase activity -glycerophosphate dehydrogenase activity
KcH	(3)	80-100	1X:2A	0.5	0.163 ± 0.008
KcI	(3)	1-10	2X:2A	1.0	0.175 ± 0.011
67jDBS	(4)	180-200	2X:2A	1.0	0.151 ± 0.002
67j25D	(4)	600-620	2X:2A	1.0	0.172 ± 0.006

Identification of the isozymes of all three enzymes was carried out by means of polyacril amide gel electrophoresis. All cultures showed heterozygosity in three enzymes except Kc cell line cells. We could find only two bands of fumarase in heterozygotes.

The ratio of fumarase and α-glycerophosphate activity remains approximate-

ly constant in all cell cultures (see Table 1). It means that the cells with one X chromosome have fumarase activity per X chromosome two times higher than the cells with 2X chromosomes. The change of ratio between X chromosomes and autosomes from 1 to 0.5 causes the "switching" of gene activity from the low level to the high which means the existance of dosage compensation on the cell level (see Table 1).

The same data obtained for 6PGD varied greatly from passage to passage and from experiment to experiment. For instance, in 67j25 cell lines and KcH the ratio between 6PGD and α-GPDH activities was fluctuating from 1.8 to 4 and from 2 to 6.4, respectively.

Detection of dosage compensation on cell level will make it possible to make further investigation of this phenomenon.

References: Echalier, G. and A. Ohanessian 1970, In vitro 6(3):162-172; Kakpakov, V.T., V.A. Gvozdev, T.P. Platova and L.G. Polukarova 1969, Genetika 5:67-75; Luccheci, J.C. and Rawls, Jr. 1973, Bioch. genet. 9:41-51; Pipkin, S.B., P.K. Chakrabartty and T.A. Bremner 1977, J. Hered. 68:245-252.

Osipova, N., L. Korochkin, M. Golubovsky, T. Khlebodarova and V. Kulutchkov. Institute of Cytology and Genetics, Novosibirsk, USSR. Biochemical-genetical investigation of the unstable locus lozenge in D. melanogaster.

The following stocks of D. melanogaster have been investigated: Oregon R - wild type. Lozenge 50 (stable allele) - eye narrower than wild type and ovoid, facets are absent; females are fertile. Lozenge A (unstable allele) - males are characterized by oval small eyes; facets are absent, tarsal claws reduced; females are sterile. Stock A+1 (stable allele A^+) - reverse of unstable lzA to wild type (A^+); phenotype of males is identical to the wild type. Stock B+5 (stable allele A^+) - revertant of unstable lzA to the wild type; males are phenotypically identical to stocks Oregon R and A+1. In all stocks (except Oregon R and lz50) males cross to females $\widehat{XX}$ (linked X chromosomes) with markers w of ywf. The development of flies was synchronized beginning with the stage of white pupa (the formation of puparium). The pupae have been investigated in different times after pupariation. We detected the activity of phenol oxidase (Mitchell 1966) and pattern of isozymes of this enzyme, using the microelectrophoretic method (Korochkin et al. 1977).

Table 1. Changes of the activity of phenol oxidase during the development of pupae of D. melanogaster.

Age of pupae (hours)	Total activity of phenol oxidase (units of act./mg/min)				
	Oregon R	lozenge A	A+1	lz50	B+5
0	43.5±0.5	18.0±1.0	29.5±0.5	34.0±1.0	32.5±1.0
24	17.5±1.1	22.5±1.2	21.0±0.5	16.8±1.0	21.5±1.5
48	23.0±0.5	30.0±1.0	24.5±1.25	17.8±1.0	15.1±1.0
72	26.0±1.0	28.0±1.0	23.5±1.0	23.0±1.0	28.1±1.8
96	17.5±1.0	12.5±0.7	11.5±0.5	17.0±0.2	10.0±0.5

Table 2. Ratio A_2/A_1 fractions of phenol oxidase during the development of pupae of D. melanogaster.

Age of pupae (hours)	Ratio A_2/A_1				
	Oregon R	lozenge A	A+1	lz50	B+5
0	0.76±0.07	---	0.71±0.07	0.50±0.05	0.65±0.12
24	1.20±0.04	3.70±0.40	0.78±0.08	1.54±0.02	1.02±0.11
48	0.98±0.10	1.43±0.14	1.28±0.19	1.67±0.30	0.87±0.05
72	0.44±0.14	0.07±0.06	0.83±0.21	2.25±0.30	1.05±0.24
96	2.02±0.31	---	0.61±0.05	1.05±0.24	0.65±0.05

The results of the detection of enzymatic activity are depicted in Table 1. The similarity of changes of enzymatic activity in stocks Oregon R and lz50 can be seen.

The unstable stock lzA is characterized by the low level of enzymatic activity on the stage of white pupae and in 96 h after pupariation and by the high level of the activity of phenol oxidase during the middle pupal period.

It is interesting that the pattern of enzymatic activity during the development of two reversible stocks is different on the stage 48 h after pupariation. In this period the enzymatic activity is higher in stock A+1 in comparison with stock B+5 (see Table 1).