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The effect of juvenile hormone analogs on mutation frequency in D. melanogaster.

Table 1. The effect of JHA (Entacon) on frequency of dominant lethal mutations.

Line	Variant	n	% mutations
LA	control	7095	1.3 ± 0.13
Canton-S	"	4267	1.0 ± 0.15
LA	treatment	974	3.4 ± 0.58
Canton-S	"	1797	4.4 ± 0.48

Table 2. The effect of JHA (Altozid) on frequency of recessive viability mutations.

Line	Variant	Chromosome	n	% Semilethals	% Lethals
LA	control	X	784	0.8 ± 0.32	0.6 ± 0.35
"	treatment	X	635	1.6 ± 0.50	0.3 ± 0.22
"	control	2	1123	12.0 ± 0.97	2.8 ± 0.49
"	treatment	2	854	21.3 ± 1.40	4.6 ± 0.72
Canton-S	control	2	988	0.2 ± 0.14	0.5 ± 0.22
"	treatment	2	934	3.5 ± 0.60	4.8 ± 0.70

The physiological hypothesis of the mutation process (Lobashev 1947) suggests that the endocrine system is able to control mutagenesis. The aim of this work was to study the effects of juvenile hormone analogs (JHA) on mutation frequency in D. melanogaster. Two strains were studied: Canton-S (wild strain) and LA. The latter line was selected for the low male mating activity and characterized by a high rate of spontaneous mutations and hypofunction of the gland corpus allatum (Sapunov and Kaidanov 1977; Kaidanov 1978; Kaidanov et al. 1978).

The analogs used were Altozid and Entacon (Zoecon Corporation). Dominant lethal mutations, effective at the end of embryogenesis, were detected by microscope as eggs which stopped development at the last stages of embryogenesis. Recessive viability mutations were checked by the method of Muller-5 (X-chromosome) and Cy/Pm (chromosome 2).

Analogs were applied in concentrations of 10% (Altozid, water solution) and 20% (Entacon, oil solution). 0.07 μ-liter was applied to pupae at age 135 hours. The data (shown in Tables 1 and 2) suggest that the LA strain has a high rate of mutability in chromosome 2. JHA has no effect on the mutation frequency in the X-chromosome of strain LA, but increased the mutability in chromosome 2 of both lines. Entacon could induce dominant mutations in both strains.

The data suggest that hormones are able to induce some types of mutations. Perhaps the endocrine system is the natural regulator of mutability in living organisms as well.

References: Kaidanov, L.Z. 1978, XIV Internat. Cong. Gen., Symposia 91-92; Kaidanov, L. Z., I.R. Pole and V.B. Sapunov 1978, XIV Internat. Cong. Gen., Contrib. Paper Sessions I:553; Lobashev, M.E. 1947, Vest. Leningrad Univ. 8:10-29; Sapunov, V.B. and L.Z. Kaidanov 1977, Vest. Leningrad Univ. 15:135-142 (Russ.)

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The effect of juvenile hormone analogs on reproductive behavior of D. melanogaster.

In some insect species the corpus allatum has been shown to affect mating behavior, while in others this gland is less important (Engelmann 1970). To test the effect of juvenile hormone (JH), the secretion of the corpus allatum, on mating behavior in D. melanogaster, we have compared the wild strain Canton-S to the LA strain, which has been selected for 10 years for low male mating activity (Kaidanov 1978). In the LA line the corpus allatum contains very small cells, suggesting that corpus allatum function might also be altered (Sapunov and Kaidanov 1977). A third stock was obtained in which the proximal part of the X-chromosome is derived from the LA, but the rest of the genome is from wild strain. This strain, L,y ct, is characterized by males with mating activity lower than of the parent LA stock.

The index of mating activity was the percent of animals engaging in copulation during 0.5 hours after contact with 3-4 virgin flies of the opposite sex. The JH analogs (JHA) Altozid and Entacon (Zoecon Corporation) were topically applied in doses of 0.07 microliter. Altozid was dissolved in water, Entacon in oil. Concentrations are given in the tables. Treatment was performed in white prepupae (Stage I), middle pupae (130-140 hours after hatching of the larvae, Stage II), and some hours (3-5) before hatching of the larvae (Stage III).