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The mutagenic effect of Nitosoguanidine in Drosophila.

Adult feeding (for 24 hours) of starved one day old males with a freshly prepared solution containing 5% glucose and Nitrosoguanidine, is found to produce a significant increase in sex-linked recessive lethal mutations on Drosophila spermatozoa (sampled by mating treated males individually to two virgin Muller-5 females for 3 days).

An increase in the concentration of Nitrosoguanidine from 0.05% to 0.1% double the yield of complete sex-linked recessive lethals (Table 1). An indication of delay in the mutagenic effect of Nitrosoguanidine is seen in table 1, where 7.7% of the tested non-lethal F_2 cultures show F-1 lethal-mosaicism after 0.1% of Nitrosoguanidine treatment, compared with 3.6% from the control; the corresponding F-3 lethal frequencies are 5.8% for Nitrosoguanidine and 0.36% for the control.

Table 1: Complete and mosaic sex-linked recessive lethal mutation frequencies in Drosophila males after adult feeding treatment with Nitrosoguanidine.

	Concentration (%)	Control	0.05	0.1
	Duration of treatment (hrs.)	24	24	24
	Survival (%)	100	100	97
	Number of males examined	56	50	70
F-2	Average no. chromosomes examined/male	9	8	7
	Number of chromosomes examined.	510	400	490
	Number of lethal chromosomes	1	14 (from 11 ♂♂)	35 (from 27 ♂♂)
	Complete lethals (%)	0.2	3.5	7.1
	No. non-lethal F-2 cultures examined.	55 (arising from 55♂♂)		65 (arising from 65 ♂♂)
	Average no. female examined/ non-lethal F-2 cultures	10		9
F-3	No. non-lethal F-2 cultures yielding at least one lethal in F-3 set	2		5
	Cultures showing mosaicism (%)	3.6		7.7
	Total no. F-2 females examined	547		610
	No. of lethal bearing F-2 females.	2		35
	Lethals in F-3 (%)	0.36		5.8

This work was done at the Dept. of Genetics, University of Cambridge.

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Phenogenetic studies on control of drosopterin synthesis.

A wild type-like phenocopy of rosy or maroon-like genotype can be caused by phenylalanine, the mechanism is still unknown. Furthermore, rosy-like phenocopies of wild-type genotype could be obtained by feeding the xanthine dehydrogenase inhibitor 4-hydroxypyrazolo(3,4-d)pyrimidine to larvae or by exposing late pupal stages to this inhibitor in the "free pupae incubation" procedure (latter method described for the phenylalanine studies, Schwinck, I., Zeitschr. f. Naturforschung 20b, p. 322-326, 1965). The combination of feeding and incubation experiments and incubation with mixed solutions of various concentrations revealed an antagonism of the phenylalanine stimulation and XDH inhibitor as well as an antagonism of phenylalanine and hypoxanthine; the effect on drosopterin synthesis was determined in single head extractions spectrophotometrically.

A model discussing the indirect control of drosopterin synthesis by accumulated xanthine dehydrogenase substrates is proposed as unifying explanation for the pleiotropic pattern of the rosy and maroon-like mutants and their previously described plasticity in phenotypic expression, as revealed in the transplantation and phenocopy studies (Schwinck, I., Zoolog. Anz. 30th Suppl.Bd., p. 382-390, 1966).

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