Woodruff, R.C. University of Texas, Austin, Texas. A new sex-linked mutator gene in Drosophila melanogaster.

A new sex-linked mutator gene (Mu-f^{3n}) has been identified in Drosophila melanogaster. This gene significantly increases the frequency of reversion of the mutationally unstable mutant forked-3n (f^{3n}, 1-56.7) in females. The spontaneous reversion frequency of f^{3n} in females in the presence of Mu-f^{3n} is 8.7×10^{-5} (13 revertants/149,074 f^{3n} loci scored), whereas, the frequency is 2.0×10^{-5} (2/100,499) in the absence of Mu-f^{3n}. Furthermore, the reduction in f^{3n} reversion frequency in the absence of Mu-f^{3n} in females (2.0×10^{-5}) is similar to the f^{3n} reversion frequency in males which contain the gene (2/101,303=2.0×10^{-5}) (Woodruff, Bowman and Simmons, 1972). This suggests that Mu-f^{3n} does not affect f^{3n} reversion events in males. Green (1970) has reported a third chromosome mutator gene in Drosophila melanogaster which also functions only in females.

Other genetic properties of Mu-f^{3n} are as follows: (1) It is a dominant mutant. (2) It is located on the X chromosome between f^{3n} and Beadex-2 (Bx^2, 1-59.4). (3) Since Mu-f^{3n} does not increase the spontaneous sex-linked-lethal frequency, it does not seem to be a general mutator. (The influence of Mu-f^{3n} on the reversion frequencies of other mutants is currently being tested). (4) Preliminary data indicate that Mu-f^{3n} reduces recombination on the proximal half of the X chromosome. The negative influence of Mu-f^{3n} on recombination is shown in the accompanying table. The relationship between the influence of Mu-f^{3n} on recombination and mutation is unknown.

Influence of the mutator gene, Mu-f^{3n}, on X-chromosome recombination

Region	Expected recombination frequency[a]	Observed recombination frequency	
		Mu-f^{3n} present	Mu-f^{3n} absent
un-f^{36a}	2.3%	-----	48/2,068 = 2.32%
un-f^{3n}	2.3%	28/2,183 = 1.28%**	-----
f^{36a}-B	0.3%	-----	6/3,052 = 0.20%
f^{3n}-B	0.3%	4/7,240 = 0.06%**@	5/2,036 = 0.25%@
f^{36a}-Bx^2	2.7%	-----	58/2,068 = 2.81%
f^{3n}-Bx^2	2.7%	6/1,235 = 0.49%**	-----
v-m	3.1%	65/3,206 = 2.03%**#	100/3,010 = 3.32%#

a Lindsley and Grell, 1968
** Significantly different from the expected frequency at the 1% level.
@ Frequencies are significantly different at the 5% level.
# Frequencies are significantly different at the 1% level.

References: Green, M.M. 1970, Mutation Res. 10:353-363; Woodruff, R.C., J.T. Bowman and J.R. Simmons 1972, Mutation Res. 15:86-89.

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Tartof, K.D. Institute for Cancer Research, Philadelphia, Pennsylvania. A novel virginator stock.

I have constructed a temperature sensitive stock that will yield only female larvae, pupae or adults in large quantity, that permits the recovery of homozygous recessive markers for any chromosome and that does not involve the use of balancer chromosomes. This has been achieved by utilizing the second chromosome dominant lethal heat temperature sensitive mutant DTS-L7 discovered by Suzuki and Procunier (Proc. Nat. Acad. Sci. U.S. 62:369, 1969) which, by recombination, has then been placed onto a translocation involving the Y and second chromosomes, T(Y;2)C. Thus, the DTS-L7 mutation is maintained only in the male and since there is essentially no crossing over here, the need for balancers is obviated. In addition, recessive markers for the X chromosome or autosomes can be recovered in a homozygous condition in females at the non-permissive temperature (29°C; permissive temperature is 25°C or less). Since DTS-L7 exerts its lethal effect in the egg stage, exclusively female larvae, pupae or adults (necessarily virgin) can be obtained. DTS-L7 was kindly supplied by David Suzuki. Supported by grants from the NSF (GB-32487) and NIH (GM-19194).