Fedoroff, N. V. and R. D. Milkman. Syracuse University. Induction of puffs in Drosophila salivary chromosomes by amino acids.

In view of the role of small molecules in enzyme induction and the relationship of gene activation to enzyme induction and to puffing, we have been investigating the effects of amino acids on puffing in D. melanogaster salivary chromosomes. Glands are excised from third-instar larvae grown at 18° and incubated separately in Ringer's solution containing the test substance and in plain Ringer's solution. After a given interval, puffing patterns are compared. The production of a puff with 0.03M tryptophan at site 68D on III-L has been reported (Biol. Bull. 127, in press). Puffing at 68D is never observed in controls. It was also reported that methionine and tyrosine appear to have no effects. A study of the comparative effects of d- and l-tryptophan also showed differences. However, although one might expect that a puff would appear either regularly or not at all, d-tryptophan causes smaller and less frequent puffs (20% vs. 85% of nuclei observed) than l-tryptophan. In the case of both methionine and tryptophan there appears to be an increase in the frequency and extent of puffing at site 50F on II-R; this puff, however, shows relatively high variability, and some uncontrolled factor may be involved. In similar experiments, l-histidine produced no significant changes in the puffing pattern. The results are summarized in table below.

Amino acid added	Concentration (moles/liter)	Hours in Ringer's	Results
l-histidine	0.05	1	No significant change
"	0.10	1	"
l-methionine	0.06	1	50F ?
"	0.20	1	50F ?
l-tryptophan	0.03	1/2	No change
"	0.03	1	Puff at 68D (50F ?)
d-tryptophan	0.03	1	Small puff observed at 68D occasionally
l-tyrosine	0.0022	1	No significant change

These results are differential results: immersion in Ringer's solution for the durations noted produced a variety of changes in the puffing pattern. Only those ascribable to the amino acids are reported. Absence of visible puffing does not, of course, imply the absence of local changes in rates of RNA synthesis. The present survey continues in an attempt to learn more about the turning on and off of genes. (Work supported by NSF Grant G-24023 and NSF Undergraduate Research Participation Project).

Slizynski, B. M. Institute of Animal Genetics, G. B. Differential X-ray sensitivity of spermatogonia in Drosophila melanogaster.

Slizynska found that in regard to the effects of irradiation there was a profound heterogeneity between males as well as between the germ cells of individual males in brood. Heterogeneity between the males would arise if at the time of treatment some males have more spermatogonial mitoses than the others. Heterogeneity between the germ cells of individual males can be reduced to the fact that in the testis some spermatogonial cells are in a susceptible stage (metaphase) while the majority of cells are in a resistant stage. The question was studied cytologically and the following results were obtained.

Among 129 2-3 days old males of y w stock there were 25 males in which there were no mitotic divisions in the testes, 23 males had mitoses in the apex cells and 81 males had spermatogonial mitotic divisions in the cysts. Among the males of this last category there were 51 with 4 or less dividing spermatogonial cells, 14 males with 5-7 divisions per testis, and 16 males with 8-16 divisions of spermatogonial cells per testis. Thus the highest sensitivity to treatment in brood is expected to occur in about 12% of males. This figure will be doubled if two last classes of frequency of mitoses are taken as resulting in high sensitivity.