Nöthel, H. Freien Universität Berlin, Berlin-Dahlem, Germany. An estimation of the number of active oogonia per ovariole in D. melanogaster females.

In spite of the fact that there is a lot of dividing cells in each germarium, the amount of active oogonia is quite unknown. It seems to be rather difficult to distinguish between oogonia and follicular cells by means of histological methods. Hence, some indirect attachments have been made by using external influences on oogonia.

Since the development from oogonia to mature eggs lasts up to 10 days, the effects induced by such influences are seen in eggs laid 10 days after exposition and later. After X-irradiation the number of eggs laid at that time is decreased according to dose. This decrease is probably caused mainly by induced chromosomal aberrations in the oogonia and/or by affecting its DNA systhesis (Nöthel, unpublished). The radiation-induced reduction of egg laying, relative to unirradiated controls, therefore, is equal to the frequency of oogonia destructed. Without oogonial divisions an ovariole will become empty when the more mature stages have completed development. It diminishes and may be absorbed. The extent to which the ovariole number is decreased by a given reduction in the frequency of oogonia depends on the number of active oogonia per ovariole and is a matter of probability. Given in frequency numbers relative to the unirradiated controls (control values set 1) the equation assumed is: reduction in ovariole number = number of oogonia destructed potentiated with the number of oogonia/ovariole. Since in unirradiated controls as well as after X-irradiation with different doses the ovariole number is simply found by preparation, the destruction of oogonia by means of egg laying, the equation can be solved to find the number of oogonia/ovariole.

Eggs were counted 24 hours prior to preparation which was performed between the 10th and 16th day after onset of the experiment. Experimental conditions are to be published in detail elsewhere. The results are summarized in the table below.

	number of w^e-♀♀ tested	mean number of eggs/♀/day	mean number of ovarioles/♀	
unirradiated controls	99	41.7	38.3	
X-ray dose in kR		frequency of induced reduction, relative to controls	mean reduction, relative to controls	number of oogonia per ovariole (x) calculated from
		(a) eggs/♀/day	(b) ovarioles/♀	x = log b : log a
4	97	0.089	0.099	0.96
5	106	0.153	0.164	0.96
6	96	0.590	0.433	1.59
8	90	0.887	0.817	1.69

As a result based on the assumptions made above it has to be stated that there are 1 to 2 active oogonia per ovariole. The differences between the 4 values calculated have proved statistically significant since the egg to ovariole number relations in the F-test have shown a high degree of inhomogeneity between dose classes. Therefore these differences are to be explained by methological reasons. Moreover, they seem to be systematically in the way that with increasing doses and decreasing egg numbers the oogonia/ovariole number tends to increase from 1 to 2. This may be caused by some oversimplifications in the assumptions made above. Firstly, the experiments point to a decrease in the speed of egg deposition when the support of immature stages is lowered. Secondly, the duration of egg development may be enhanced by irradiation. Finally, at 6 or 8 kR damage in follicular cells may contribute to the reduction of egg development. Since egg number is measured per female per day as well in the controls as in the irradiated groups, all 3 factors mentioned can increase the postirradiation reduction in egg number relative to controls and will, therefore, increase the number of oogonia calculated. Hence, the number of 1-2 oogonia/ovariole resulting from these experiments may be reduced to only 1 by interpretation.