Hydantoin	1.25	0.75	+
1-Methylhydantoin	2.00	1.00	+
Allantoin	?	2.00	-
Uric Acid	?	2.00	-
N-methylformamide	0.50	0.35	+
N,N'dimethylacetamide	0.25	highly toxic	?

Sobels, F. H. State University, Leiden, Netherlands. Oxygen dependent differences in radiosensitivity between fully mature and almost mature spermatozoa.

Experiments by Lefevre and Jonsson (1964, Mut. Res. 1:231-246) showed that after X-irradiation of 3-day-old Drosophila males the mutation frequency decreases from the first to the third mating. Similar differences in radiosensitivity, though slightly less pronounced, were observed between sperm obtained from the first mating of 7-day-old males and that from 1.5-hour-old males. A number of experiments with X-irradiation in O_2, air or N_2 were carried out to investigate whether these differences in radiosensitivity between fully mature, motile spermatozoa and the immotile, late spermatids (in Lefevre's terminology) are associated with differences in oxygenation. The most radiosensitive kind of sperm was sampled by using the first ejaculate from 7-day-old males. Sperm with lowest sensitivity was obtained from the first ejaculate of 1-hour-old males. After radiation exposures in O_2 and N_2, post-treatments with N_2 or O_2 were given, after irradiation in air with N_2 or air.

The pooled results from a number of replica experiments (see table) show that only after irradiation in air considerably higher mutation frequencies were obtained for sperm from 7-day-old males than for that from 1-hour-old males; X^2 of the difference is 9.41, with $P < 0.003$. After radiation in O_2, the radiosensitivity in sperm of 7-day-old males was not significantly higher than in that from 1-hour-old males, and a similar result was obtained after irradiation in N_2.

The frequencies of recessive lethals (in the $X^{C2}y$ B chromosome), obtained from the first ejaculates of 1-hour and 7-day-old males which had been exposed to X-irradiation in O_2, air or N_2.

		1-hour-old ♂♂		7-day-old ♂♂	
Radiation Exposure	Post Treatment	No. chromosomes tested	% lethals	No. chromosomes tested	% lethals
2000 R in O_2	N_2	1675	8.6	1162	9.0
	O_2	1024	8.4	1555	9.5
3000 R in Air	N_2	695	9.4	587	12.9
	Air	626	8.5	430	12.8
4000 R in N_2	N_2	1277	7.8	1639	7.4
	O_2	790	9.0	1828	8.4

The oxygen enhancement ratio under comparable conditions of post-treatment, and this radiosensitivity in the presence of oxygen, is only slightly higher for sperm in 7-day-old males than for that in 1-hour-old males. The pronounced differences in sensitivity after radiation in air therefore clearly originate from a greater availability of oxygen for sperm in the old than for that in the young males, and a priori it is not unlikely that similar causes underly the differences in sensitivity of successive ejaculates derived from 3-day-old males.

The present results confirm an earlier conclusion by Oster (1961, J. Cell. Comp. Physiol. 58, suppl. 1:203-207), based on observations for first and second day sperm.

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