Dolfini, S., A. Gottardi and G. Rezzonico Raimondi. University of Milan, Italy.

First results on changes of chromosome number in cells of D. malenogaster cultured in vitro.

In order to explain the changes of chromosome number that occur in vitro, embryonic cells of the Varese wild strain of D. melanogaster, which could be a favorable material for these investigations, have been cultured, according to the technique described by Horikawa and Fox (1964) (fig. 1).

Chromosome countings on squashed cells after 12, 18, 21, 24, 48, 72, 96, 120 and 168 hours of culture, have shown that at the first analysis (12 hours) some heteroploid cells are already present. The frequency of abnormal mitoses increases during the subsequent hours of culture (Table 1).

Table 1. Percentage of metaphases showing various chromosome numbers after in vitro culture of Drosophila melanogaster embryonic cells.

Hours of Culture	Number of chromosomes													No. metaphases analyzed
	4	5	6	7	8	9	10	11	12	13	14	15	16	
12	-	-	-	3.	88.1	5.2	3.0	0.7	-	-	-	-	-	135
18	1.6	-	1.6	6.3	71.9	7.8	4.7	-	-	1.6	-	4.7	-	64
21	-	-	1.7	10.3	79.3	1.7	3.4	-	-	1.7	-	-	1.7	58
24	-	1.4	2.7	8.1	70.3	10.8	4.1	1.4	1.4	-	-	-	-	74
48	-	1.6	1.6	8.2	70.5	6.6	3.3	6.6	1.6	-	-	-	-	61
72	-	12.3	4.6	29.2	24.6	15.4	7.7	-	-	3.1	3.1	-	-	65
96	-	5.0	11.7	26.7	20.0	15.0	6.7	5.0	6.7	-	-	1.7	1.7	60
120	-	10.0	3.3	38.3	20.0	20.0	-	-	1.7	3.3	3.3	-	-	60
168	2.0	4.0	16.0	24.0	22.0	20.0	4.0	2.0	4.0	-	2.0	-	-	50

Two periods of striking increase in heteroploidy have been noted, the first between 12 and 18 hours and the second between 48 and 72 hours. Tetraploid cells were virtually absent during the first hours of culture.

The first and fourth pairs of chromosomes are most frequently involved (86.4%) in these chromosomal variations (fig. 2). The data, we have found, seem to indicate that heteroploidy results from non-disjunctions and/or other mitotic errors and not from a primary polyploidization followed by chromosomal losses.

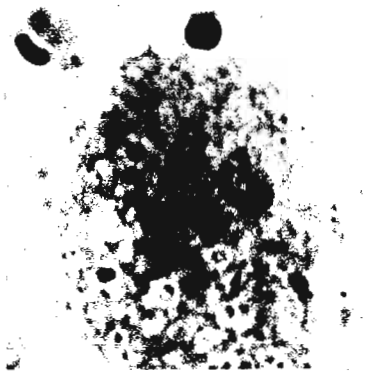

Fig. 1

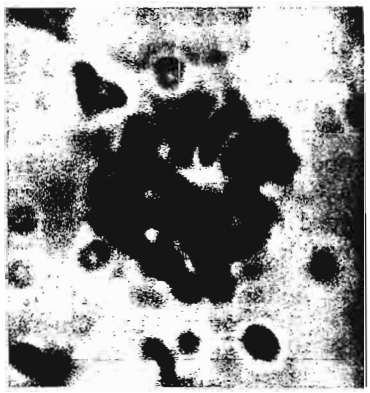

Fig. 2

Fig. 1: Normal metaphase after 24 hours of culture.
Fig. 2: Abnormal metaphase showing five elements of the first pair (48 hours of culture).