

SEX RATIO IN CBA × C57BL HYBRID MICE

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UDC 575.18:575.222.5

The sex ratio and postimplantation mortality were compared for CBA and C57BL mice and (CBA×C57BL) F_1 hybrids. Female embryos were found to be more numerous in the progeny of the hybrids. The sex ratio of CBA and C57BL embryos is 1:1. Disturbance of the balanced sex ratio in the progeny of the hybrid mice confirms the conclusion that the genetic characteristics of these mice affect the sex distribution of the embryos. The equal sex ratio in CBA and C57BL mice points to the absence of selective mortality among embryos of either sex during embryogenesis.

KEY WORDS: sex ratio; embryonic mortality; hybrid mice.

Among the numerous investigations into the action of various factors on the sex ratio of embryos, an important place is occupied by studies of the effect of the genetic characteristics of mammals, especially mice, on the sex ratio of the progeny. For instance, it has been shown that the genetic features of mice of inbred lines do not affect the sex ratio of the embryos [5, 6, 10]. The sex ratio in the progeny of hybrid mice has received less study and the results are contradictory.

The object of the present investigation was to study the sex ratio in the progeny of hybrid mice.

EXPERIMENTAL METHOD

(CBA × C57BL) F_1 hybrid mice and mice of lines CBA and C57BL, from the "Rappolovo" Nursery, were used. Female CBA and C57BL mice were crossed with males of the same line. Female hybrid mice were crossed with hybrid males. The day of discovery of a vaginal plug was taken as the first day of pregnancy. The mothers were killed on the 18th day of pregnancy. The embryos were removed from the uterine cavity and their gonads were examined with the MBS-1 microscope after laparotomy.

Altogether 242 pregnant mice (98 hybrids, 94 CBA mice, and 50 C57BL mice) were used. The sex of 1618 embryos (690 hybrids, 611 CBA, and 317 C57BL) was determined.

EXPERIMENTAL RESULTS

Investigation of the postimplantation embryonic mortality of hybrid and pure-line mice showed that it was about the same for the CBA and C57BL mice (9.3 and 10.4% respectively), but much lower for the hybrid mice, only 5.5% (Table 1).

The sex ratio in the progeny of the mice was determined as the ratio between the number of males and the number of females. The sex ratio of CBA and C57BL mice was 1:1 (Table 2).

TABLE 1. Postimplantation Mortality of 18-day Mouse Embryos

Mice	Number of implanted embryos	Number of implanted embryos	Number of embryos dying after implantation	
			absolute	% ($M \pm m$)
CBA × C57BL hybrids	98	730	40	5.5 ± 0.8
CBA	94	674	63	9.3 ± 1.11
C57BL	50	354	37	10.45 ± 2.63

TABLE 2. Sex Ratio of 18-day Mouse Embryos

Mice	Number of embryos	Sex ratio	χ	P
CBA × C57 BL hybrids	312:378	82.5:100	6.3	0.01
CBA	300:311	96.4:100	0.19	0.5
C57B	159:158	100.6:100	0.002	0.95

Department of Embryology, Institute of Experimental Medicine, Academy of Medical Sciences of the USSR, Leningrad. (Presented by Academician of the Academy of Medical Sciences of the USSR P. N. Veselkin.). Translated from *Byulleten' Éksperimental'noi Biologii i Meditsiny*, Vol. 88, No. 10, pp. 473-474, October, 1979. Original article submitted January 9, 1979.

This ratio between the numbers of male and female embryos in the mice of these lines is further proof that the genetic features of mice of inbred lines do not significantly affect the sex ratio in the progeny.

The view is held in the literature that selective mortality among embryos of one sex takes place during embryogenesis [8, 9]. Studies on human and pure-line mouse embryos have demonstrated the absence of correlation between spontaneous embryonic death and the sex of the embryo [1, 2, 4, 5, 7, 11, 12].

Analysis of the postimplantation embryonic mortality and sex ratio in the progeny of CBA and C57BL mice confirms the conclusion that spontaneous death of the embryos does not affect the sex ratio for inbred lines of mice.

As Table 2 shows, female embryos were significantly more frequent in the progeny of the hybrid mice. In hybrid mice some workers have found an equal sex distribution of the embryos [3], whereas others describe variations in the sex ratio in different directions, which are probably attributable to the more marked genetic differences in hybrid mice than in mice of inbred lines [6].

The predominance of female embryos in the progeny of hybrid mice revealed by this investigation supports the view of those workers who consider that genetic features of hybrid mice affect the sex distribution of the embryos.

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