



Title	ANALYSES OF MALE HYBRID STERILITY CAUSED BY THE Hst-1 GENE IN MICE
Author(s)	KAKU, Yoshihiro
Citation	Japanese Journal of Veterinary Research, 43(1), 66-66
Issue Date	1995-06-15
Doc URL	<a href="http://hdl.handle.net/2115/2509">http://hdl.handle.net/2115/2509</a>
Type	bulletin (article)
File Information	KJ00002398172.pdf



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ANALYSES OF MALE HYBRID STERILITY CAUSED  
BY THE *Hst-1* GENE IN MICE

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Sterility of interspecific hybrids, like the mule, is a well-known general phenomenon. In some mice, only male interspecific hybrids or intersubspecific hybrids between laboratory mice and wild mice become sterile. The hybrid sterility genes are called *Hst*, and a total of six genes, *Hst-1* to *Hst-6*, have been found to date. The study of *Hst-3*, which controls the sterility of interspecific hybrids between laboratory mice and *Mus spretus* (Spanish wild mouse), have progressed well compared to those of other *Hst* genes. On the other hand, few studies of *Hst-1*, which controls the sterility of intersubspecific hybrids between laboratory mice and *M. m musuculus* (Danish wild mouse), have been reported, and most of the mechanisms of the sterility remain unknown. In this study, first, the spermatogenesis of F1 hybrids as well as that of the parental C57BL/6 mouse was examined by observing cross sections of testes and specimens of their chromosomes. These analysis suggested that the spermatogenesis of F1 hybrids progressed in a relatively normal manner up to the meiotic early prophase, but was disrupted in two stages; 1) the pachytene phase and 2) the maturing stage of sperm. Therefore, no complete spermatozoa of F1 hybrids were observed. A differential mechanism was demonstrated in the spermatogenesis retardation of *Hst-1* and *Hst-3*.

Second, as the sterile mice had different testis weights and cross sections from the fertile mice, the frequency of fertility and sterility was examined in backcross mice of the following cross, (C57BL/6 female × NJL male) F1 female × C57BL/6 male. NJL is a strain of *M. m. musuculus*, and C57BL/6 is a strain of laboratory mouse. The ratio of fertile mice to sterile mice was 3:1. Therefore it was suggested that two genes controlled this sterility of intersubspecific hybrids. The *Hst-1* gene has already been mapped on chromosome 17, but the chromosome mapping of the other gene was not determined. The latter new gene was designated *Hst-7*. I attempted to map the *Hst-7* gene using the previous backcross progeny after determination of whether the *Hst-1* gene was derived from C57BL/6 or NJL. The *Hst-1* gene was mapped at position 8.0 on chromosome 17 calculated from analyses using three DNA markers on chromosome 17.

The study of intersubspecific hybrid sterility using mice should throw light not only on the sterility of the mice but also on that of humans and domestic animals.