

**EXAMINATION OF HYBRID MOUSE MEIOTIC METAPHASE SPREADS WITH
MLH3 AND MUS81 RESOLVASE ACTIVITY**

AN HONORS THESIS (HONORS 499)

BY

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ABSTRACT

Mouse meiosis is used as a model for how DNA double strand breaks (DSBs) that have been stabilized into double Holliday Junctions (dHJs) can be resolved. In purebred mouse lines, information on recombination frequencies in the presence or absence of DNA dHJ resolvases has already been published, but questions lingered about the dHJ resolvase protein activity in hybrid mice. The tested hypothesis was that the presence or absence of DNA dHJ resolvase activity in hybrid mice would have the same affect on recombination frequencies as in purebred mouse lines. Bright-field microscopy and macrophotography of chromosomes from B6xDBA F1 hybrid MLH3 and MUS81 Heterozygote (Het) and Knockout (KO) mouse line primary spermatocytes in metaphase I of prophase I of meiosis was used to visualize bivalent and univalent formation as an indication of the affects of the resolvase activity, or lack thereof. Analysis of nearly 200 cells from four different mouse genotypes revealed that the hybrid mice behave the same as the purebred mice with respect to dHJ resolvase activity. In addition, an aberrant chromosome translocation was discovered in the MUS81 hybrid mouse line.

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