

A system to test for non-random disjunction

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Abstract

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Beadle (1936, *Genetics* 2: 554-604) found that exchange within inversion heterozygotes did not increase zygote mortality but resulted in the recovery of non-exchange chromatids or patroclinous offspring. They postulated, therefore, that, of the four nuclei, either of the outer nuclei only could be fertilized and that dicentric bridges were retained in the center nuclei. Novitski (1951, *Genetics* 36: 267-280) and Novitski and Sandler (1956, *Genetics* 4: 196-204) demonstrated that when asymmetrical dyads are formed by a crossover event within a tetrad, the shorter member of the dyad is recovered, i. e., is included in the outer nuclei, more frequently than the longer member.

In Drosophila females, the products of meiosis are oriented in a row of four similar to the orientation of ascospores within the ascus. Sturtevant and

If the chromosome mechanics of unrelated organisms have common features, *Neurospora* could provide a cytological demonstration of non-random disjunction. Dr. de Serres and coworkers (personal communication) are studying various heterokaryotic systems to attempt to recover deletions involving the right arm of LGI. With such a system it should be possible to recover terminal or gross deletions involving a large part of the linkage map to the right of the ad-3 region. By appropriate matings, it should be possible to obtain such a deletion with its normal homolog in a meiotic nucleus. Perithecial squashes would permit scoring of asci for first and second division segregation by patterns of spore abortion. By scoring second division segregants resulting from an exchange between the breakpoint and the centromere of the right arm of LGI, the frequency with which the deletion (aborted spore) reaches the outer pair of nuclei can be determined. Any deviation from the expected 50:50 ratio might indicate non-random disjunction. Translocation heterozygotes could be tested in a similar manner. As a control, abortion patterns of asco would indicate the distribution of aborted spores in tetrads having no gross chromosome aberrations. ---Department of Genetics, University of Alberta, Edmonton, Alberta, Canada.