

7. Centromere activity.

Comparisons of rings of four at metaphase I in corn and in barley show much stronger centromere activity in the chromosomes in corn than in those in barley. In barley as first reported by Hagberg, often only two chromosomes in alternate positions in the ring are orientated toward the two poles. Further studies are needed to determine if these observations offer any clue as to the cause of directed segregation.

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1. Crossing over and chromosome duplication.

The problem of chromosome duplication in relation to time of crossing over can be approached by use of the 5-6c translocation in maize with which crossovers in the interstitial segments of plants heterozygous for the translocation can be determined by abnormal nucleolar organizer distribution in the quartet stage. The following preliminary results with a small number of plants (het T5-6c, homo In5) indicate that high temperature treatment at 35-38°C during mid-pachytene to diplotene increases the frequency of crossover quartets compared with controls at 22-25°C. The heat treatment presumably is being applied after DNA-histone duplication is complete, although this remains to be verified for maize - probably by radioautography since Feulgen staining of maize PMC's generally is too weak for spectrophotometry. The substantiation of these results by further experimentation with larger numbers would indicate separation of chromosome duplication and crossing over in time, a fact which seems to be contrary to the current views of a majority of microbial geneticists.

Sample	Quartet Type			% C.O. Quartets
	Non-C.O.	C.O.	Total	
(35-38°)				
A	31	89	120	74
B	21	48	69	68
C	3	13	16	81
D	19	30	49	61
E	11	32	43	74
	<u>85</u>	<u>212</u>	<u>297</u>	<u>71</u>