7. Preferential Segregation in Translocations.

Preferential segregation of the abnormal form of chromosome 10 (ab10) to the basal cell of the linear tetrad during megasporogeneis is a phenomenon that is not completely understood.

Studies, the past season, indicate that when ab10 is substituted for normal 10 as the homologue in heterogygous A-type translocations involving chromosome 10, preferential segregation is restricted to cells with a cross-over between the translocated piece of 10 and the ab10 homologue. Preferential segregation was tested by marking the translocated piece with the dominant *R* gene and introducing the recessive *r* gene with the ab10. Progenies of reciprocal out-crosses to *R*-testers were scored to determine the types of gametes transmitted. A similar series with only normal 10 was grown for comparison.

The summarized data from six translocations are given in the following table, in which the percent of transmitted normal gametes (gametes that do not transmit the translocation) is given.

	Parent carrying Nor. 10 homologue.		Parent carrying ab10 homologue.	
	Egg	Pollen	Egg	Pollen
	%	%	%	%
No crossing-over in distal section of 10.	53.2	52.0	55.2	53.0
Crossing-over in distal section of 10.	48.9	46.0	14.0	43.7

These data show the pronounced preferential segregation at megasporogenesis of divisions in which the distal section of 10 has crossed over with ab10. They fail to show any appreciable preferential segregation when crossing-over was restricted to the interstitial section. All translocations used had sufficiently long interstitial segments to allow an appreciable amount of crossing-over.

The conclusions from these observations are that crossing-over in the section adjacent to the abnormal piece of 10 is associated with preferential segregation and that crossing-over in the interstitial segment is followed by normal segregation. This difference may be associated with terminalization of cross-overs, since it seems possible that proximal cross-overs may terminalize through the primary rather than the secondary centric region.

Translocation B-10a was also used to observe the effect of ab10 when paired with a B^{10} chromosome. The following table gives the data from four parent types that were pollinated by a standard and the transmitted gametes scored in the F_1 progeny.

	Gametes transmitted (containing)	
	10 or ab10	10
Parent	%	%

10 10^{B} B^{10}	50.0	26.3
ab10 10^{B} B^{10}	48.6	26.2
ab1O 10^{B} B^{ab10}	50.0	29.6
10 10^{B} B^{ab10}	50.0	31.2

The data fail to show any striking differences that indicate preferential segregation associated with the presonce of ab10.

Crossing-over of 10^{B} with ab10 is restricted to the proximal 1/3 of the long arm. Consequently, as in the A-type translocations preferential segregation is absent when crossing-over is restricted to the section adjacent to the primary centromere.

The conclusions from both the A-type and the B-type translocations have not taken into consideration the possible presence of secondary centric regions in other arms of the translocation complex. In TB-10a such a centric region in the B part of the 10^{B} chromosome might nullify the effect of the secondary centric region of ab10, and eliminate the possibility of preferential segregation. It is poosible that cytological checks will serve to show the presence or absence of a secondary centric region on chromosome 10^{B} when ab10 is present. Checks have not yet proven conclusive.

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