Thus, the data obtained strongly suggest that the secondary X nondisjunction is a result of X-Y pairing and the frequency of this pairing depends on a correspondence of X and Y sizes, in agreement with Grell's rule for nonhomolog pairing (Grell 1964).

References: Chadov, B.F. 1971, Genetica (Rus) 7(2):117-127; Chadov, B.F. and S.N. Davidova 1971, Genetica (Rus) 7(5):87-94; Grell, R.F. 1964, Proc. Nat. Acad. Sci. USA 52:226-232.

Chadov, B.F. and E.V. Chadova. Institute of Cytology and Genetics, Siberian Branch of the USSR Academy of Sciences, Novosibirsk 630090, USSR. Nonhomologous pairing and spontaneous interchange in D. melanogaster males.

It may be concluded from Moore's cytological data that nonhomolog pairing takes place in mitosis of D. melanogaster males (Moore 1971). Inasmuch as nonhomolog pairing is usually accompanied by spontaneous interchanges in D. females (Chadov 1975, 1977), it was supposed that nonhomologous pairing and interchanges between C(2L) and C(2R), C(2L) and Y, C(2L) and X chromosomes took place in mitotically divisioned spermatogonial cells of sc^8·Y/y;C(2L)RM, b pr;C(2R)RM,cn males bearing autosomal compounds C(2L)RM, b pr and C(2R)RM,cn. The appearance of chromosomes 2L·2R,b pr cn with the standard order of genes was expected as a result of interchanges between the compounds in their centromeric regions, and the appearance of half-translocations Y·2L,b pr or X·2L,b pr, containing arm 2L with b and pr genes, as a result of interchanges C(2L)-Y and C(2L)-X.

In experiments the males mentioned above were mated to C(1)DX,y;b j pr cn/T(Y;2)C and C(1)DX,y;+/T(Y;2)C females. These females produce several types of gametes: some of them are euploid and complementary to sperm cells with new arising chromosome 2L·2R,b pr cn; others are aneuploid and complementary to sperm cells with half-translocations Y·2L or X·2L. The progeny of females in three crosses constituted 225 individuals. Judging by phenotypes, 156 individuals contained chromosomes 2L·2R and 12 individuals, half-translocations bearing arm 2L. As the subsequent analysis showed, some of the 225 individuals were sterile, 123 individuals contained chromosome 2L·2R,b pr cn and 5 individuals, half-translocation Y^S·2L,b pr. 35 individuals arose from sperm and egg cells with nondisjunctional autosomes 2. The progeny with interchanged chromosomes arose in clusters. The data obtained have shown that in spermatogonial cells of Drosophila males nonhomologous pairing and interchanges take place.

References: Chadov, B.F. 1975, Genetica (Rus) 11(1):80-100; _____ 1977, DIS 52:79; _____ and E.V. Chadova 1977, Genetica (Rus) 13:477-489; Moore, C.M. 1971, Genetica (Ned) 42:445-456.

Chadov, B.F. Institute of Cytology and Genetics, Siberian Branch of the USSR Academy of Sciences, Novosibirsk 630090, USSR. Nonhomologous X-2 pairing in females containing structurally normal X chromosomes.

Phenomena of nonhomolog pairing usually arise in genotypes in which a conjugation of no less than two chromosome pairs was purposely disturbed or some supernumerary chromosomes were introduced into the genome. One may suppose, however, that the nonhomolog pairing is not restricted to the above mentioned range of genotypes, but can take place in any genotype, if two nonhomologs don't conjugate for some reason. I have observed two cases when chromosomes, whose conjugation was not purposely disturbed, participated in nonhomologous pairing.

(1) Females with structurally normal X chromosomes and heterozygous SM1, al^2 Cy cn^2 sp^2 inversion were tested for formation of oocytes aneuploid for autosomes 2 and X's (Chadov et al. 1970). In mating with C(2L)RM,b pr;C(2R)RM,cn males they produced progeny arising from the following oocytes:

Oocyte type	XX	XX22	2-2	0	X22	X
Number	20	-	41	-	39	63

Double aneuploid oocytes, i.e., oocytes aneuploid both for the X's and autosomes 2, constituted 55% of all oocytes. The double aneuploid oocytes were of two types only: XX and 2-2. Based on these data, it may be supposed that X-2 pairing takes place and X and 2 disjoin after the nonhomologous pairing. If X-2 pairing did not take place and autosomes 2 and the X's were distributed independently, the double aneuploid oocytes would rarely arise and four types of such gametes instead of the two types observed would be formed.

(2) Females y/y;C(2L)RM4,dp;C(2R)RM4,px were crossed to C(2L)P4,+;C(2R)Pr,+ males (Chadov and Podoplelova, in press). They produced, among others, 123 individuals resulting from the nondisjunction of matroclinal dp and px compounds. 49 of them arose from double aneuploid oocytes: 32 of XX type and 17 of C(2L);C(2R) type. Oocytes of XX;C(2L);C(2R) and 0 types were absent. One can suppose that the formation of double aneuploid oocytes is a result of pairing between the autosomal compounds and X's.

In both cases the conjugation of the X chromosomes was not purposely disturbed, but a part of them was involved in pairing with autosomes. The frequency of X-2 pairing is nearly 1% in the first genotype and 8% in the second. According to Weinstein's data nearly 5% of X's are non-crossovers even if they are structurally normal (Weinstein 1936). Probably, these X's have taken part in the nonhomologous pairing. However, in the second genotype the frequency of nonhomolog pairing is higher than the 5% level. It is not ruled out that some crossover X's could be involved in nonhomologous pairing with autosomal compounds. Recent data concerning spontaneous formation of half-translocations in y/$\overline{XY}$;C(2L);C(2R) females showed that some of them arising as a result of $\overline{XY}$-C(2L) interchanges are X crossovers (Chadov and Podoplelova, in press).

The data obtained, from the methodical point of view, show that the registration of double aneuploid gametes is a simple and sufficiently sensitive test for the presence of nonhomolog pairing. In principle, it makes possible the study of this process also in structurally normal genotypes.

References: Chadov, B.F., E.V. Chadova and A.K. Gaponenko 1970, Genetica (Rus) 6(10): 79-91; Chadov, B.F. and M.L. Podoplelova, Genetica (Rus) in press; Weinstein, A. 1936, Genetics 21:155-199.

Charton-Strunk, U. and W.-E. Kalisch.
Ruhr-Universität Bochum, Germany.

Intrachromosomal effect of a heterozygous tandem duplication.

The tandem repeat chromosome Dp(1;1)Gr, y^2 sc (w^- spl sn^3)(w^c sn^3), which duplicates approximately one quarter of the euchromatic part of the X-chromosome (3A2-3;8B4-C1), was checked for an introchromosomal effect (reviewed by Lucchesi 1976) on the v - f and f - car region. Dp(1;1)Gr is homozygously and hemizygously lethal (Kalisch 1973). Crossover values are decreased within and adjacent to the duplication (Kalisch 1975). Exceptions come from patroclinous males and intrachromosomal exchanges between the two parts of the tandem repeat after double loop pairing (Kalisch 1976).

Data of experiments no. 3 and 4 in Table 1 show that the crossover decrease in region 1 is accompanied by a significant crossover increase in regions 2 and 3. The long distance between vermilion (33.0) and forked (56.7) as well as the values of regions 1 and 3 suppose that the crossover value of region 2 could be composed of a decreased value near vermilion and an increased one in the rest of the region. Table 2 shows a comparison of the intrachromosomal effect in different X-chromosomal chromosome mutations on the f - car region. Surprisingly there is neither a correlation between the genetic length nor between the crossover reduction in the distal part (y-v region) and the strength of the intrachromosomal effect on the proximal part of the euchromatic chromosome region (f - car region). The simultaneous effects of the heterozygous Dp(1;1)Gr chromosome (intrachromosomal effect) and of two heterozygous inversions in the autosomes (interchromosomal effect) on the f - car region have also been tested. The data of the experiments no. 2, 4, 5 and 6 in Table 1 show that the simultaneous effects are in the range of the summation of the two separate effects (90.63 ± 47.98 : 157.51).