their corresponding sites of the respective chromosomal elements of the parental species. Such autonomous 'parental' behaviour of each chromosomal arm in the hybrids and the early replicating property of the C element (3rd chromosome) in D.pseudoobscura, D.persimilis as well as in D.miranda (X_2, Das et al. 1982), as mentioned earlier (Mutsuddi et al. 1984), indicate the presence of inbuilt genetic control of replication that is conserved in individual chromosome during evolutionary process.

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Unequal diameter of the homologous chromosomal elements in the hybrids of D.mulleri and D.arizonensis.

The salivary gland chromosomes of the hybrids, produced from the cross Drosophila mulleri females to D.arizonensis males, are being investigated. In hybrid females, a certain proportion of nuclei represent a beautiful situation of coexistence of two homologue with distinct differential diameter for all the chromosomal elements in the same nucleus. While one homologue is much wider, other is distinctly thin, being almost half or about one third to that of the former. Interestingly, irrespective of diameter, the staining intensity is equal in both the homologue and they show considerable good pairing in most of the homologous sites. Study of ^{3}H-TdR labelling pattern of the salivary gland chromosomes in these hybrid females reveal that the replication pattern of all the homologous sites are similar between these two homologue (Fig. 1a-d) and to those of the corresponding sites of their respective parental species.

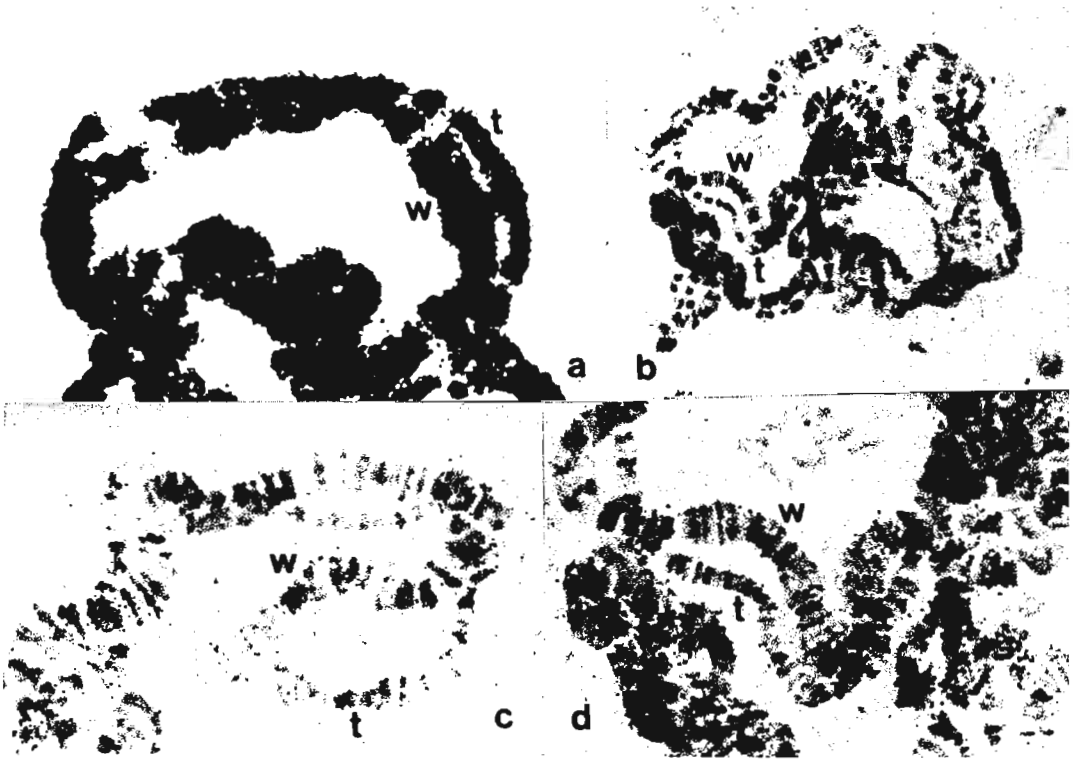

Fig. 1. Autoradiograms showing similar ^{3}H-TdR labelling patterns on the two homologue with differential diameter in hybrid females of D. mulleri and D. arizonensis. Such synchrony in replication cycle (a) very early terminal stage, (b) very late terminal stage; (c) and (d) represent magnified portion of (b).

w - wider homologue t = thinner homologue

In the hybrid male nuclei, though the unusual increase of the X chromosome and micro-chromosome are evident and also have been reported earlier (Bicudo & Richardson), the coexistence of two homologue with such differential diameter for all chromosomal elements in the hybrid females is undoubtedly unique. Howver, the similar staining intensity and synchronous pattern of replication between these two homologue suggests that the unusual increase in diameter between these two homologue is probably due to similar chromatin condensation between them but additional polyteny in one homologue over the other.

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Effect of transforming mutants on the X chromosomal replication pattern in Drosophila melanogaster.

In Drosophila melanogaster, sex determination is under the control of X chromosome/A autosome ratio (Bridges) as well as wild type alleles of the sex-transforming mutants (Baker & Ridge). With the help of such sex-transforming mutants and by changing the sexual physiology of the flies, attempts have been made to study the role of altered sexual physiology on X chromosomal gene expression (Muller; Komma; Smith & Luchesi). In our present study, we have examined the ^{3}H-TdR labelling pattern of the salivary gland chromosomes in changed physiological conditions with a view to determine the effect of such sex-transforming mutants on the X chromosomal replication pattern. Five such mutants viz., sex-combless (sx), double sex (dsx), double sex dominant (dsx^{D}), intersex (ix) and transformer-2 (tra-2) were used in our present study and DNA replication pattern have been examined in 6 genotypic conditions vix., sx/Y, dsx/dsx; XY, dsx/dsx; XX, dsx^{D}/+; XX, ix/ix;XX tra-2/tra-2;XX.

Autoradiograms reveal that generally while the X chromosomes in sex-combless males (sx/Y) and male intersexes (dsx/dsx; XY) are early replicating (Fig 1a,b) than the remaining autosomes, the X chromosome in pseudo-males (tra-2/tra-2;XX) and three types of female interesexes.

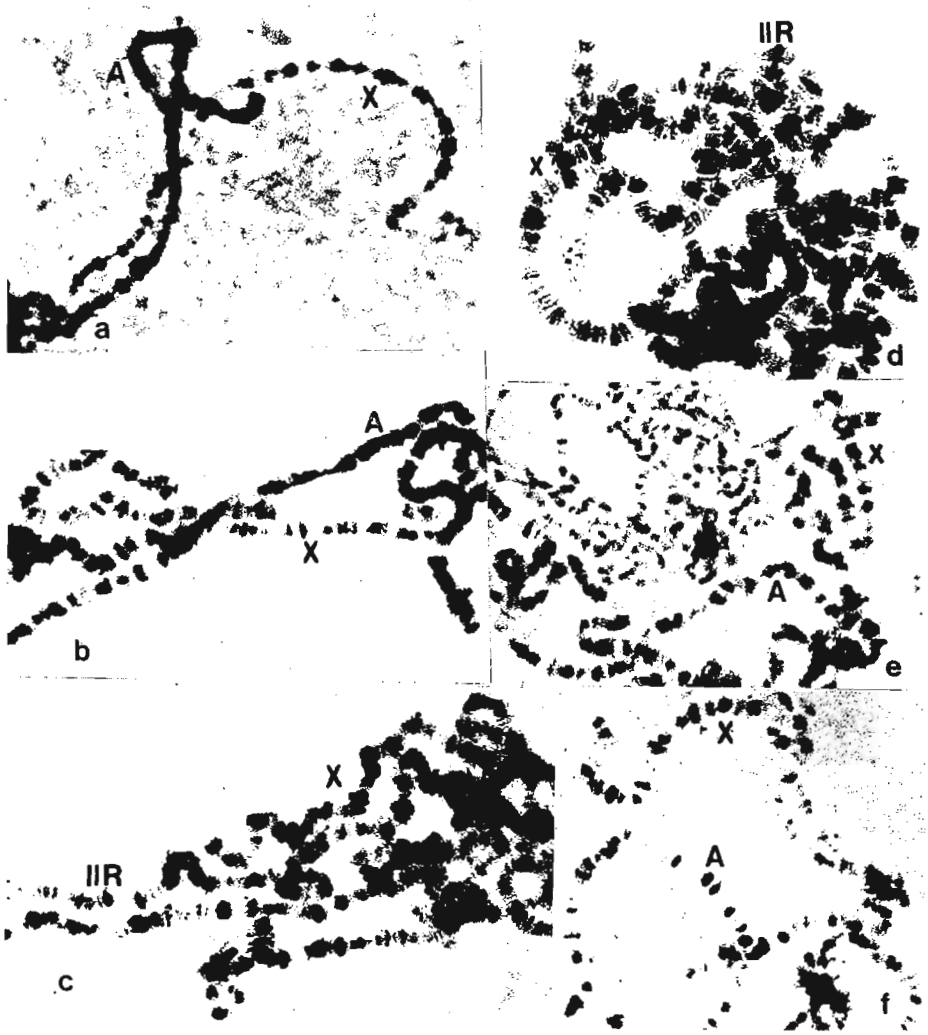

Fig. 1. Autoradiograms showing ^{3}H-TdR labelling on the X chromosome in comparison to the pattern on the autosome in
(a) dsx/dsx;XY,
(b) sx/Y,
(c) ix/ix;XX,
(d) tra-2/tra-2;XX,
(e) dsc/dsx;XX and
(f) dsx^{D}/+;XX.
X = X chromosome,
A = autosome.