Thus at least three mobile elements are simultaneously mobilized in this case. Different mobile elements seem to have different locus specificities: mdg4 prefers the cut locus, the P-element prefers w and sn.

The above results show that the activization of mobile elements conforms to the "all-or-none" principle. Various mobile elements are mobilized with a frequency of 10^{-3}-10^{-4}, leading to the reversion of some mutations and to mutagenesis in other genes. This is often accompanied by the appearance of new copies of the P-element in the X-chromosome.

What triggers off these transposition processes? Hardly the P-element, for it is present in all cells, while transposition occurs in one out of 1000-10000 cells. The processes may be genome-controlled, as suggested by the cm^{MR1} ct^{MRpN1} stock, where the transposition events involving a number of mobile elements are enhanced by an order of magnitude as compared with the ct^{MR2} stock. The activization of mobile genetic elements is certainly important in evolution, since it is capable of causing spontaneous changes in the genome and ensuring its rapid rearrangement.

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Nucleolar chromatin thread in different species of Drosophila.

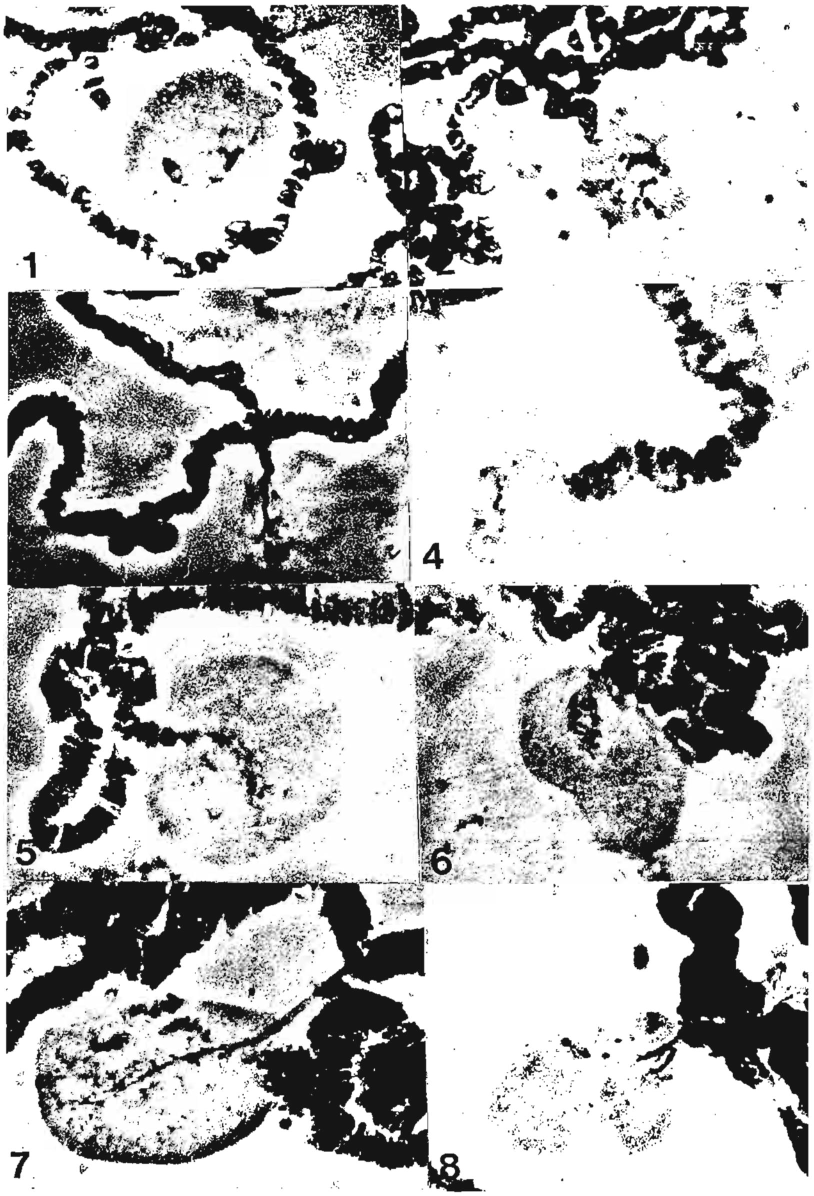
It has been reported earlier (Ghosh & Mukherjee 1982) that the nucleolus of Drosophila salivary glands exhibit a variation in morphological conformations of nucleolar chromatin thread (NCT) in different cytological preparations. That such intranucleolar structures are DNA materials have also been confirmed by Feulgen staining, Acridine Orange and Hoechst 33258 fluorescence. Futhermore, these NCT structures have been classified into four principal types (Ghosh & Mukherjee 1982).

Results on the treatment of nucleolar chromatin thread with various chemical agents viz. NaOH, HCl, DNase, 2,4 Dinitrophenol, heat treatment followed by acridine orange (AO) fluorescence revealed that both chromosome and NCT exhibit identical AO fluorescence. These findings suggest that the general organization of both chromosome and nucleolar chromatin is similar (Ghosh & Mukherjee 1982).

In the present investigation it has been revealed that in all the species (altogether 14 species reported in this issue) of Drosophila studied, 4 main types of NCT are manifested as has been reported earlier (Ghosh & Mukherjee 1982). In addition, some interesting features of the NCT have also been noted. These features are as follows.

In some preparations NCT appears as puff. These puffs resemble the puffs of chromosome (Fig. 1). Sometimes specific chromosome ends as a large puff, i.e., nucleolus with NCT (Fig. 2). The nucleolus itself also appears as a puff from the terminal portion of a chromosome (Fig. 3), showing the nucleolus with Type 2 NCT. It is also interesting enough to note that in Drosophila melanogaster the X-chromosome of some nuclei ends at its terminal (proximal) portion as a large puff within which a clear doublet is present. The terminal large puff appears as a nucleolus with NCT (doublet band). The doublet of the NCT is similar to that with some doublets of chromosome (Fig. 4). The banding pattern, i.e., bands, interbands are also observed in the NCT (Fig. 5).

The NCT sometimes appears as a small puff, i.e, chromosomal small band ends in a small puff in the nucleolus (Fig. 6). The NCT of Drosophila sometimes appears as banded structures i.e., NCT with regular bands and interbands as they are found in the chromosomes. Such regions can be clearly distinguished as dark and light bands and interbands of NCT. In many nuclei of different species of Drosophila a clear connection has been marked between the chromosomal band(s)and the nucleolus, i.e., NCT is continuous with the chromosomal band(s) (Figs. 7 & 8).



FIGURES. Photomicrographs showing the NCTs in different species of Drosophila. NCTs appear as: (1) puffs; (2) chromosome ends as a puffy structure with Type 1 NCT; (3) one chromosomal band is continuous as NCT; (4) chromosome ends as a puff in which NCT is present as a doublet; (5) NCT differentiated as bands and interbands; (6) NCT as a small puff; (7 & 8) NCT appears to originate from one band of the chromosome.

Fig. 1 = D.nasuta; 2 = D.melanica; 3 = D.virilis; 4 = D.melanogaster; 5 = D.pseudoobscura; 6 = D.ananassae; 7 = D.hydei; and 8 = D.simulans.

In general it appears from our data that (1) in all species of Drosophila studied (altogether 14 species) 4 main NCT types are found as reported earlier (Ghosh & Mukherjee 1982); (2) the structural organization of both chromosomes and NCT are similar as revealed by the presence of bands, interbands and puffs in both chromosomes and nucleolus.

Reference: Ghosh, M. & A.S. Mukherjee 1982, Cell and Chromosome Res. 5(1):7-22.

Ghosh, M. and A.S.Mukherjee. University of Calcutta, India. Evolutionarily related species and their NCT structures.

Nucleolus of eukaryotes is now well known as a distinct body which is either round or oval in shape. There are some reports (Rodman 1969; Lettré et al. 1968) that the nucleolar chromatin thread or NCT (DNA) remains embedded within the nucleolar mass. A species specific nucleolar chromatin structure in polytene nuclei of Drosophila has also been reported by Barr and Plaut (1966a,b). Rodman (1969) reported variable conformations of nucleolar chromatin (DNA) present in Drosophila melanogaster. Earlier we have reported that there are 4 major types of nucleolar chromatin threads (NCTs) in the nucleolus of Drosophila hydei (Ghosh & Mukherjee 1982a,b). In the present investigation we have examined the NCT in 14 species of Drosophila viz., D.melanogaster, D.simulans, D.willistoni, D.insularis, D.melanica. D.miranda, D.pseudoobscura, D.persimilis, D.virilis, D.nasuta, D.malerkotliana, D.bipectinata, D.ananassae and D.hydei to find out the evolutionary relationship in the NCT structure, if any.

Analysis of the data reveals that (1) the 4 major types of NCTs are present in all the species studied, (2) the NCTs of slaivary gland nuclei are not species specific, (3) the frequencies of different NCTs in the closely related species are more or less equal and,