eye to demonstrate mosaicism in ocelli. A second purpose is to describe how to optimize viewing of ocellar pigmentation. Two lines of flies with "salt and pepper" *vs.* "large patch" mosaicism in the compound eye were described by Lu *et al.* (1996); they are respectively *In(3L)BL1*, here dubbed "BL1", and *Tp(3;Y)BL2* ("BL2"). Mosaicism has been useful in our studies of compound eye development and autonomy of gene expression (Antoine *et al.*, 1983; Harris and Stark, 1977; Stark *et al.*, 1988; Stark *et al.*, 1981); Ready *et al.* (1976) initiated use of eye color mosaicism in developmental analyses which has been widely applied since.

Traditionally, pigmentation in ocelli is visualized in a dissection microscope with incident illumination; pigmentation is subtle with such viewing in ocelli (between arrows) of wild type (A). An Optronics color CCD camera and an MCI black and white CCD 72 camera coupled with Image Pro Plus and Pagemaker operating on a PC (IBM clone) facilitated viewing and "photography." The same head viewed with transmitted light provided by a dark-field illuminator makes the pigmentation more obvious (B). Ocellar pigmentation is even better imaged in wild-type flies by fixing flies to a microscope slide, illuminating through the head with a narrow beam of transmitted light and viewing through the ocellar lenses with a 40× oil immersion objective (C). Ultrastructural studies (Stark *et al.*, 1989) showed that ocellar pigmentation is located proximally (but distal to the axon) within photoreceptor cells; this results in the cup-like appearance on the medial edges (in C). Corresponding images from white-eyed flies without ocellar pigmentation are shown (D-F). An example of the striking large patch mosaicism in the BL2 compound eye is shown (G). Ocellar pigmentation in BL2, if present, is not clear (H) even with the illumination used above for wild-type flies (B). An ocellus of a wild-type fly is shown (I and J) to show how we further improved our visualization of ocellar pigmentation. With a 100× oil immersion objective, the cup-shaped ocellar pigmentation is obvious with white light (I). However, the same ocellus appears uniformly dark when we optimized our viewing with a blue (480 nm) interference filter placed in the beam (J); eye color pigments absorb blue light well (Stark, 1973). Applied to the analysis of BL2, white light yields insufficient contrast (K) while blue light shows medium and large pigmented patches in BL2 reared at room temperature (L). When viewed from the side using blue light, large patch mosaicism in another ocellus is clear (M). The salt and pepper mosaicism in the compound eyes of BL1 is shown in several micrographs (N and O). As with BL2, ocellar pigmentation in BL1 is difficult to discern even with dark field illumination in a dissecting microscope (P). Mosaicism of ocellar pigmentation is obvious in the ocelli of BL1 flies reared at 25°C when viewed at higher magnification. Viewed with white light (Q) or blue light (R), many small pigmented patches are seen with straight-through viewing and a 100× oil immersion objective. In a different fly reared at room temperature and viewed from the edge with blue light, only a few pigmented patches are seen (S). Reared at 18°C, very few pigmented patches were seen in ocelli of BL1 or BL2. Thus, both stocks showed a direct correlation of numbers of pigmented patches with temperature, expected from the literature (Gowen and Gay, 1934). Our images of discrete pigmentation in a white background imply for ocelli what is well-known for the compound eye, namely that ommochrome pigmentation is autonomous to the cell.

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The interchromosome effect on nondisjunction of FRT-site insertion.

The genetic study of X-chromosome rearrangements shows that the nucleolus organizer is responsible for a correct X-chromosome disjunction (Gershenson, 1933; Cooper, 1964; Appels and Hilliker, 1982; McKee and Lindsley, 1987). The insertions of parts of ribosomal RNA genes in X -chromosome with deleted nucleolus organizer show that 240 bp of IGS contains almost all necessary information for this disjunction.

The autosome disjunction gives a more complex picture. The data of McKee *et al.* (1993) about the absence of heterochromatin participation in pairing is contrary to our results (Omelyanchuk and Volkova, 1994). Despite the noncompetitive nature of Dp(2;Y) element pairing (McKee *et al.*, 1993), we had found a case (Omelyanchuk and Volkova, 1994), where pairing does not obey this rule. Here we would like to give the evidence of FRT-site insertion in

III- chromosome influence on II-chromosome nondisjunction, that gives the additional complexity to the male chromosome behavior in meiosis.

The elements of yeast site-specific recombination system FLP-FRT contain FLP-recombinase construct inserted in X- chromosome under a heat shock promoter and the vector P[ry^+; hs-neo; FRT] 80B inserted in 80B region of the 3L chromosome were described in Xu and Rubin (1993). The results of crossing of individuals containing different combinations of those elements to *y; C(2)EN; ru ca* females is shown in Table 1. It could be seen that most low level of II- chromosome nondisjunction takes place in the absence of FRT-sites. FRT homo- and heterozygous individuals give a higher level of II- chromosome nondisjunction in comparison to wild type (0.92×10^{-3} in accord to Ashburner's Table 27.8 [1989]) despite the presence of FLP-chromosome. This gives the evidence that one III- chromosome FRT-site is enough to ensure increased level of the III-chromosome nondisjunction, *i.e.* FRT is dominantly acting. The heat shock induction (40 min. at 37°C) of FLP-recombinase has no effect on the nondisjunction. This means that the phenomena could not be due to the site-specific exchanges in the FRT area.

Table 1.

Sex of flies	Genotype of tested individuals	Heat shock treatment	Number of embryos	Number of alive progeny	Frequency of nondisjunction
Male	FRT /*ry e*	—	2224	5	2.2×10^{-3}
Male	FRT /FRT	—	1149	8	7.0×10^{-3}
Male	*w* FLP; *ry e* / TM3	—	2427	1	0.4×10^{-3}
Male	*w* FLP; FRT / FRT	+	3752	5	1.3×10^{-3}
Male		—	1252	51	40.7×10^{-3}
	w FLP; FRT / TM3	—	2629	57	21.7×10^{-3}
Female		—	2903	0	0
	FRT / FRT	—	2237	0	0
Female	*w* FLP; FRT / FRT	—	2574	0	0
Female	*w* FLP; FRT / FRT	+	2563	1	0.4×10^{-3}

Dramatic increase of II- chromosome nondisjunction could be seen when FRT-site presents together with III-chromosome balancer TM3.

The phenomenon described here clearly shows that the behavior of different pairs of homologous chromosomes in male meiosis are not independent. Some cellular structures such as a spatial organization of chromatin or a spindle structure may be mediators of the observed interaction.

Similar experiments with female meiosis (Table 1) show no FRT induced nondisjunction.

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Institute of Cytology and Genetics, Novosibirsk 630090 Russia. Chromosome abnormality in new mutant allelic to *aar* gene.

Earlier we have described some P[1ArB] insertion mutants, which demonstrated an increasing of lethality and mitotic abnormalities in the third instar larvae (Omelyanchuk and Volkova, 1996). One of those insertions, named as *v158*, was mapped in the 85F region of 3R chromosome by *in situ* hybridization. In result of cytogenetic analysis we have found an abnormal mitotic chromosome condensation and appearance of chromosome-like bodies, the quantity of which did not coincide with chromosome karyotype; nondisjunction of the X and the IV-chromosome also took place. It was shown (C. Sunkel, personal communication) that the *v158* mutant is an allele of the *aar* gene (Gomes, 1993). Further detailed analysis demonstrated characteristic mitotic defects of the *v158* mutant, that distinguish it from already known aar^1 and aar^2 alleles.

Mitotic chromosome preparations of neuroblasts and its C-band staining were made by standard techniques (Ashburner, 1989).

In Figure 1 A, B, C a positive C-staining of heterochromatic blocks is shown at different and sequential stages of mitosis in wild type strain (normal). In *Drosophila*, pairing of homologous chromosomes and nonhomologous association of asynaptic paracentromeric region in the chromocenter are both in meiotic and mitotic cells. At the late stages the pairing of heterochromatic regions and transition from nonhomologous bounds to homologous ones that orient