Schäfer, U. University of Düsseldorf, Germany. Some observations on bobbed in Drosophila hydei.

There is good cytological evidence that in addition to the nucleolus organizer (N.O.) in the X chromosome, in both D. melanogaster (Cooper, 1959) and D. hydei (van Breughel, 1970), a second one is located in the short arm of the Y chromosome. However, contrary to the situation in D. melanogaster, XO males of D. hydei with a normal bb^+ X chromosome show the bobbed phenotype (Hess and Meyer, 1963; van Breughel, 1970). It seemed, therefore, possible to genetically confirm the localization of the N.O. in D. hydei by the use of different Y chromosome fragments.

Males of the following 6 different sex chromosome constitutions were used:
1) $X(bb^+)/T(A;Y^{TCN})$. The latter is an autosome-Y translocation chromosome which carries the entire short arm and a proximal part of the long arm of the Y chromosome. Cytologically this chromosome includes the sites for the lampbrush loops "tubular ribbons" (T), "clubs" (C), and "nooses" (N) (Hess and Meyer, 1968).
2) $X(bb)/T(A;Y^{TCN})$.
3) $X(bb^+)/T(A;Y^{ThP})$. Here the reciprocal half of the translocation chromosome described in 1) was used. It carries a distal part of the long arm of the Y chromosome with the loci for the lampbrush loops "threads" (Th) and "pseudonucleolus" (P).
4) $X(bb)/T(A;Y^{ThP})$.
5) Nondisjunction males with $X.Y^S$, the Y fragment containing only the short arm with the loop forming sites for the "nooses".
6) Nondisjunction males carrying $X.Y^{Th}$, in which the Y fragment comprises only the tip of the long arm including the site for the "threads".

Contrary to the expectation that only those males carrying fragments of the short arm of the Y chromosome would show the bb^+ phenotype, in all 6 cases the males were found to be wild-type.

Ritossa (1968) and Tartof (1971) have shown that the lack of a certain number of the ribosomal RNA cistrons (rDNA) could be compensated for in XO males of D. melanogaster. The results from the present experiments seem to indicate that such "compensation" does not occur in XO males of D. hydei, but does occur in D. hydei in the presence of various - even very small - fragments from different parts of the Y chromosome.

The situation becomes considerably more complex, however, in view of Hennig's report (1968) that XX and XXY females of D. hydei have 0.25% and 0.08% rDNA, respectively, in their total complements of DNA. Both types of females are, furthermore, phenotypically bb^+. On the basis of these measurements one would expect that, at a minimum, 0.125% of the total DNA in the XO males would be rDNA. Under such conditions, however, the observation that XO males in D. hydei show the bobbed phenotype while XXY females with less rDNA do not show bb is difficult to reconcile with the explanation of the bobbed mutation (Ritossa, Atwood, and Spiegelman, 1966).

A biochemical analysis of this problem is currently in progress.

References: van Breughel, F.M.A. 1970, Genetica 41:589; Cooper, K.W. 1959, Chromosoma 10:535; Hennig, W. 1968, J. mol. Biol. 38:227; Hess, O. and G.F. Meyer 1963, J. Cell Biol. 16:527; Hess, O. and G.F. Meyer 1968, Advanc. Genet. 14:171; Ritossa, F.M. 1968, P.N.A.S. 60:509; Ritossa, F.M., K.C. Atwood and S. Spiegelman 1966, Genetics 54:819; Tartof, K.D. 1971, Science 171:294.

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suppressed in females with a Y chromosome, and males lacking this chromosome show enhanced mutant expression.

Examination of the Malpighian tubules from third instar female larvae of genotype Rev^B/lt revealed that the tubules are composed of yellow (wild type) cells and colourless cells similar to those of the light mutant.

These results suggest that the variable Rev^B phenotype occurs as a result of position effect at the relavent locus, induced by the Rev^B inversion, and that the same inversion is also responsible for position effect at the light locus.