was captured nearly 40 years ago in the southern coastal part of Finland (60° 20'; 25° 30') in Porvoo, Åminsby, and since then has been cultured in normal laboratory conditions. Inbreeding has been efficient due to small population size and several "bottlenecks" in the cultured history of the strain.

The inversion quite evidently corresponds to In(2L)Cy = In(2L)22D 1-2;33F 5 - 34A 1 (Lindsley and Grell 1968, cf. Fig. 1). In the strain Porvoo wild, the inversion exists without Curly phenotype and the homozygotes are thus viable. However, the frequency of homozygous individuals was significantly smaller than theoretically expected. For the determination of the frequency of the inversion genotypes, the chromosomes of 130 individuals were analyzed from squash preparations of salivary glands (cf. Sorsa and Pfeifer 1972). The frequencies of +/+ individuals, In(2L)/+ heterozygotes and In(2L)/In(2L) homozygotes were 40.0%, 58.5% and 1.5% respectively, thus equalling chromosome frequencies p=0.69, q=0.31. Inversion heterozygotes thus possess a positive selective value. At this point it is not known whether the disproportionate frequencies would be due to meiotic drive (Sandler and Novitski, 1957) type of mechanism resulting in an increased proportion of heterozygotes. The permanence of the inversion types in the stock has now been followed for over 10 generations.

References: Lindsley, D.L. and E.H. Grell 1968, Carn. Inst. Wash. Publ. 627; Mukai, T. and O. Yamaguchi 1972, DIS 48:43; Sandler, L. and E. Novitski 1957, Amer. Nat. 91:105-110; Sorsa, M. and S. Pfeifer 1972, Hereditas 71:119-130; Watanabe, T.K. 1967, Japan. J. Genet. 42:375-386.

Subbarao, S.K., P. Szabo and O. Uhlenbeck
University of Illinois, Urbana. Visualization of poly rA:dT hybrids in the mitochondrial genome of D. melanogaster.

There is good evidence that long AT rich stretches exist in mitochondrial (Mt) DNA of Drosophila melanogaster. Polan et al. (1973) report that the thermal denaturation profile of purified MtDNA has three discernable transitions. The first transition has a T_m of 71°C in SSC, implying that a portion (about 20%) of MtDNA contains few if any GC base pairs. Denaturation mapping of MtDNA by electron microscopy shows that the early melting portion of MtDNA is contiguous (Peacock et al. 1973). We have found that this segment and therefore MtDNA can be visualized by in situ RNA-DNA hybridization with ^3H polyriboadenylate, implying that at least a portion of MtDNA is dA:dT. Testicular tissue was chosen for preliminary experiments because mitochondria (Nebenkern) of sperm and spermatids are localized in well defined positions, along the entire length of the tail.

The standard in situ procedures of Steffensen and Wimber (1971) were used with the following modifications: 1) the slides were denatured with 0.2 N HCl for 20 minutes at 25°C; 2) the hybridization conditions were 17°C in 50% formamide: 2xSSC for 15 hours, which should optimize the rate and specificity for rA:dT hybridization; 3) T_2 ribonulease was used as the post treatment to remove excess poly A. ^3H polyribonuleotides were synthesized from their corresponding ^3H nucleotide diphosphates with E. coli polynucleotide phosphorylase.

Figure 1a shows heavy poly A labelling over tails of late spermatids whereas the heads are poorly labelled. To verify that the DNA in the heads is accessible for hybridization, a mixture of random polynucleotides, ^3H poly (AUGC) was used on the same tissue. In this case (Figure 1c) very heavy labelling of the heads and only light labelling of the tails was observed in accordance with the DNA concentrations in the two regions. In an additional control experiment, ^3H poly U was, as expected, also shown to hybridize to the spermatid tails (not shown).

The density of grains observed after poly A hybridization varies with the stage of the developing sperm. Figure 1b shows that while early spermatid tails label heavily, the narrower mature sperm tails do not label at all. The inability of mature sperm tails to label with poly A may either be due to the elimination of MtDNA or to interference with the hybridization reaction by proteins deposited in the Nebenkern of mature sperm. Currently we are using in situ hybridization with poly A to follow MtDNA during all stages of spermatogenesis.

References: Polan, M.L., S. Friedman, J.G. Gall and W. Gehring 1973, J. Cell. Biol. 56: 580; Peacock, W.J., D. Brutlag, E. Goldring, R. Appels, C.W. Hinton and D.L. Lindsley 1973, C.S.H.S.Q.B. 38:in press; Steffensen, D.M. and D.E. Wimber 1971, Genetics 69:163.

(See Figure next page)

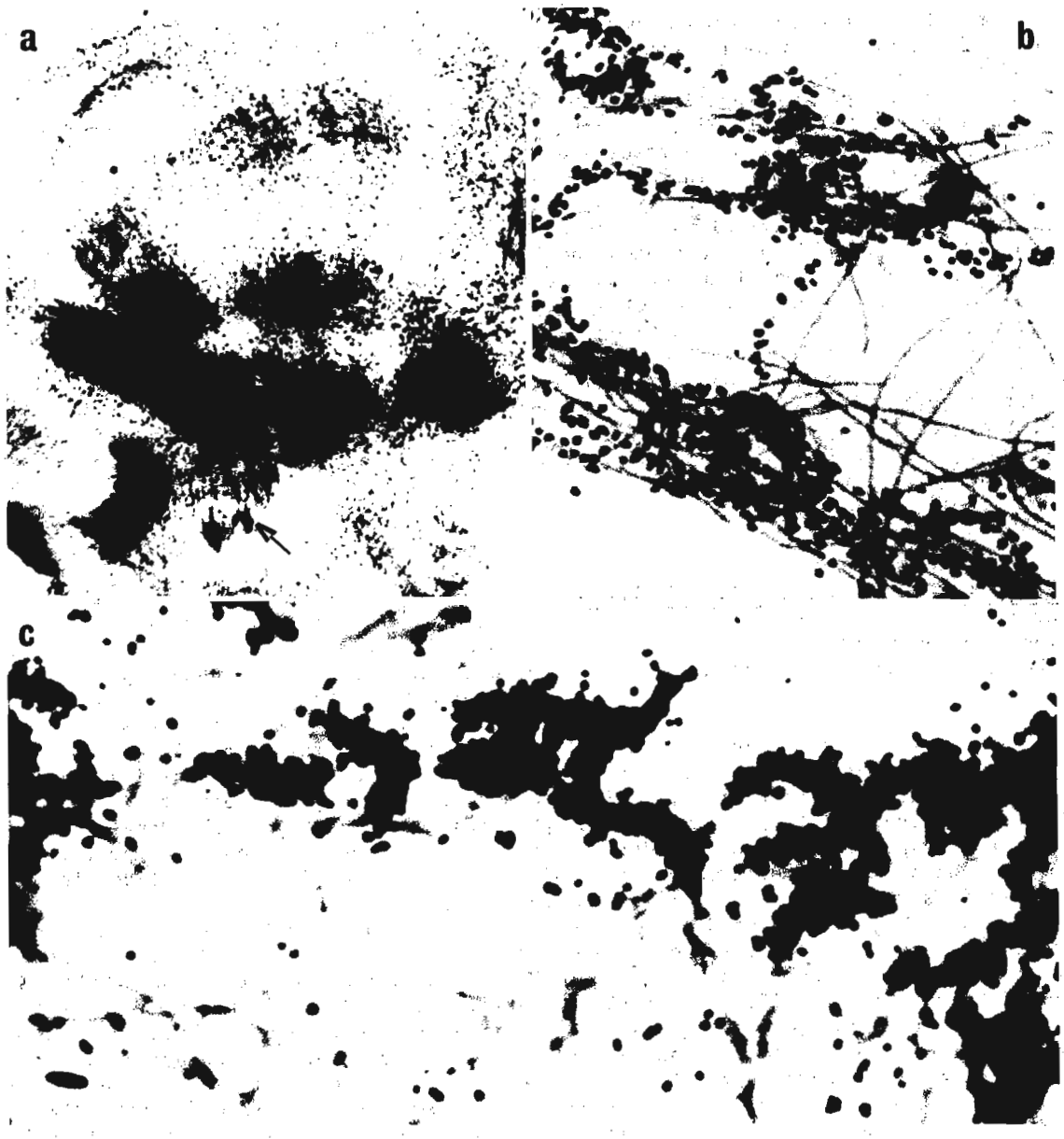

Figure 1

a) A late spermatid bundle, hybridized with poly A (s.a. 18 Ci/mmole) and exposed for twelve days, shows label over the tails. The arrow marks the position of the spermatid heads. b) A similar preparation at a higher magnification, the tails of early spermatids are heavily labeled with poly A. The label is lost during maturation; the mature sperm tails in the figure show no label above background. c) Spermatid heads from a slide hybridized with poly AUGC (s.a. 1 Ci/mmole) show dense label over the heads and a few grains over tails. The conditions of this hybridization were incubation in 50% formamide: 2xSSC at 40°C for fifteen hours.