Arajärvi, Pirkko, and Aloha Hannah-Alava.
Turku, Finland. Cytogenetic mapping of in and ri.

One of the most extensively studied, but cytogenetically least well-mapped chromosomal regions in D. melanogaster is the centromeric region of chromosome 3. More than 30 mutant loci have been placed, primarily on the basis of linkage data, in this genetically rather short region, between st (3L-44.0) and p (pP; 3R-48.0). Although a high degree of accuracy in genetic localization is presumed when the genetic position is given, as for many of the mutants in the st-p interval, in tenths of a unit, the actual linkage data frequently do not warrant such precision in mapping. Thus two of the loci, in and ri can be (and have been) placed on the basis of linkage data either in 3L, in 3R, or one in 3L and the other in 3R, and their order either in-ri or ri-in. It is obvious that their genetic location is yet to be resolved since the position of in was given only as 47, i.e., about 47, in the recent "Revision of the Mutants" (Lindsley & Grell, 1968), while the position of ri was changed from 47.1, as listed in "The Mutants" (Bridges & Brehme, 1944) to 47.0. Inasmuch as Sturtevant's (1943, DIS 17) correction for the position of in, i.e., to 46.9, was not cited in either listing of the mutants, the different values for the two loci could be based entirely upon different interpretations of Waletsky's (1939 DIS 12) linkage results.

In view of the number of recent investigations on the effect of radiation and radiomimetic chemicals or chromosomal aberrations upon crossing over, particularly in the centromeric region of chromosome 3, it is surprising that there have been no attempts to remap in and ri. This may be because of the finding that there is a rather consistent and frequently a pronounced deviation from the standard value of 4.0 for the st-p interval, which might affect the relative positions of the loci within this interval. The rather characteristic range in values for the st-p interval, as shown in the following table, may be obtained in experiments involving somewhat different genotypes (#2 and 3#; from Thompson, 1964 Genetics 49) in experiments with different procedures (#4A and B; from Suzuki & Parry, 1964 Genetics 50) as well as in replicates (#1A-D; Arajärvi, unpublished). Even when a correction is made for the deviation from the standard value of 4.0 for the st-p interval, the calculated positions for in, or for ri, vary as much within an experiment as between the experiments:

Experiments: (Chromosomes and loci in 3)		Total count	st - p interval	Map positions in	ri
# 1. X/X th st cp in ri pP bx/sr	A.	1,596	2.94	46.6	46.7
	B.	5,496	4.55	46.8	46.9
	C.	3,494	5.78	46.9	46.9
	D.	2,425	6.43	46.6	46.6
	Tot	13,011	5.03	46.75	46.81
#2. X/X; st in ri pP/+		9,878	4.11	46.8	47.1
#3. X/X; st in ri pP/W		7,124	2.15	46.7	47.1
#4. RM/0; st in ri pP/+	A.	6,456	2.57	46.5	46.7
	B.	3,583	1.79	46.4	46.5

These results clearly reveal the difficulties in mapping loci as closely linked as in and ri from the linkage data. Although all of the experiments suggest that both loci may be more distal from the centromere than is generally presumed, there is no reason for assuming that any of these positions could be considered a standard position for either in, or ri, that would be more accurate than the locations based on the earlier and perhaps even more ambiguous linkage results. However, as was first pointed out by Sturtevant (1943 DIS 17) and recently confirmed by Puro & Arajärvi (Hereditas, in press), in experiments such as these with sufficient tester genes, the types of recombinants recovered proves that the linear order is in - ri.

Although Sturtevant had suggested as early as 1943 (DIS 17) that in was in the left arm of chromosome 3, it was only firmly established that both in and ri were in the left arm on the basis of their mapping to the left of $Dp(1;3)sn^{13a1}$ (Muller, 1958 DIS 32) and $Dp(1;3)N^{264-58}$ (Gersh, 1966 DIS 41).

Because they also map to the left of T(2;3)spy (Puro & Arajärvi, 1968 DIS 43) and In(3LR)C269 (Hannah-Alava, unpublished), they are to the left of 78C, the left breakpoint of the inversion, and thus are not even in centric heterochromatin as had long been thought.

The location of the in-associated breakpoint at 77D3-5 in T(1;3)w^{vco} (Schultz, cited by Bridges & Brehme, 1944; Lindsley & Grell, 1968) and the breakpoints of the three in or ri position mutations and an in-deficiency obtained in our specific-locus experiments (Hannah-Alava, 1964 Mutation Res. 1) supports the genetic evidence that both loci are to the left of 78C:

Dp(1;3)in^{61j2} with the nucleolus organizer (probably from the X-chromosome) inserted into 3L at 77B-D;

T(2;3)in^{60i2} a complex translocation (and inversion(s) in 3L) with breaks in 62D-F, 77B and 80C;

Df(3)in^{61j1}, a deficiency for sections 76F to 77D inclusive;

T(2;3)ri^{60b2} with the one breakpoint in 3L after 77E3 and before 78A1.

Inasmuch as T(2;3)C11 and T(2;3)C65, with breakpoints in 77A showed no position allelism in compounds with either in or ri, the tentative position for the in locus is 77B-D, and for the ri locus is 77E-78C, possibly 77E-F, in the salivary map.

Ginter, E. K., B. A. Kusin. Institute of Medical Radiology, USSR. Growth of the imaginal discs of Drosophila in the adult host.

The growth of eye-antennal and wing discs after their transplantation into 2-3 days old adult females was investigated in connection with the problem of the "regulative" ability of the discs. The imaginal discs from 40, 52, 72 and 84 h. larvae were used for implantation. The discs were allowed to grow in the adult host for 1, 3, 7 and 14 days. After cultivation the discs were removed from the abdomen of the hosts and their volumes were measured with the help of a micropipette with known diameter (Table).

Table

Growth of eye-antennal and wing discs in the abdomen of adult fly.

Volume of discs ($x10^{-4}$ mm^3)

Donors age(h.)	40		52		72		84	
Days of cultivation	No. of discs	Mean volume	No. of discs	Mean volume	No. of discs	Mean volume	No. of discs	Mean volume
0	20	9.2±0.53	6	21.2±0.64	19	102.3±4.55	17	114.3±3.04
1	20	14.1±0.45	15	24.4±1.85	22	92.4±4.11	20	106.4±3.38
3	24	25.3±1.98	16	56.2±3.80	22	71.3±3.75	29	94.0±3.52
7	22	60.4±5.09	24	70.1±3.30	16	84.3±5.10	20	86.2±3.11
14	20	89.5±4.32	21	88.0±4.87	30	86.7±2.95	21	88.0±4.11
0	18	4.9±0.24	6	17.5±0.86	20	111.5±5.73	23	124.0±4.46
1	10	15.3±1.03	17	24.2±1.39	17	99.2±3.81	15	131.9±5.79
3	24	27.1±1.65	15	57.9±6.07	17	89.1±5.34	33	114.5±3.22
7	20	60.9±5.57	22	77.3±3.62	22	81.2±4.72	15	102.1±6.46
14	25	87.8±4.22	21	96.1±4.65	31	85.0±3.56	21	88.7±5.17

The greatest increase in the discs volume in situ was observed from 52 to 72h. In the adult fly only the discs from young larvae (40, 52h) continued their growth. The growth rate of the discs in culture was lower than that in situ, and only after 14 days cultivation the discs reached the dimensions of the discs from 72h. larvae. The implanted discs from 72 and 84 h. larvae did not grow in the adult flies, on the contrary their volumes diminished significantly after their cultivation. After a few days of cultivation of the implanted eye discs the traces of red pigment were observed. It may be supposed that the maximum size of the intact discs is genetically controlled.