Reäsearch Notes

Coyne, J. Crossing-over within a closely linked group of genes near locus 40.4 of Chromosome 3.

Preliminary tests for the location of M 33j (Demerec, x-ray induced) showed it to be between hairy(26.5) and thread (42.2) in the third chromosome. With the intention of using Dichaete as a marker M 33j was crossed with Ly/D $. The combination Ly/M33j proved lethal, since there were no Ly/M33j survivors in a total of 2416 flies. This led to testing M 33j as a possible deficiency for all available genes in the 40.4 group around D. Those tested included Glued, Minute-h, Lyra and Dichaete itself. The combination with Lyra was the only one proved to be lethal. The Mh/M33j combination is also probably lethal, but further tests must be made. Mh is not lethal with either Ly, D, or Gl. This evidence made it seem more unlikely that all five of these genes are uni-local. Crossing-over tests for all viable combinations of the five genes gave the following results: (Gl/D was not tested since Plough's evidence (Gen.20: 42-60) shows that there were no crossing-over between these two genes in 5000 test flies).

Mating	No. of crossovers	Total No. of flies
D/se Mh x seple	D-Mh=0	484
Ly/se Mh x seple	Ly-Mh=2	1335
Ly/se Gl x seple	Ly-Gl=10(.61%)	1933
Gl/se Mh x seple	Gl-Mh=24(1.4%)	1046
se D/M33j x seple	D-M33j=0	298
se Gl/M33j x seple	Gl-M33j=0	772
Ly/D x M33j/Payne	Ly-D=0	2416

Since the 10 crossover flies between Gl and Ly were of the two phenotypes se and Ly Gl, it is probable that Ly lies to the left of Gl, unless these 10 were all double crossovers, which is unlikely. Since there is no crossing-over between Ly and D or between D and Gl, it is likely that D lies between the two. As the combination M33j/Ly is lethal, M33j may be a small section deficiency to the left of and including the Ly locus. Similarly, Mh may be a deficiency just to the left of and including part of the M33j deficiency. This possibility is further confirmed by the large crossover percentage of 1.4 betwen Gl and Mh, which places them at the two extremes of the region under observation. From these experiments the probable order from left to right of these five mutatnts would be Mh, M33j, Ly, D, Gl, covering a total map distance of 1.4 units. Further tests will be made to get larger numbers for D/M33j and D/Mh crossovers, and to prove definitely the inviability of Mh/M33j. My, an allelomorph of Mh recently received, will also be investigated.