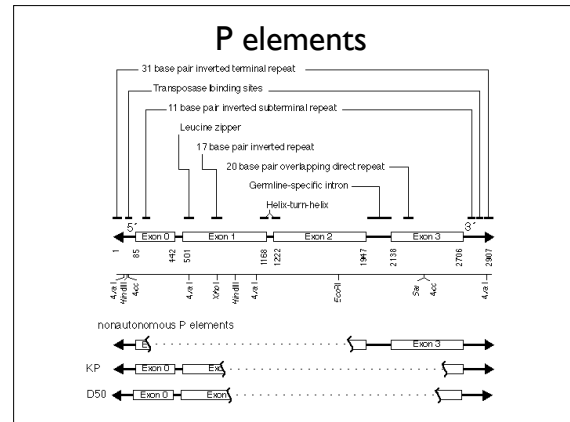


P elements

Problem Set 4 for this and the last lecture.

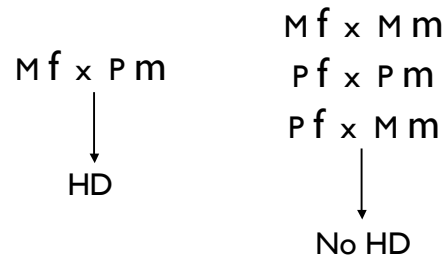
Quiz coming up next week: covers material up to today--7 lectures (includes lecture Chromosomes 4 from Sept. 12)



Hybrid Dysgenesis

1. Heat sensitive sterility
2. Increased rates of mutagenesis-unstable alleles
3. Increased rates of chromosomal rearrangements
4. All effects in the germline, not in somatic tissues

Two Strains
Laboratory strain: M cytotype
Strains from the wild: P cytotype



M strains have no P elements.

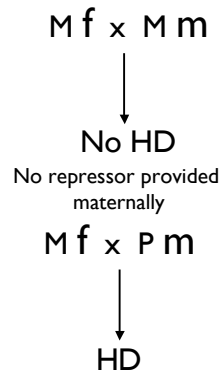
P strains have many P elements.

P elements produce an inhibitor of transposition, which is inherited maternally in germline.

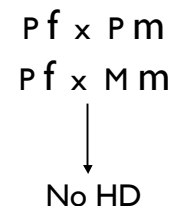
Therefore, inhibition of transposition a maternal effect.

All somatic cells produce an inhibitor.

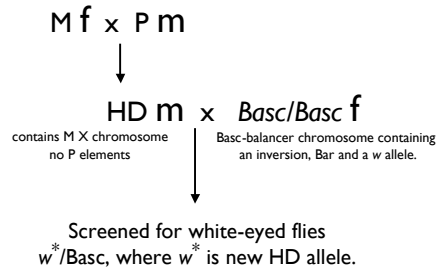
No P elements



Repressor provided maternally



Rubin and colleagues showed that HD caused by a transposable element.
 Rationale: *white* gene had been cloned, so induced HD *white* mutations and looked for insertions in *white* gene.

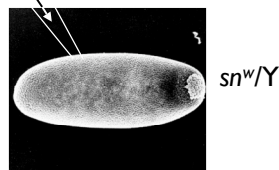


Isolated seven new *white* alleles

1. All seven white mutants spontaneously reverted to red.
2. All seven contained insertions that the wild-type *white* gene lacked.
3. All of the insertions were related (Ac like).
4. Many elements present in P strains, but none in the M strains.
5. The largest element in the genome was 2.9 kbp.

Does the 2.9 kb element contain transposase activity?

Inject plasmid containing 2.9 kb P element



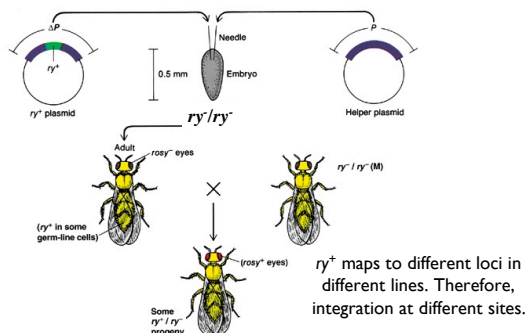
Singed bristle assay: sn^w is a weak allele of *singed*. sn^w has two P elements in the *singed* promoter. When one is excised, get a more extreme phenotype (sn^e). When the other is excised, get wild-type (sn^+).

Injected $sn^w/Y m \times sn^-/sn^- f$

sn^w/sn^- females

Also get wild type (sn^+/sn^-) and more extreme phenotype (sn^e/sn^-)
 2.9 kb element has transposase activity.

Can use P elements to integrate genes into the genome



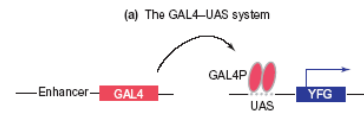
Uses of P elements

1. New alleles of gene
2. Insert genes into genome e.g., test whether cloned correct gene by mutant rescue.
3. Genetic mapping
4. Reverse genetics
5. Enhancer trapping
6. Misexpression of genes.

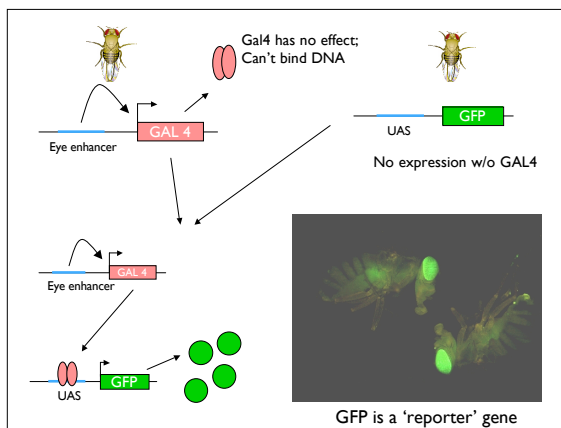
Uses of P elements

1. New alleles of gene
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The bipartite GAL4-UAS system



- GAL4 is a transcriptional activator from yeast that recognizes a DNA sequence called the UAS (upstream activating sequence)
- We can use this to control expression of YFG in a tissue specific manner by using enhancer elements specific for the tissue we are interested in



Mix-N-Match!

