LECTURE 4 – GEN2041

Extensions to Mendelian inheritance

Complementation test

- Different genes: wild type phenotype, mutations complement
- Same genes: mutant phenotype, mutations fail to complement

Gene interactions

- Many genes contribute
- Follow ratios is from no gene interactions
- Epistasis results in modified ratio
- Parallel pathways
- Blue and yellow work together to make green in buggies
    - Novel phenotypes in a 9:3:3:1

Complementary gene interaction

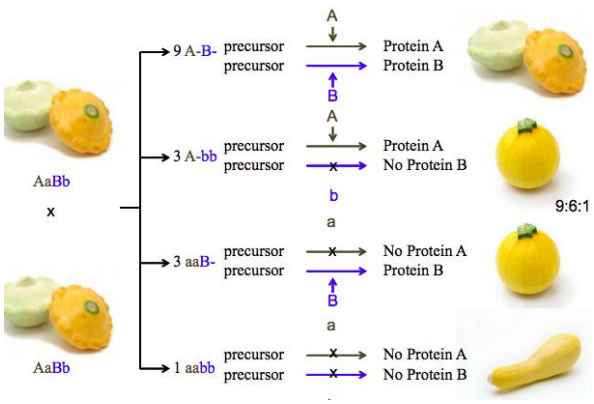
- Complementation each of mutation was in different gene
- Wild type phenotype
- Need a dominant allele for each gene to produce that trait
    - Duplicate recessive epistasis
- Need to be non-mutated to give wild type
- 9:7

Duplicate genes

- 15:1 ratio
- either A or B required
    - two genes each with two alleles
    - 15 T-, --, or – V-
    - 1 tt;vv

Dominant gene interactions

- 9:6:1
- phenotype depends on dominant alleles at 2 loci



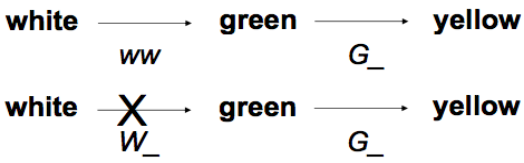
- if dominant allele A/B there disk shape
- if you only have only one dominant allele of A or B gives sphere
- no dominant gives elongated shape

Recessive epistasis

- coat colour in lab retrievers
- ee is epistatic to B gene
- 9:3:4

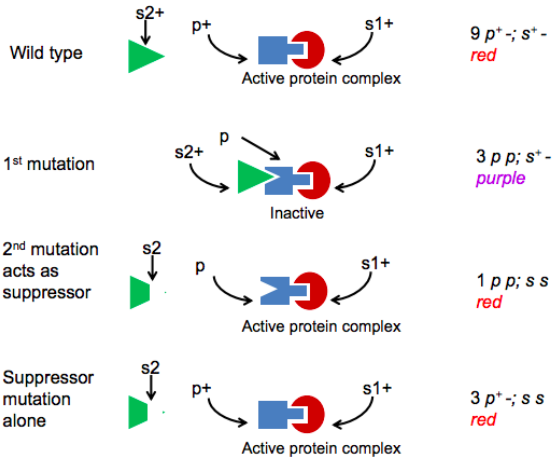
Dominant epistasis

- Squash fruit colour
- W- is epistatic to gene
- 12:3:1



Suppression

- A suppressor allele is an allele of one gene that reverses effect of a mutation of another gene that results in wild type allele
- May or may not have their own phenotype
- Can be dominant or recessive
- Produce modified dihybrid ratios
    - Means epistatic
- 13:3
- how does it work



Parallel pathways (no gene interaction)	9 : 3 : 3 : 1
complementary gene interaction	9 : 7
duplicate genes	15 : 1
dominant gene interaction	9 : 6 : 1
epistasis- recessive	9 : 3 : 4
epistasis – dominant	12 : 3 : 1
suppression	13 : 3