

I. Genes and phenotypes

- one gene can have many phenotypes
- a single phenotype may be affected by many genes
- genes not always strictly dominant/recessive
- genes can have multiple alleles

II. Types of gene interactions - departures from 9:3:3:1 useful for interpreting two gene interactions

- A. same phenotype, but complement (distinct steps in same pathway)
- B. different, but related, phenotypes, with both seen in double mutant (independent pathways)
- C. Epistasis: one mutant phenotype “masks” the other in double mutant
 1. may represent steps in biochemical pathway
 2. developmental pathway
- D. Suppression or enhancement
 1. some mutations may have no effect on their own but act to modify effect of other mutations
 2. In crosses only two phenotypes are segregating, though severity of phenotype may vary
- E. Synthetic phenotypes
 1. New phenotype seen for double mutant
 2. Phenotype may be lethality

III. Manifestation of interactions with modifiers and environment

- A. Variable penetrance - penetrance is the fraction of genotypic mutants that actually show the phenotype
- B. Variable expressivity - degree of phenotype shown by genotypic mutants