

Incomplete dominance and codominance

Incomplete dominance

- ▶ Neither allele completely dominant
- ▶ Heterozygotes have a phenotype between homozygotes

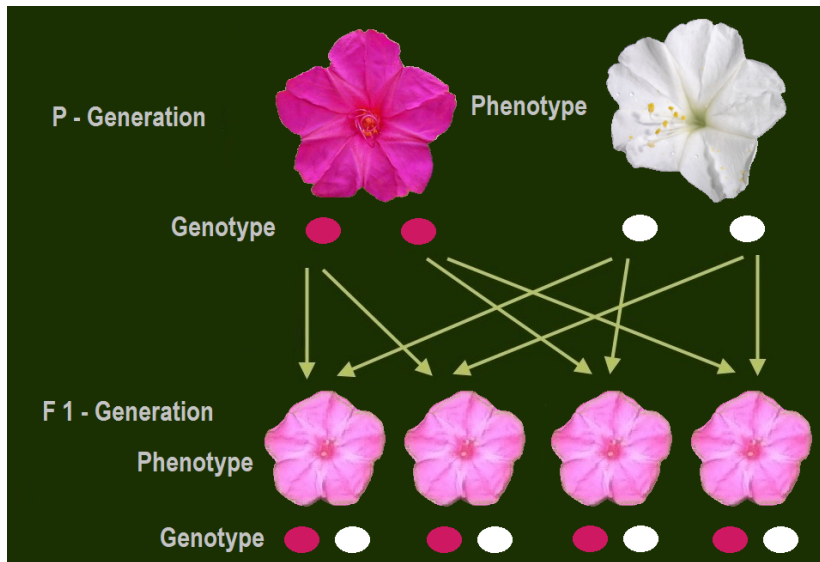
Incomplete dominance: Snapdragon



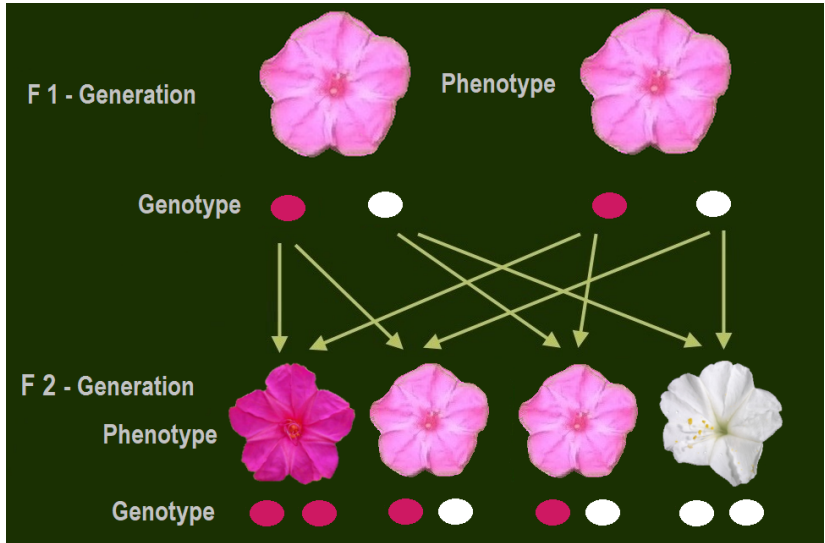
Antirrhinum majus

- ▶ Native to the Mediterranean region
- ▶ Grows in crevices and walls
- ▶ Flower colour shows incomplete dominance
 - ▶ Homozygous red ($C^R C^R$) makes red flowers
 - ▶ Homozygous white ($C^W C^W$) makes white flowers
 - ▶ Heterozygous ($C^R C^W$) makes pink flowers
- ▶ Letter C with superscript indicates neither allele is dominant

Incomplete dominance in snapdragons



Incomplete dominance in snapdragons



Incomplete dominance

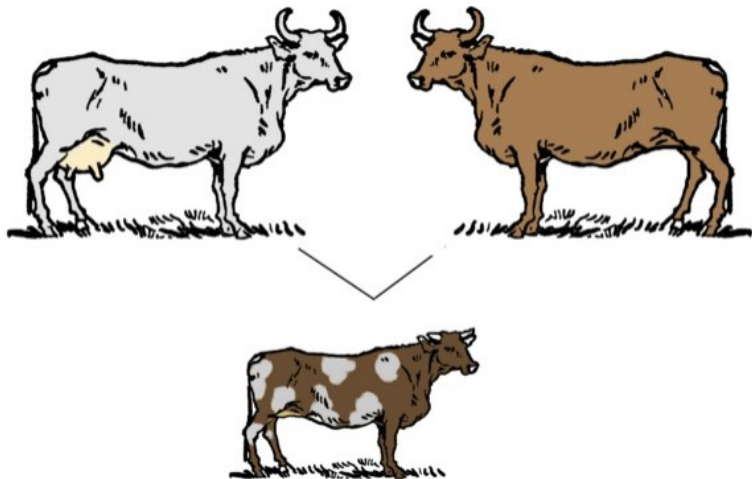
- ▶ Incomplete dominance is not blending inheritance
 - ▶ Variation maintained by discrete alleles
 - ▶ Alleles segregate independently
- ▶ Different degrees of incomplete dominance possible
- ▶ Degree of dominance¹ (h) matters in terms of visibility to selection (s)

¹Bourguet, D. (1999). The evolution of dominance. *Heredity*, 83:1-4. [\[PDF\]](#)

Codominance

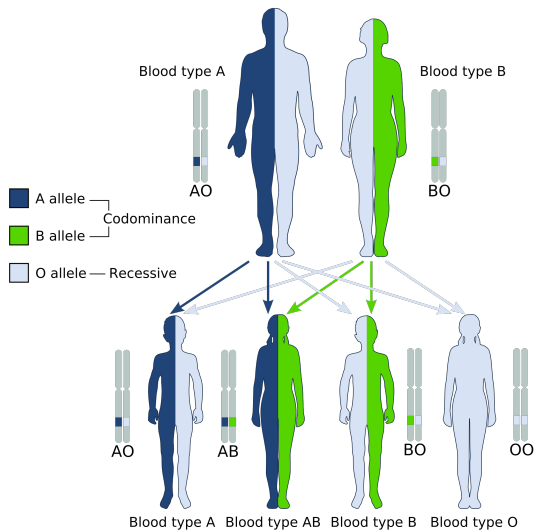
- ▶ Two alleles are expressed to yield a different phenotype
- ▶ Alleles are expressed to an equal degree

Codominance



¹Image: Prof Leandro A. Freire (2023), CC BY-SA 4.0.





Codominance



Human blood types are codominant

Phenotypes: A, B, AB, and O

Codominance

Genotype	Phenotype
$I^A_$ ($I^A I^A$ or $I^A i$)	 Type A
$I^B_$ ($I^B I^B$ or $I^B i$)	 Type B
ii	 Type o
$I^A I^B$	 Type AB

Three total alleles

- ▶ 2 dominant (A, B)
- ▶ 1 recessive (i)

Dominant alleles caused by production of A or B antigens

Other antigens (Rh) determine positive or negative status

Different types of dominance

- ▶ **Complete dominance:** Phenotype of dominant homozygote and heterozygote are identical
- ▶ **Incomplete dominance:** Phenotype of F_1 hybrids is somewhere between the phenotype of the parents
- ▶ **Codominance:** Two dominant alleles affect the phenotype in separate distinguishable ways