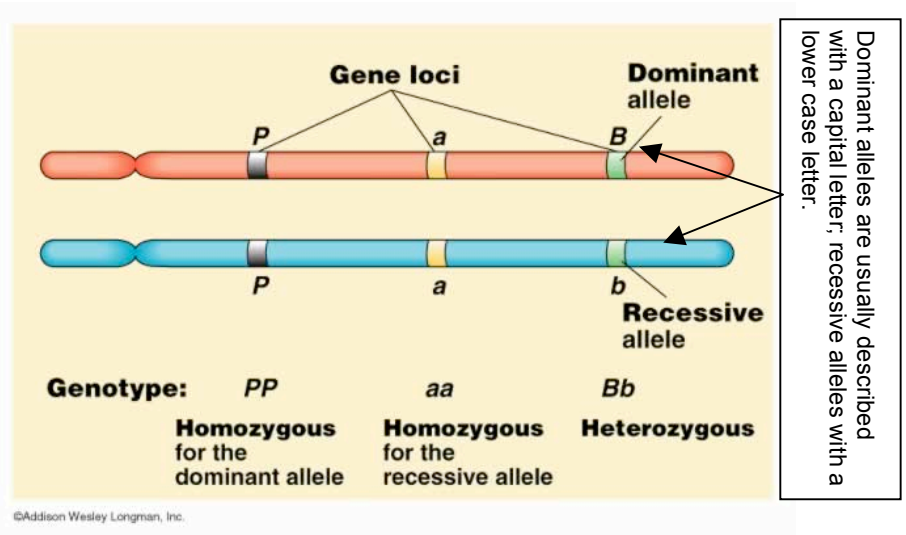


Human chromosomes contain 20,000-25,000 **genes**.

Genes come in pairs (1 on each chromosome). Variations of genes are **alleles**. A person may have 2 different alleles (**heterozygous**), 2 of the same alleles (**homozygous**), or even be missing a gene and so have only 1 allele (hemizygous).

Alleles are described as **dominant**, **recessive**, or **codominant**. When 2 of the same alleles are paired (homozygous pair), the expression of the gene (**phenotype**) will be for that allele. When 2 different alleles are paired (heterozygous pair), the dominant allele will be expressed for that pairing unless they are co-dominant, in which case both will be expressed.



Gene Pair	Phenotype
PP	
pp	
Pp	

Gene Pair (blood type)	Phenotype
AA	
BB	
AB	
Ao	
Bo	
Oo	

Single Gene Traits in Humans

These are autosomal human traits attributed to a single gene. Other genes are involved, but inheritance of these acts as if it were governed by a single gene. 1) Indicate your expressions of a trait. 2) Indicate if this is the expression of the dominant or recessive trait (D/R). 3) Using any letters you want, write your genotype for that trait.

Trait	Dominant or Recessive Phenotype?	Genotype(s)
Tongue: rolling (D) or non-rolling (R)*		
Hairline: widow's peak (D) or straight (R)		
Ear wax: wet (D) or dry (R)		
Interlocking fingers: L/R (D) or R/L (R)***		
Earlobes: attached (D) or unattached (R)		
Thumb extension: straight (D) or hitchhiker's (R)		
Chin: cleft (D) or smooth (R)		
Darwin tubercle: present (D) or absent (R) <i>(little bump on the inside of the ear)</i>		
S-methylthioester: nondetection (D) or detection (R) <i>(can you smell asparagus odor in urine?)</i>		
Iris: pigmented (D) or blue (R)+		
Freckles: present (D) or absent (R)		
Fingers/Toes: Polydactyl (D) or 5 in sets (R)		
Dimples: present (D) not present (R)		
Eyelashes: Long (> 1cm; D) or short (R)		
Big toe: Shorter than 2nd (D) or longer (R)		
Handedness: right (D) or left (R)**		
Colorblind: no (D) or yes (R) <i>(due to allele on the x chromosome)</i>		
Vision: farsighted (D) or normal or nearsighted (R)		
Hair color: Non-red (D) or red (R)		
Response to poison ivy: immune (D) or susceptible (R)		

*some identical twins do not share this, so it may not be inherited

**some scientists report that multiple genes are responsible for this trait

***some scientists reports that this is not genetic

+gray, green, hazel are dominant over Blue, Blue is dominant over Albino (pink)

1. If both parents **show the dominant phenotype for trait "A,"** what alleles each may be carrying?
2. What combinations might their offspring have?
3. If both parents **show the recessive phenotype for trait "a,"** what alleles might each be carrying?
4. What combinations might their offspring have?
5. Mother is BB; father is bb. What is the chance that for any birth, the offspring will have phenotype B? b?
6. A couple you meet both have brown eyes, but their child has blue eyes. Explain this in terms of alleles.
7. A widespread misconception is that traits due to dominant alleles are the most common in the population. While this is sometimes true, it is not always the case. Try to explain this.