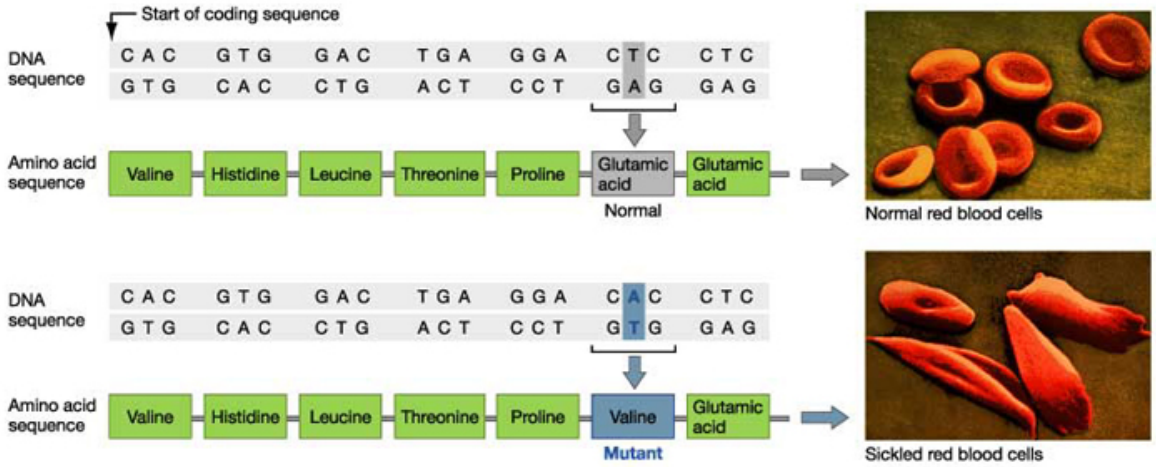
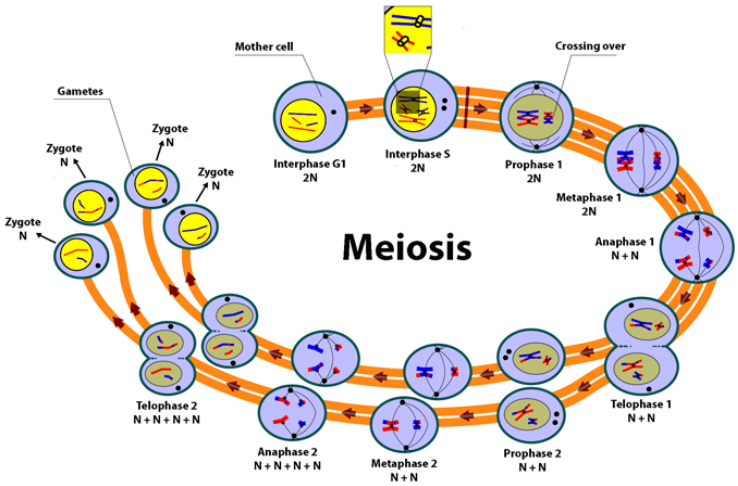
4.1.4 Consequence of a mutations, including base substitution using sickle cell



The change in amino acid sequence causes hemoglobin molecules to crystallize when oxygen levels in the blood are low. As a result, red blood cells sickle and get stuck in small blood vessels.

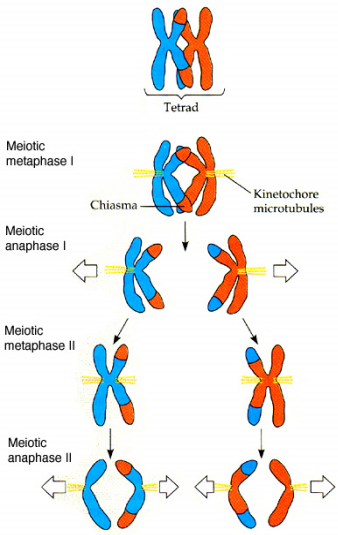
Meiosis



Creates 4 haploid gametes

Goes through PMAT twice

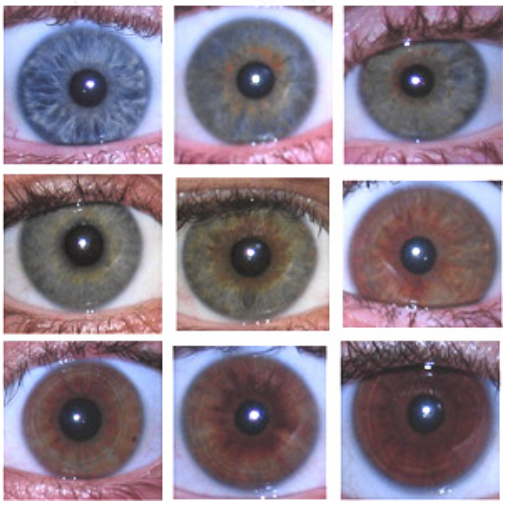
Crossing over creates additional variations, assuring each sperm and egg is different



In humans Brown eyes (B) are dominant over both blue (g) and green (G) eyes. If either (B) is dominant it will mask any type of (G).

Cross two brown eyed people who are heterozygous for both alleles, and determine what the odds of them having a brown eyed, green eyed, or blue eyed child?

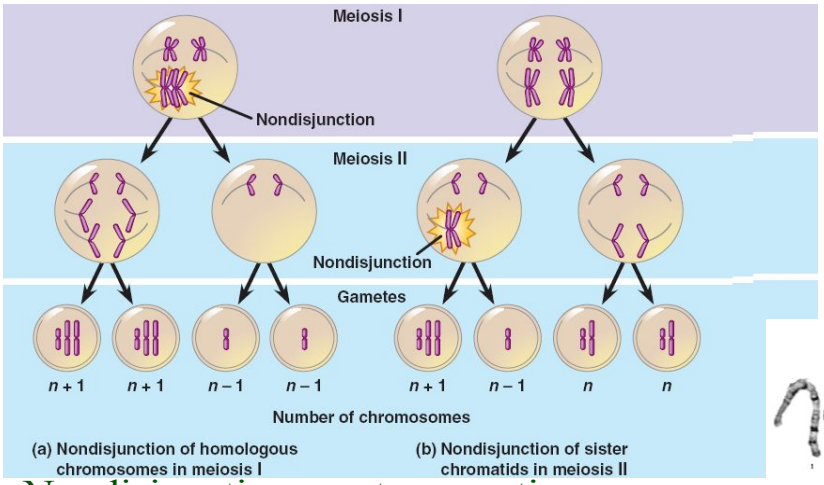
Eye Colors
Strum and Frudakis (2004) Trends in Genetics 20:327



	B/G	B/g	b/G	b/g
B/G	BB/GG	BB/Gg	Bb/GG	Bb/Gg
B/g	BB/Gg	BB/gg	Bb/Gg	Bb/gg
b/G	Bb/GG	Bb/Gg	bb/GG	bb/Gg
b/g	Bb/Gg	Bb/gg	bb/Gg	bb/gg

Sex linked traits

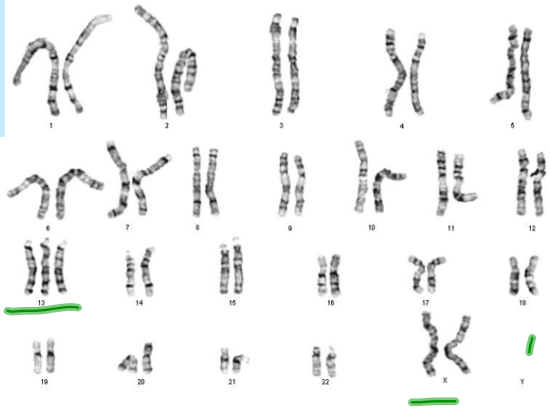
Meiosis gone wrong



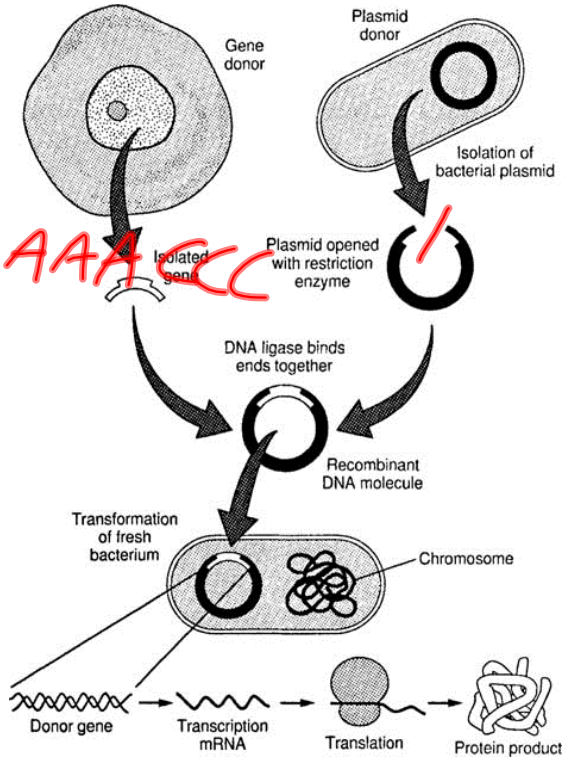
Nondisjunction creates genetic abnormalities that can be identified by a karyotype

Nondisjunction

Trisomy 13

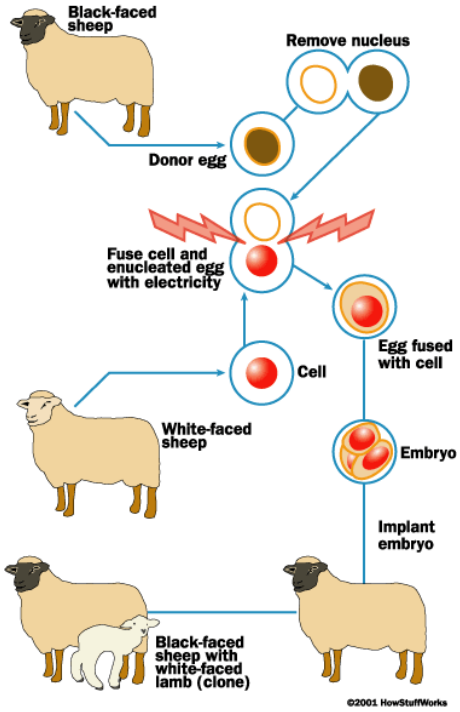


Recombinant DNA

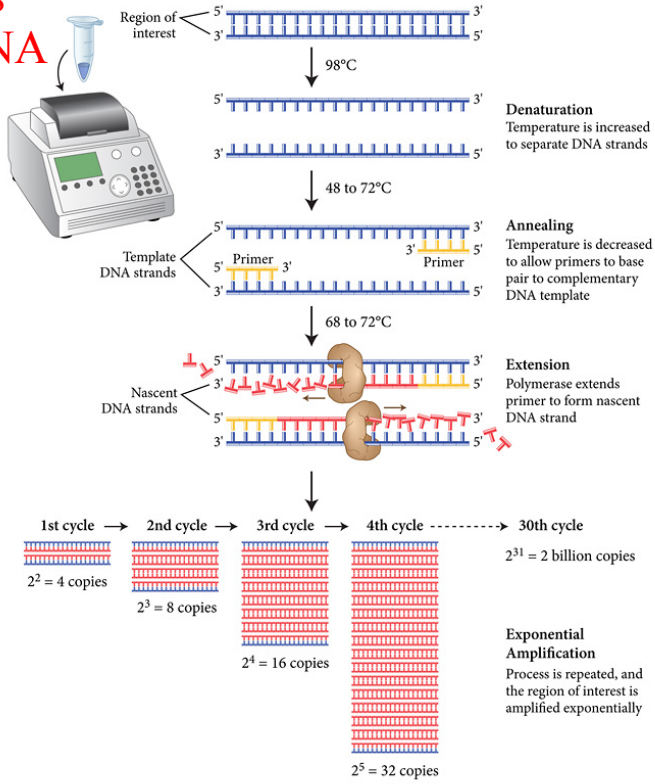


DNA from two sources:

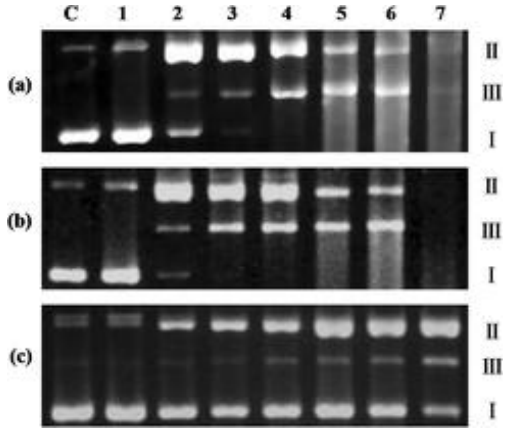
- Restriction enzymes cut out gene
- plasmids take up gene
- DNA Ligase tapes sticky ends together
- New DNA is a new combination (recombinant)


Black-faced sheep
Remove nucleus
Donor egg
Fuse cell and enucleated egg with electricity
Egg fused with cell
Cell
White-faced sheep
Embryo
Implant embryo
Black-faced sheep with white-faced lamb (clone)
©2001 HowStuffWorks

PCR machine makes copies of suspect DNA

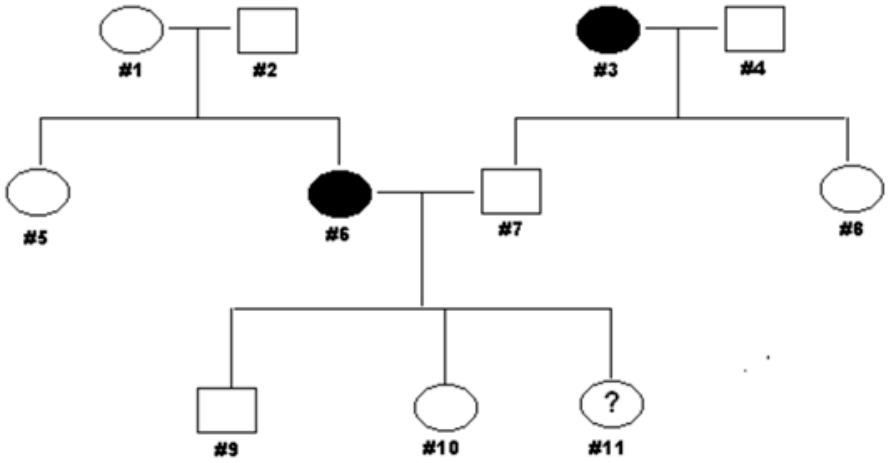


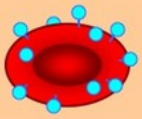
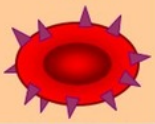
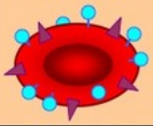
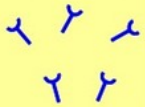
Gel electrophoresis identifies a match



Auto recessive

This pedigree is for a simple Mendelian trait. Determine whether the shaded trait is dominant or recessive, and determine the genotype for each person



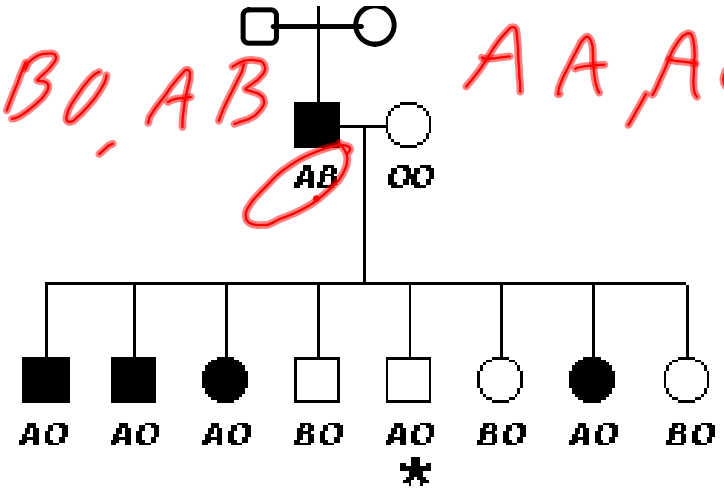
ABO Blood Groups				
Antigen (on RBC)	Antigen A 	Antigen B 	Antigens A + B 	Neither A or B 
Antibody (in plasma)	Anti-B Antibody 	Anti-A Antibody 	Neither Antibody	Both Antibodies 
Blood Type	**Type A** Cannot have B or AB blood Can have A or O blood	**Type B** Cannot have A or AB blood Can have B or O blood	**Type AB** Can have any type of blood Is the universal recipient	**Type O** Can only have O blood Is the universal donor

AA BB AB OO

AO BO

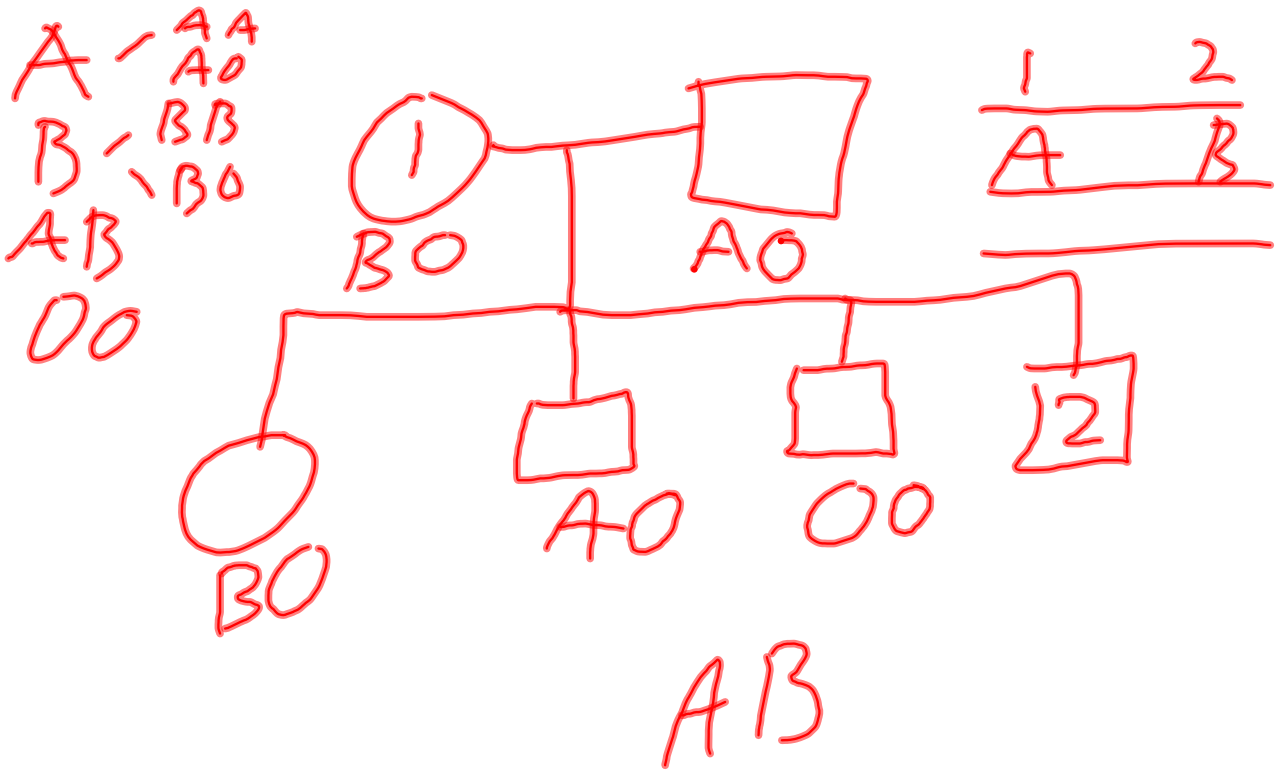
Suppose a father of blood type B and a mother of blood type O have a child of type O. What are the chances that their next child will be blood type O? Type B? Type A? Type AB?

BB, BO, AB AA, AO, AB



Nail-patella syndrome = ● or ■

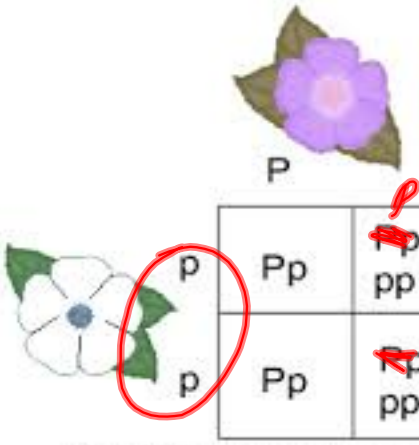
Blood Types = *OO, AB, BO, AO*


A - AA AO
B - BB BO
AB
OO
1
BO
AO
1 2
A B
BO
AO
OO
2
AB

Rolling your tongue (T) is dominant over not being able to roll your tongue (t). Hair shows incomplete dominance with curly hair being dominant over straight and wavy hair being the heterozygous. Cross two people who are heterozygous for tongue rolling and have wavy hair.

How many will be able to roll their tongue and have curly hair?

Test Cross



If all offspring are purple, then parent must be PP
If half are white and half are purple, parent must be Pp