



Genetics and Heredity

- GENETICS- The Study of the way animals and plants pass on to their off spring such as:
 - Eye color, hair color, height, body build, blood type, intelligence, gender, etc.
- HEREDITY- Characteristics that a child receives from both parents

CELL: basic unit of all living matter (adult over 10 Trillion Cells)

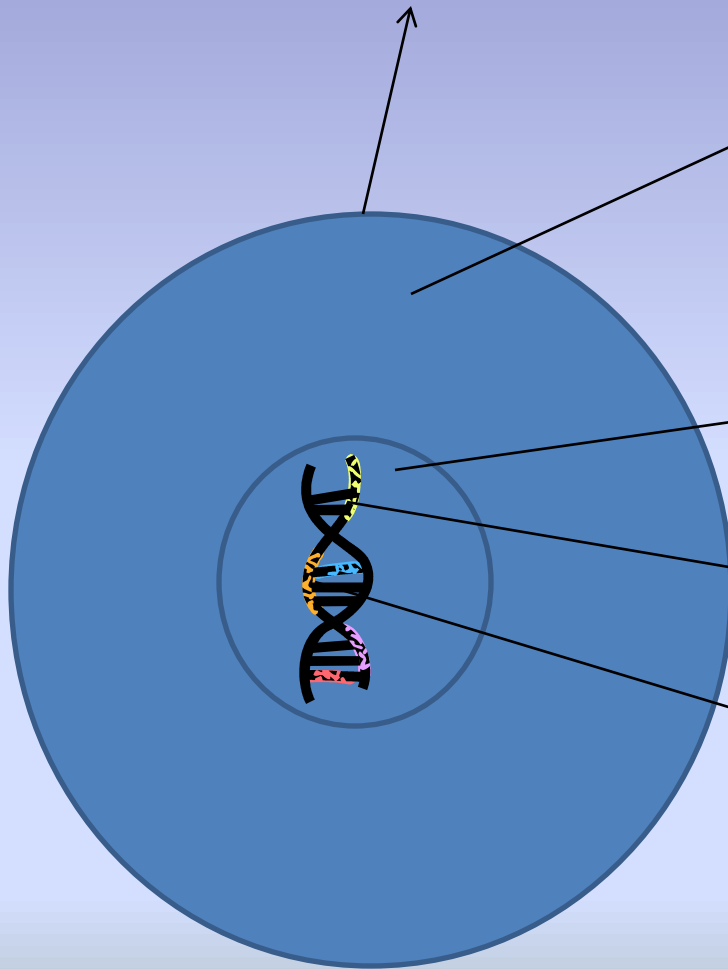
CYTOPLASM: Substance of Cell outside of nucleus

NUCLEUS: Central point of cell contains genetic coding for maintaining life systems and issuing commands for growth and reproduction

CHROMOSOMES: 46 in each Nucleus (23 pairs)

GENES: bands on chromosomes (thousands of genes)

DNA on genes (billions of DNA)



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- How many chromosomes are there in each cell?
- 46 CCHROMOSOMES or 23 PAIRS
- How many chromosomes are in Reproductive (egg and sperm) or Germ cells?
- 23 CHROMOSOMES
 - combined= the 46 chromosomes

Cell Division

- MITOSIS: cell divides by copying the DNA- cell splits-new cell with normal number of chromosomes (cell growth and repair)
- MEIOSIS: Creates $\frac{1}{2}$ sets of chromosomes
 - Women 23
 - +
 - Men 23
 - =Combined 46

- Female Sex Cells XX
 - Male Sex Cells XY
 - BABY GIRL = XX BABY BOY = XY
 - Conception is the union of an ovum and the sperm
 - Gender is Determined by the FATHER!
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- The diagram illustrates the inheritance of sex chromosomes. It shows 'Female Sex Cells XX' and 'Male Sex Cells XY' at the top. Yellow arrows point from the 'XX' to the 'XX' in 'BABY GIRL = XX'. Another yellow arrow points from the 'XX' to the 'XY' in 'BABY BOY = XY'. A yellow arrow points from the 'XY' to the 'XY' in 'BABY BOY = XY'. A final yellow arrow points from the 'XY' to the 'XY' in 'BABY BOY = XY'. This visualizes that the mother always contributes an X chromosome, while the father contributes either an X (resulting in a girl) or a Y (resulting in a boy).

- DOMINATE Gene: More powerful- trait seen in person
- RECESSIVE Gene: Weaker and hides in the background. Trait can only determine when two of them are present- may show up in future generations
- CARRIER: Has a recessive gene that is not visible
- SEX-LINKED: Mother passes the recessive X to son
 - Color-blind male receives the trait from his mother
 - The mother usually not color-blind her-self
- B=BROWN eyes (dominant) b=BLUE eyes (recessive)
 - BB=Brown eyes
 - Bb=Brown eyes but carry the recessive BLUE eye gene
 - bb= Blue eyes

Multiple Births

- ZYGOT: the cell that is formed when a sperm fertilized an egg (ovum)
- MONOZYGOT: Identical Twins 1 egg+ 1 sperm
 - Fertilized ovum splits into 2 identical cells- Always the same gender
- DIZYGOT: Fraternal Twins 2 eggs + 2 different sperm
 - Will look different-may be different or the same gender
- CONJOINED (Siamese) TWINS: Ovum splits apart, but the separation is not completed. Babies are joined at some part of their bodies
 - <http://tlc.howstuffworks.com/videos/abby-brittany-birthday-bonfire.html>

What 4 factors may contribute to Multiple Births?

- 1) History in the Family
- 2) Increased Hormones naturally
 - More than one egg released
- 3) Fertility Drugs
 - More than one egg released
- 4) Age 32-36
- Likelihood of multiple pregnancies in the US
 - Twins: African Americans 1 in 73 Caucasian 1 in 93
 - Triplets: 1 in 10,000
 - Quadruplets: 1 in 620,000

- Sex-Linked or X-Linked Defect: When an X-gene from the mother is faulty. There is a 50/50 chance of the child inheriting the disorder
- Syndrome: When a group of signs and symptoms occur together and characterize a particular problem
- Congenital Malformation: a condition that is present at birth
- Multi-factorial Defect: interaction of genes with other genes OR with environmental factors
- Chromosomal Error: The fertilized egg cell that contains chromosomes in an abnormal number, structure or arrangement