

DNA Information

- Basic Structure
 - Consists of two entwining polynucleotides.
 - Comprised of nucleobases, phosphate groups & deoxyribose sugars.
 - The order of nucleobases determines information.
- Big Picture
 - Located in:
 - Cell
 - Nucleus (In Eukaryotes, in Prokaryotes stored in cytoplasm)
 - Mitochondria
 - Contains 37 genes or 16500 nucleobases
 - Responsible for cellular respiration
 - Passed from mother to child
 - Interpreted by some scientists as proof of mitochondria being free living organisms in the past.
 - Chromosomes
 - Composed of two chromatids, held together by a centromere.
 - Made of chromatin.
 - Chromatin proteins (eg. histones) compact & organise DNA
 - The set of chromosomes make up the genome.
 - Humans contain 23 pairs of chromosomes.
 - One of these determines the sex/gender of the individual known as the sex chromosomes.
 - In females the sex chromosomes are the same (XX)
 - All female eggs are X chromosomes.
 - In males the sex chromosomes are different (XY)
 - 50% of sperm has X chromosome, 50% of sperm has Y chromosome.
 - The male chromosome fusing with the egg decides the child's sex.
 - The rest are autosomes.
 - Pictures of chromosomes are called karyotypes
 - They involve cutting out pictures of chromosomes & putting them into homologous pairs.
 - Dark bands are gene rich.
 - Chromosomes are paired with their corresponding chromosome, with matching pairs called homologous pairs or bivalents.
 - When there are two sets of chromosomes in a cell, it is called diploid, represented by $2n$ (n being number of chromosomes)
 - Sex cells are haploid (represented by n)
 - The largest chromosome is Chromosome 1 with more than 4000 genes.
 - The smallest is the Y chromosome with less than 100 genes.
 - Chromosomes can be viewed through light microscopes when cells divide.
- Bonds
 - Adenine - Thymine (pyrimidines) are bonded through 2 hydrogen bonds.
 - Adenine - Uracil in RNA
 - Uracil occurs as a breakdown of Cytosine.
 - In several species of bacteriophages uracil replaces thymine.
 - Cytosine - Guanine (purines) are bonded through 3 hydrogen bonds.
 - These bonds can come apart through a process called melting, occurring at high temperatures, low salt and high PH.
 - Melting temperature (T) is where 50% of ds molecules are converted to ss molecules.