12.2 Structure of DNA

DNA must specify how to assemble proteins and how genes are replicated & inherited.

Components of DNA

DNA is nucleic acid made up of nucleotides joined into long strands or chains by covalent bonds.

- Nucleic acids-long, slightly acidic molecules identified in cell nucleus.
- Nucleotides-building blocks (monomer) of nucleic acids (polymer).
- Nucleotides are made up of 3 basic components: 5-carbon sugar (deoxyribose), a phosphate group, and a nitrogenous base. Link together to form long chains (nucleic acids).
- Nitrogenous Bases-4 types: adenine, guanine, cytosine, & thymine (A,G, C, T).
- DNA strands are formed from covalent bonds between sugar of 1 nucleotide & the phosphate group of the next. N bases stick out sideways from the chain.
- N bases can combine in any sequence.
- N Bases absorb UV light & amount of DNA is often measured by UV light.

Solving the Structure of DNA

DNA is arranged in a 3 dimensional structure.

- Chargaff's Rule-Equal % of A & T, Equal % G & C.
- Franklin's X-rays-1952-purified & stretched DNA & captured first image (X shaped showed 2 DNA strands are twisted like helix).
- Watson & Crick-built 3D DNA model using Franklin's x-rays that explained structure & properties.

The Double Helix Model

- Looks like twisted ladder (like spiral staircase)
- Explains Chargaff's rule of base pairing & how 2 DNA strands are held together.
- 2 strands run in opposite directions-antiparellel (allows each strand of double helix to contact the center of the molecule)
- Allows for a sequence of nucleotides like letter in 4-letter alphabet
- N bases held together by weak Hydrogen bonds (covalent)-needed for separation during cell division.
- Base Pairing-A bonds with T and G bonds with C.(nucleotides)