

a double helix that copies itself, reads itself, and packs itself away

DNA as the genetic material

- Griffith's experiment on pneumonia-causing bacteria showed that some heat-killed, disease-causing bacteria could still transform a harmless strain into a disease-causing one, pointing to a transferable transforming principle
- Avery, MacLeod and McCarty later identified that transforming principle as DNA, by showing that only DNA-destroying enzymes could stop the transformation
- the Hershey-Chase experiment, using bacteriophages with radioactively labelled protein and DNA, confirmed that DNA, not protein, is what actually enters a bacterium and directs the making of new virus particles

The double helix

- Watson and Crick, building on Franklin's X-ray data, proposed DNA as two polynucleotide chains coiled into a right-handed double helix, running antiparallel to each other
- each strand is a sugar-phosphate backbone on the outside, with nitrogenous bases pointing inward and pairing across the two strands
- adenine pairs with thymine through two hydrogen bonds, guanine pairs with cytosine through three, so the two strands are complementary rather than identical
- Chargaff's rule falls out of this pairing: the amount of adenine always equals the amount of thymine, and guanine always equals cytosine

DNA vs RNA *

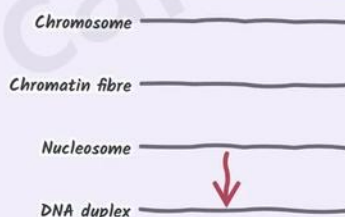
DNA

- sugar is deoxyribose, base thymine, usually double stranded
- stable, long-term store of genetic information

RNA

- sugar is ribose, base uracil in place of thymine, usually single stranded
- works the information: carries it, reads it, and helps build protein from it

Packaging: four levels, bottom to top



four packaging levels, DNA duplex to chromosome; the drawn arrow marks the reverse, a nucleosome unwinding back to bare DNA duplex

