



DNA STRUCTURE

Biology 11



HERE'S WHAT WE KNOW...

DNA has been identified as the hereditary substance

Now we need to understand DNA structure...

Once we understand a little more about the structure of DNA, we can begin to determine how it works.

CHEMICAL COMPOSITION OF DNA

Three main components:

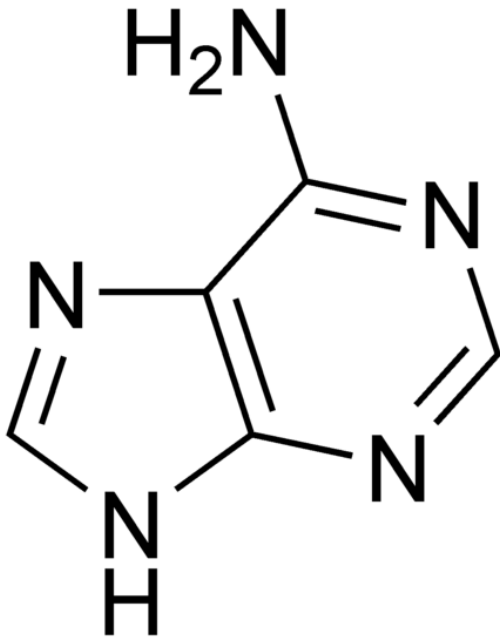
- Deoxyribose sugar
- Phosphate group
- Nitrogenous base

Deoxyribose and phosphate create the backbone of DNA

Nitrogenous bases account for the variation

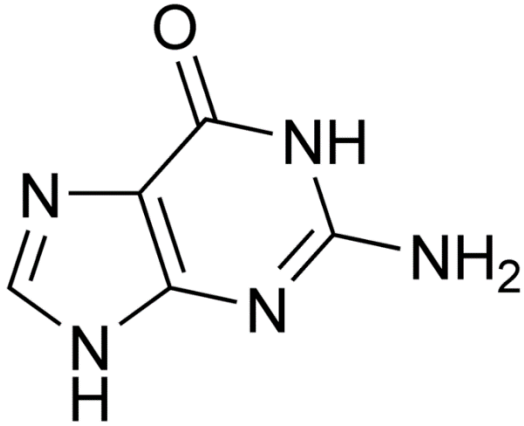
NITROGENOUS BASES

Adenine



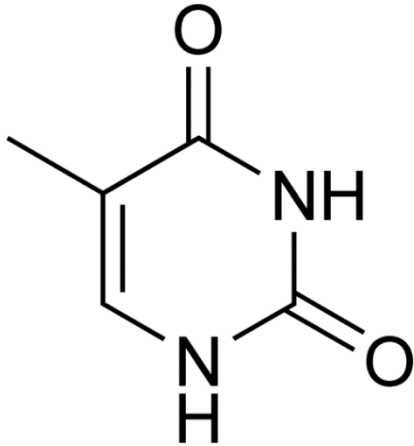
NITROGENOUS BASES

Guanine



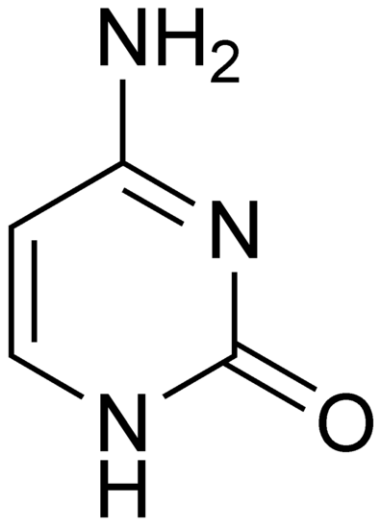
NITROGENOUS BASES

Thymine



NITROGENOUS BASES

Cytosine



NITROGENOUS BASES

In 1949:

- Erwin Chargaff noted
 - Adenine = Thymine
 - Guanine = Cytosine

WHAT A CONUNDRUM...

How does such a simple polymer account for so much variation?

- Scientists knew the chemical structure of DNA
- Scientists decided they needed to determine the physical structure to know more

PHYSICAL STRUCTURE OF DNA

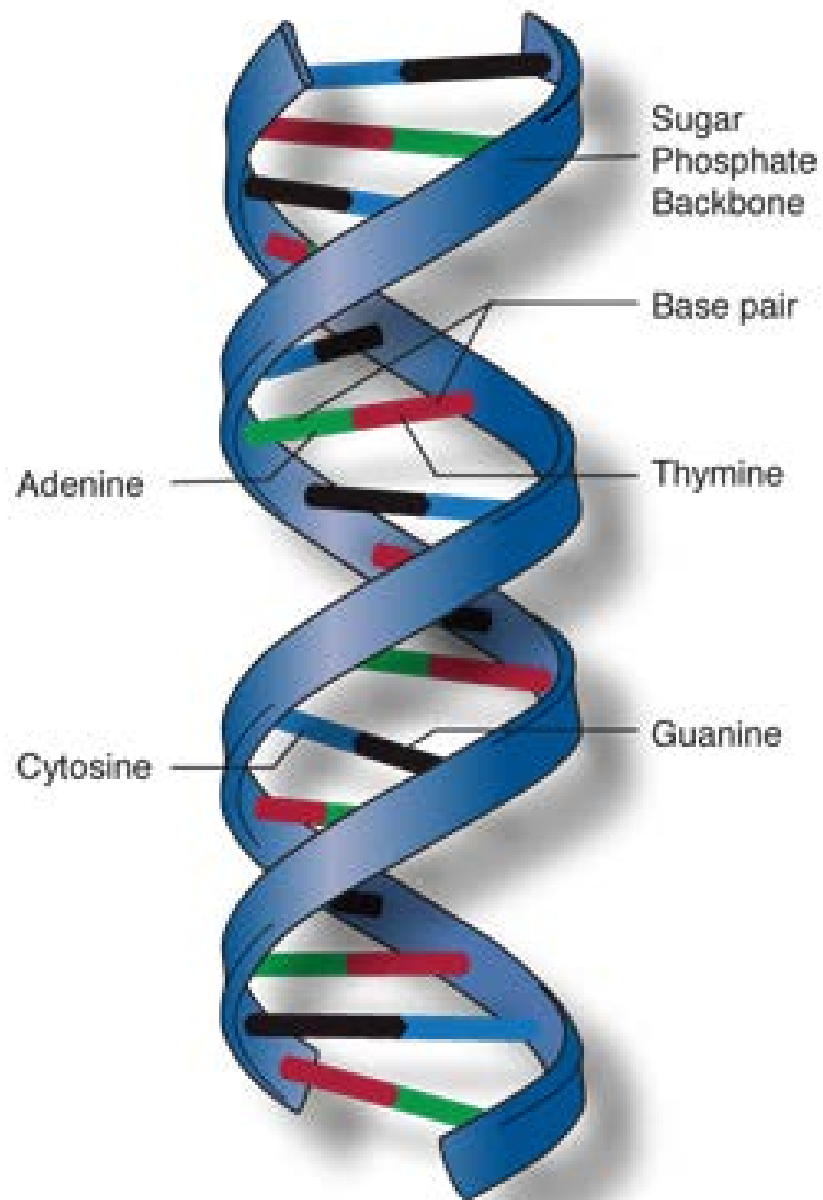
Rosalind Franklin & Maurice Wilkins

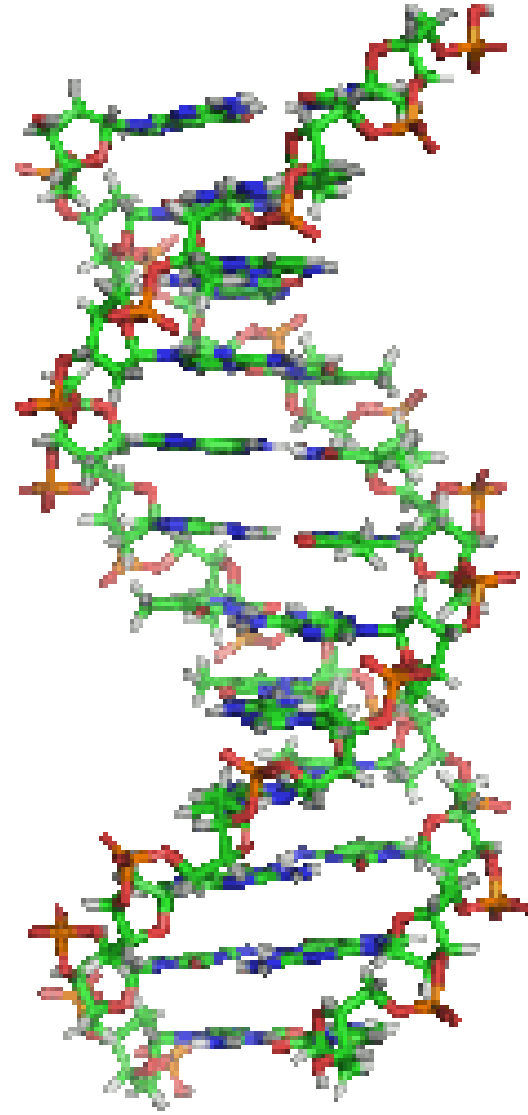
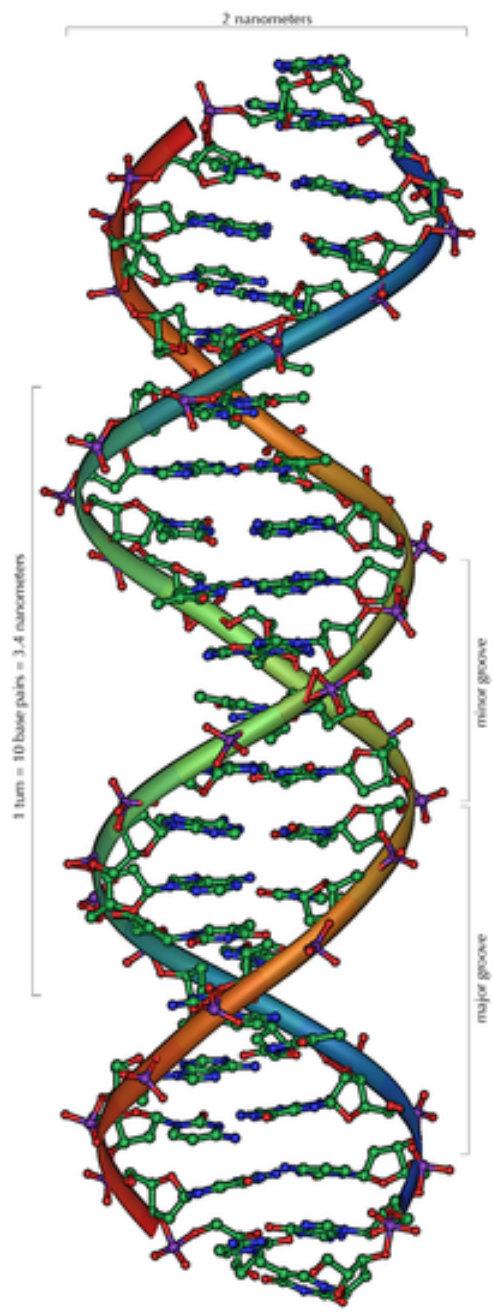
- Used X-ray diffraction
 - Technique used to determine structure/ composition
- Determined that DNA had a helix structure

PHYSICAL STRUCTURE OF DNA

Watson & Crick

- Proposed that DNA consisted of 2 antiparallel strands of nucleotides
 - Parallel but running in opposite directions
- Purines always bonded to pyrimidines // complimentary base pairing
 - Think of this as a 'lock and key' fit
 - Adenine(pu) and thymine(py)
 - Guanine(pu) and cytosine(py)





TAKE HOME POINTS

DNA is seemingly simple

- Sugar
- Phosphate
- Nitrogenous Base

Nevertheless, it accounts for all of the variation and instructions for living things