

I Wonder...

What are we learning
about next?!?

The Wonder Wars Challenge:

- Keep the wondering going **OUTLOUD** for 20 seconds for each picture...
- **No answers, just questions!**
- Can you out-wonder your partner?!



I wonder...

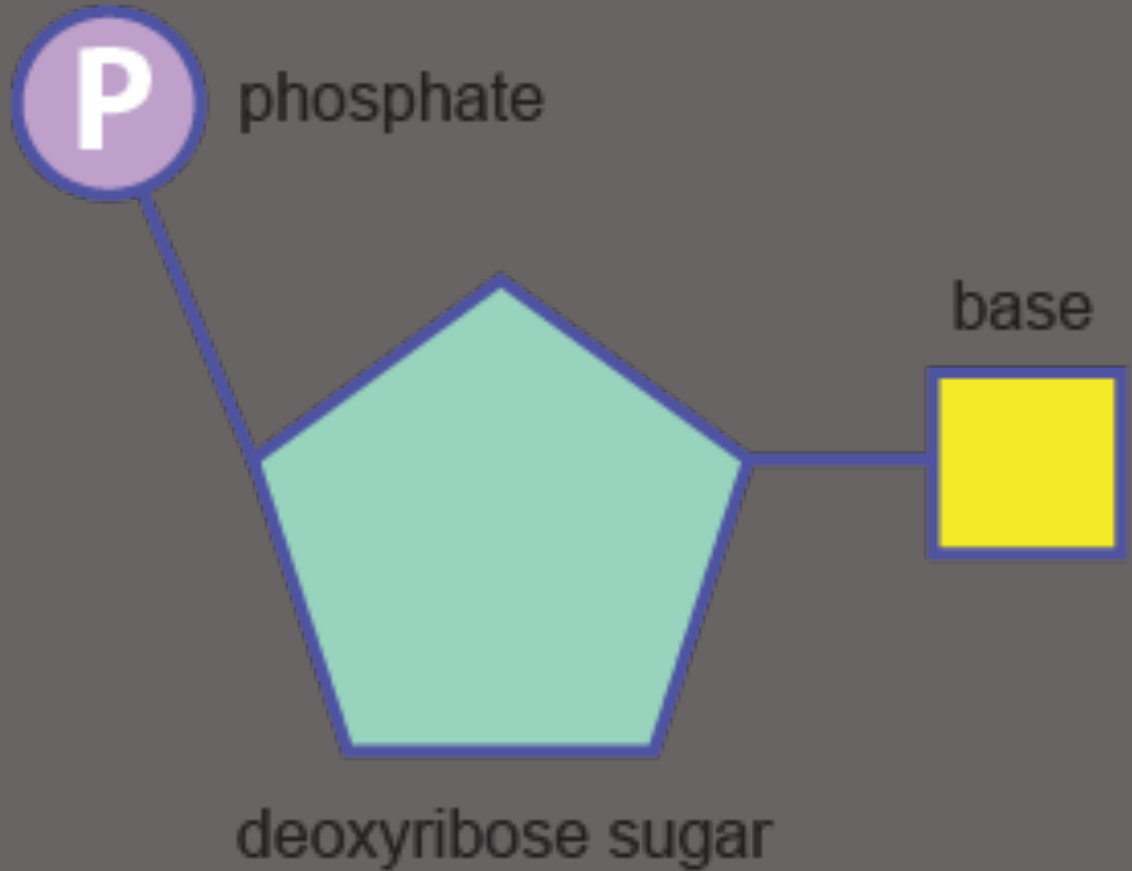
- If...
- What is....
- Where does...
- Why can...
- How could...
- Does this connect to...

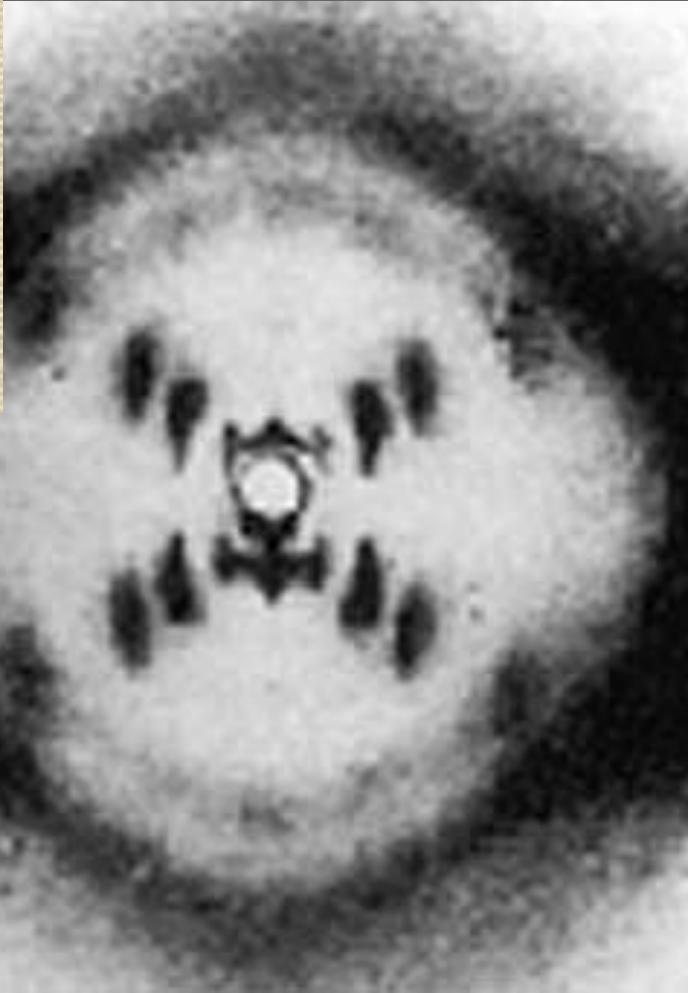


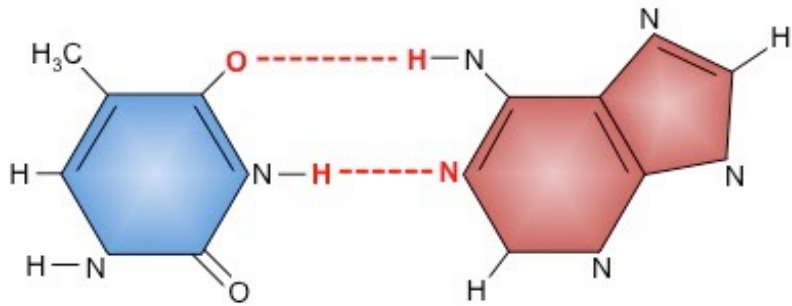
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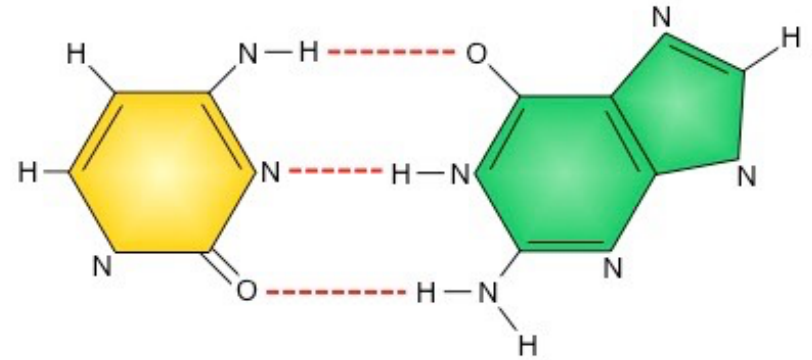
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Thymine / Uracil pairs with Adenine
(2 hydrogen bonds)

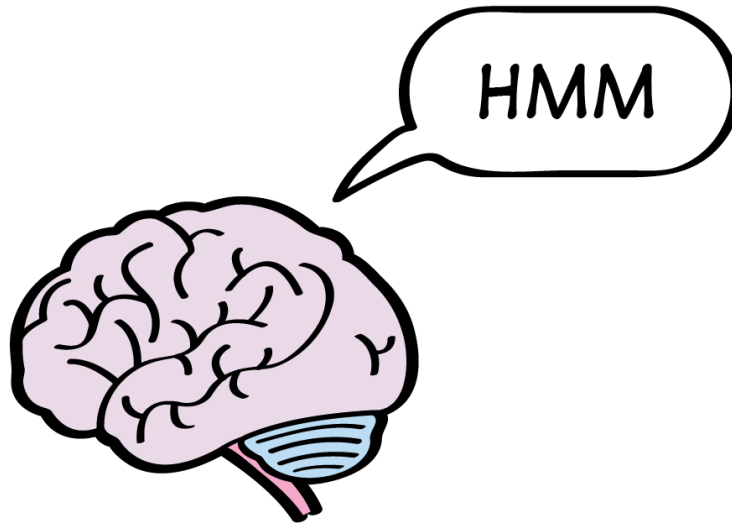


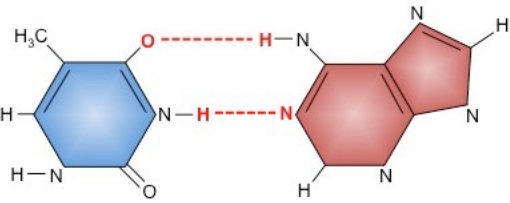
Cytosine pairs with Guanine
(3 hydrogen bonds)



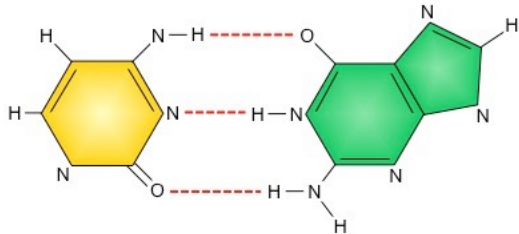
SCIENCEPHOTOLIBRARY

How are the images connected!?

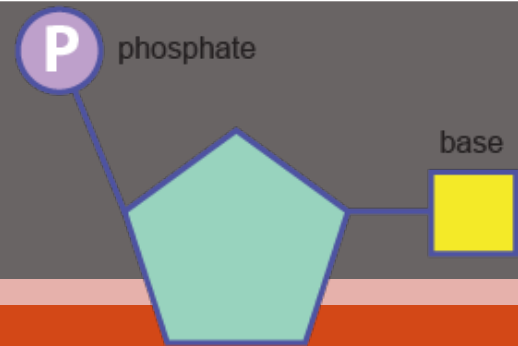




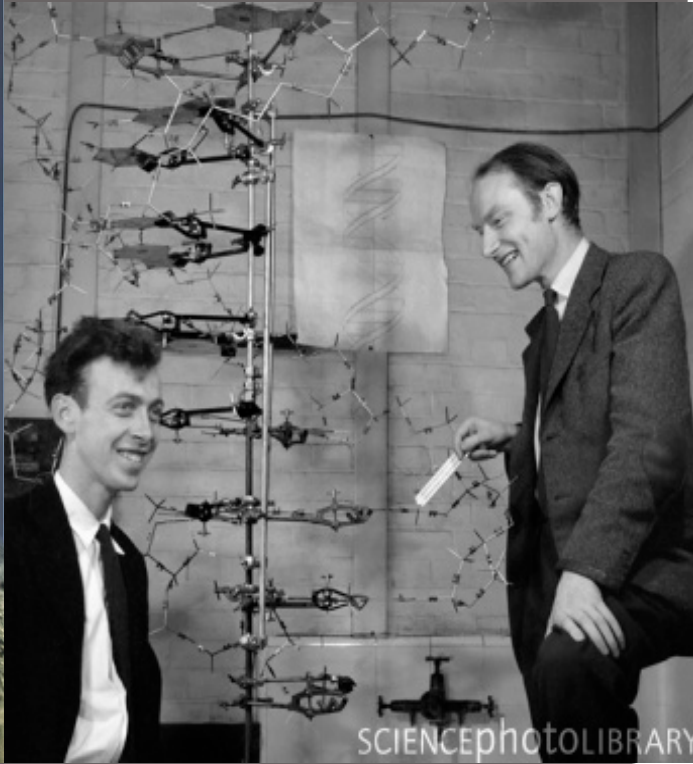
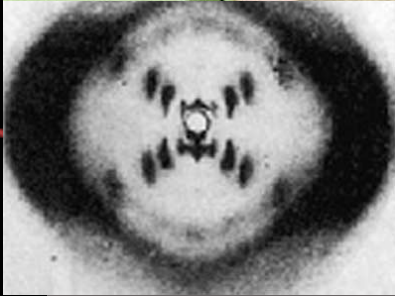
Thymine / Uracil pairs with Adenine
(2 hydrogen bonds)



Cytosine pairs with Guanine
(3 hydrogen bonds)



Can you predict what we will be learning about next?



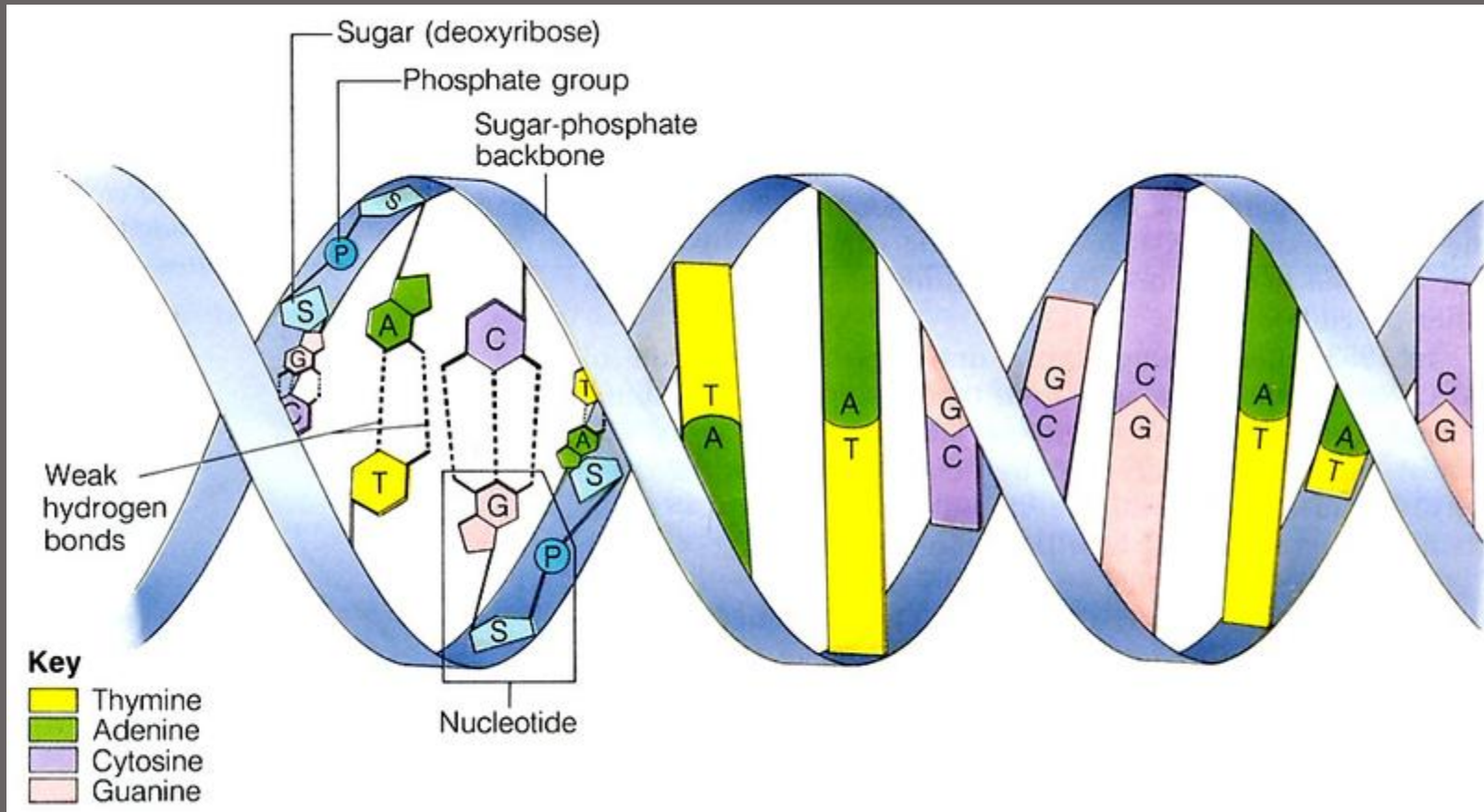
DNA

Deoxyribonucleic Acid

Campbell Chap 16 pg278



How do we know this is an accurate model of DNA?



Evidence of DNA as the genetic material...



1928- Fredrick Griffith



rough strain
(nonvirulent)

smooth strain
(virulent)

heat-killed
smooth strain

rough strain &
heat-killed
smooth strain



mouse lives

mouse dies

mouse lives

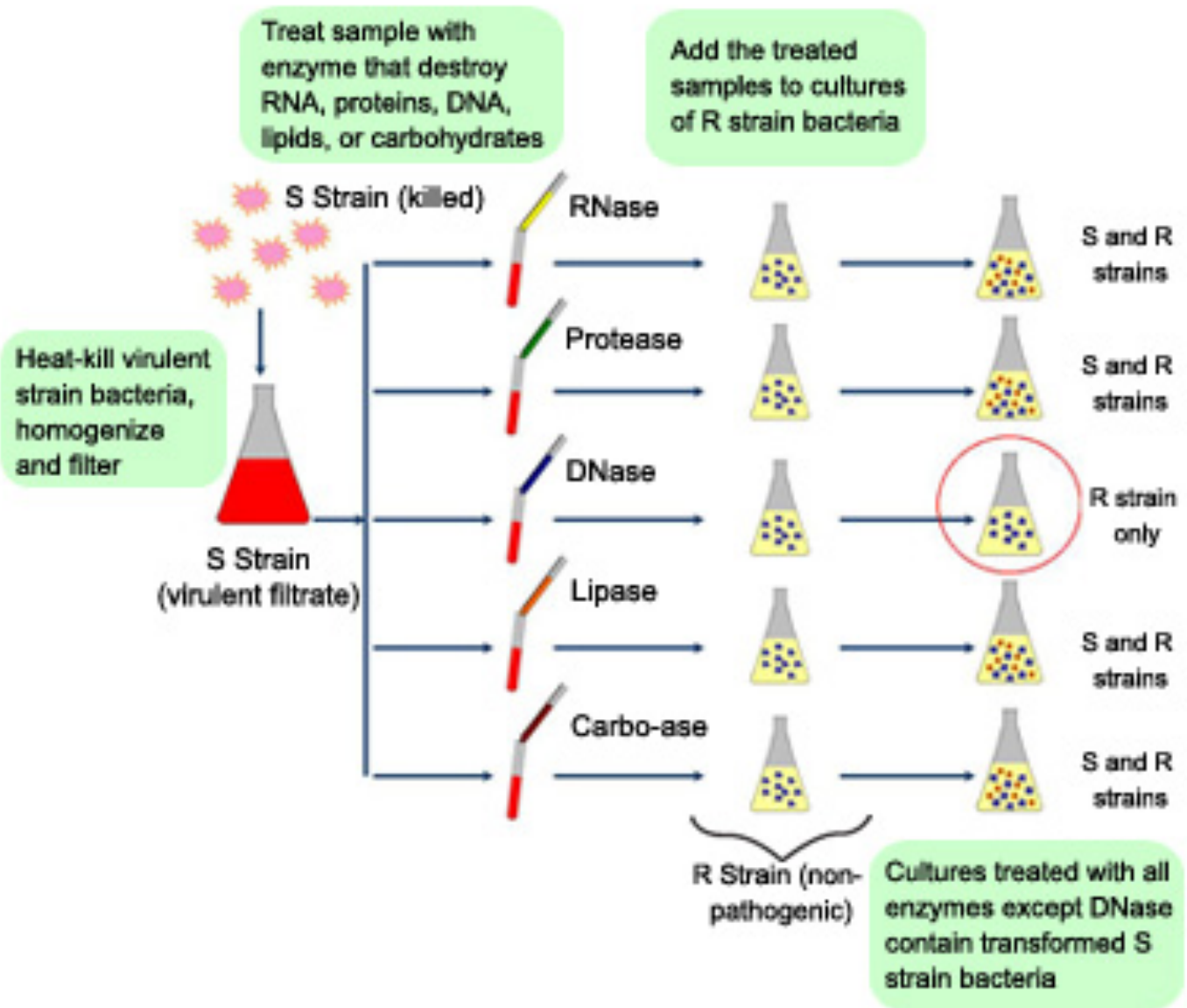
mouse dies

- Studied Pneumonia in Mice

Discovery:

one strain of bacteria was “transformed” into another!

1944- Oswald Avery



1944- Oswald Avery (& McCarty & McCleod)

1) Made a juice of heat killed disease causing bacteria

2) Added enzymes known to destroy –proteins, lipids, carbs & RNA

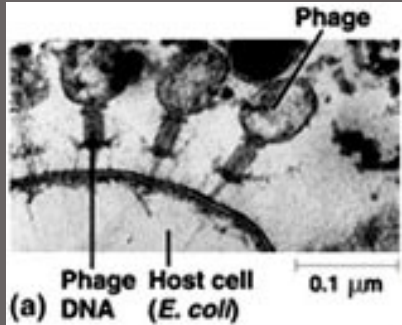
→ When added to live non disease causing bacteria, transformation still occurred

3) Repeated with adding enzymes to destroy DNA

→ transformation did NOT occurred

→ DNA stores the genetic information! It is the transformation factor

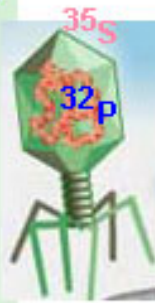
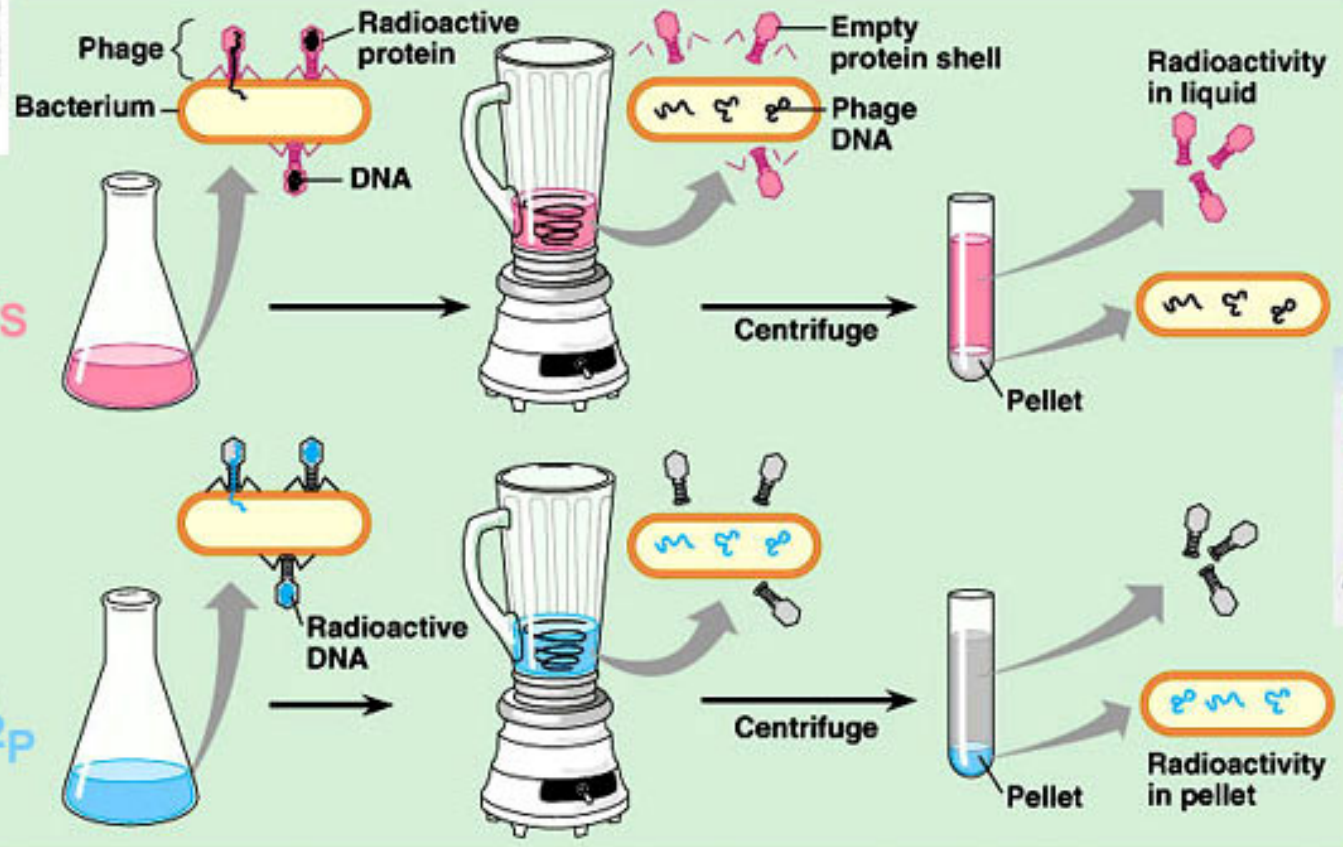
1952- Alfred Hershey & Martha Chase



- 1 Mix radioactively labeled phages with bacteria. The phages infect the bacterial cells.
- 2 Agitate in a blender to separate phages outside the bacteria from the cells and their contents.
- 3 Centrifuge the mixture so bacteria form a pellet at the bottom of the test tube.
- 4 Measure the radioactivity in the pellet and the liquid.

Batch 1:
Phages grown with radioactive sulfur (^{35}S)

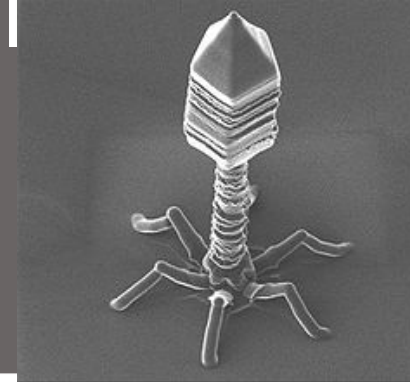
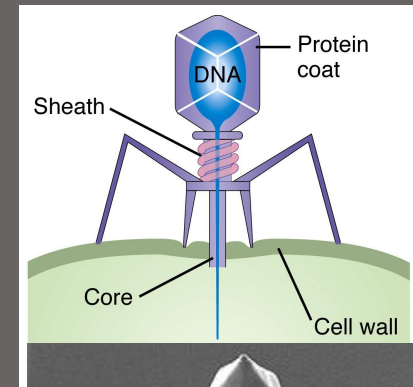
^{35}S



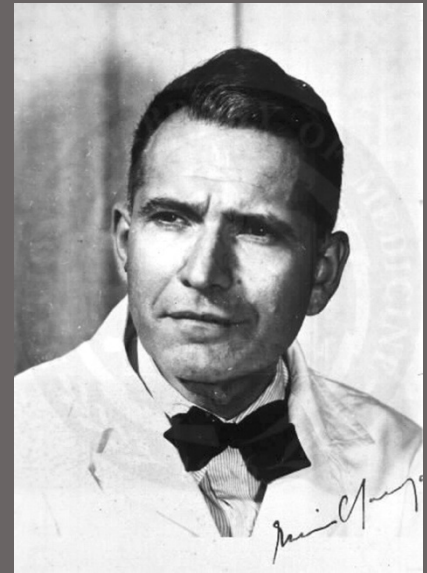
(b) The experiment showed that T2 proteins remain outside the host cell during infection, while T2 DNA enters the cell.

1952- Alfred Hershey & Martha Chase

- Studied “bacteriophages” → viruses that attack & infect bacteria
- Attached radioactive markers S-35 to protein coat
- Labelled DNA with P-32
- Discovered that the virus DNA with P-32 was injected into the bacteria

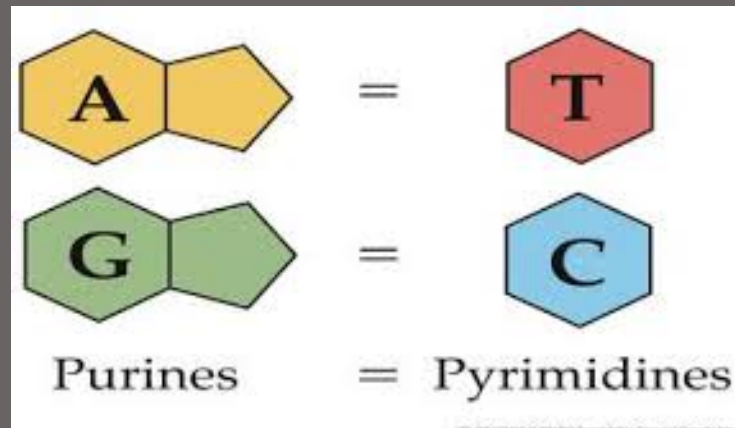


1950's- Erwin Chargaff

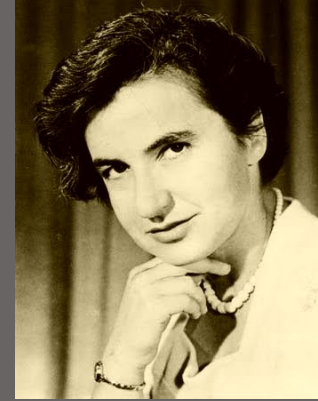


Discovery:

- The # of Adenine molecules = # of Thymine
- The # of Cytosine molecules = # of Guanine



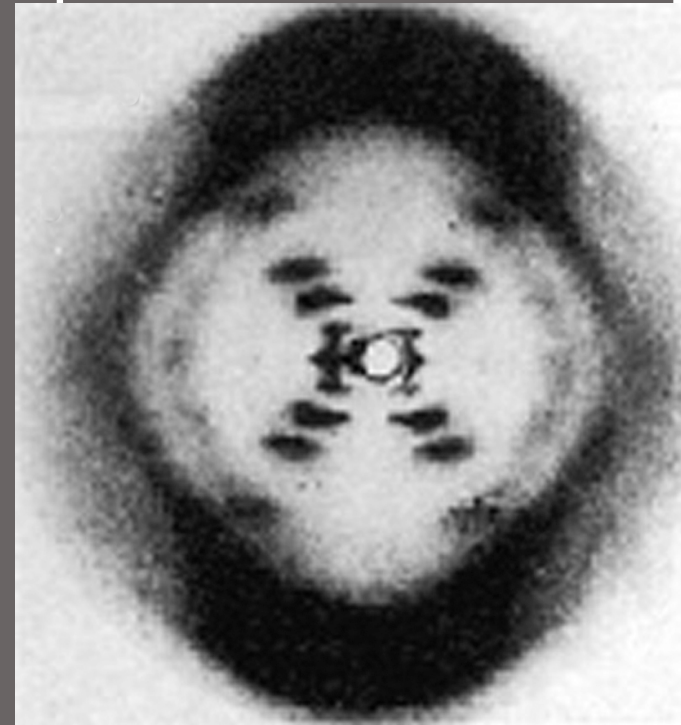
1950's Rosalind Franklin & Maurice Wilkins



- X- Ray Diffraction photo showed X pattern in centre
→ showed molecule was helical

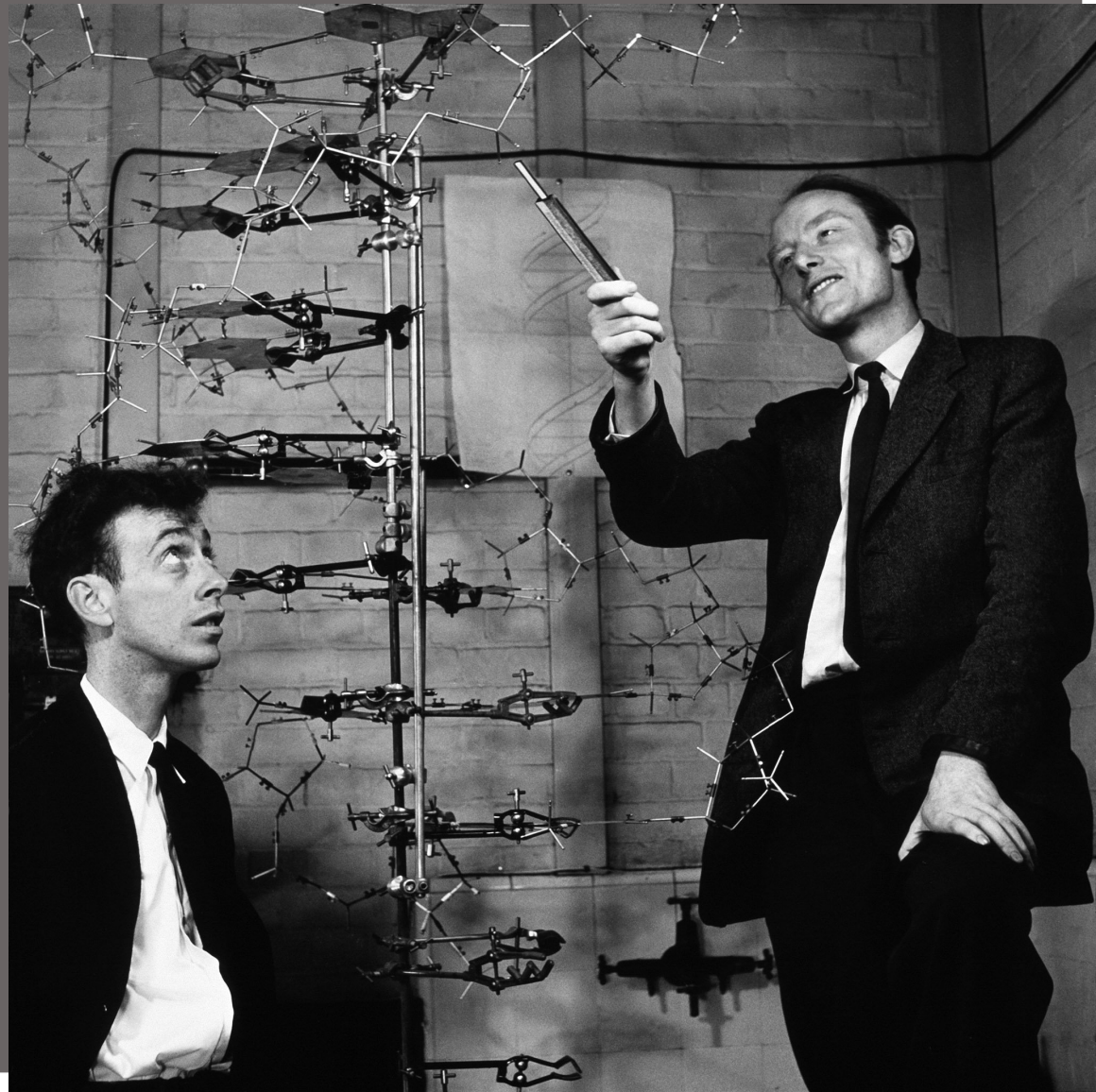
Discovery:

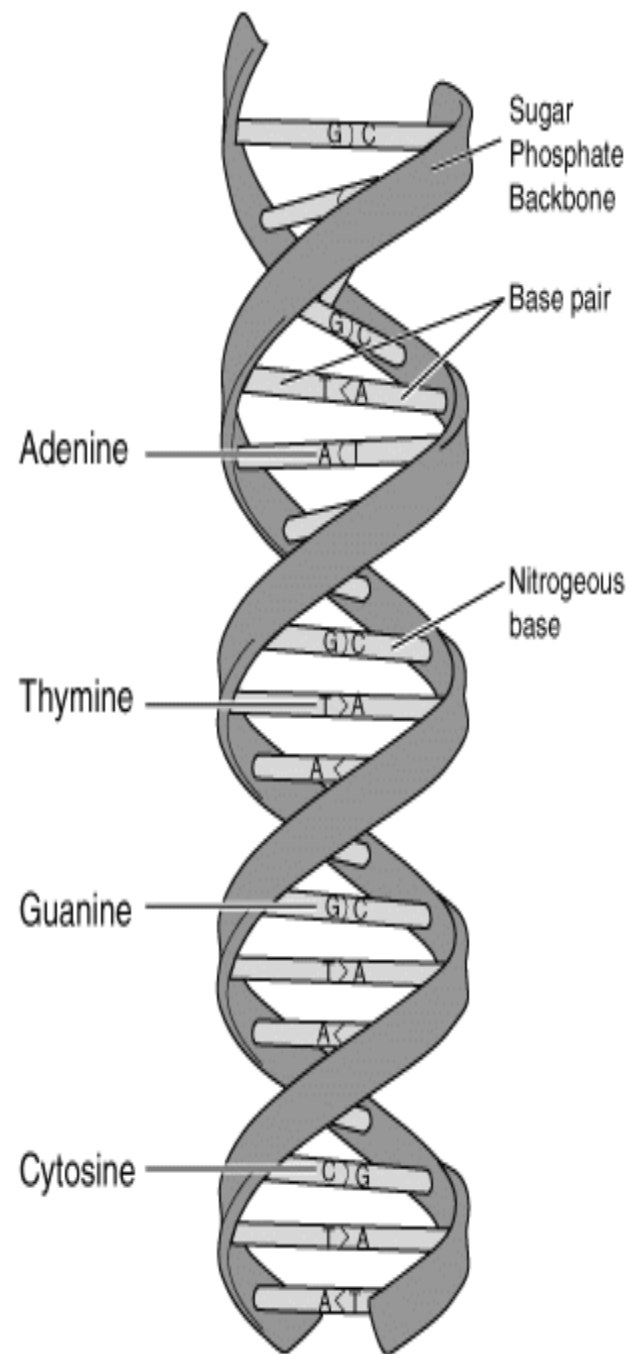
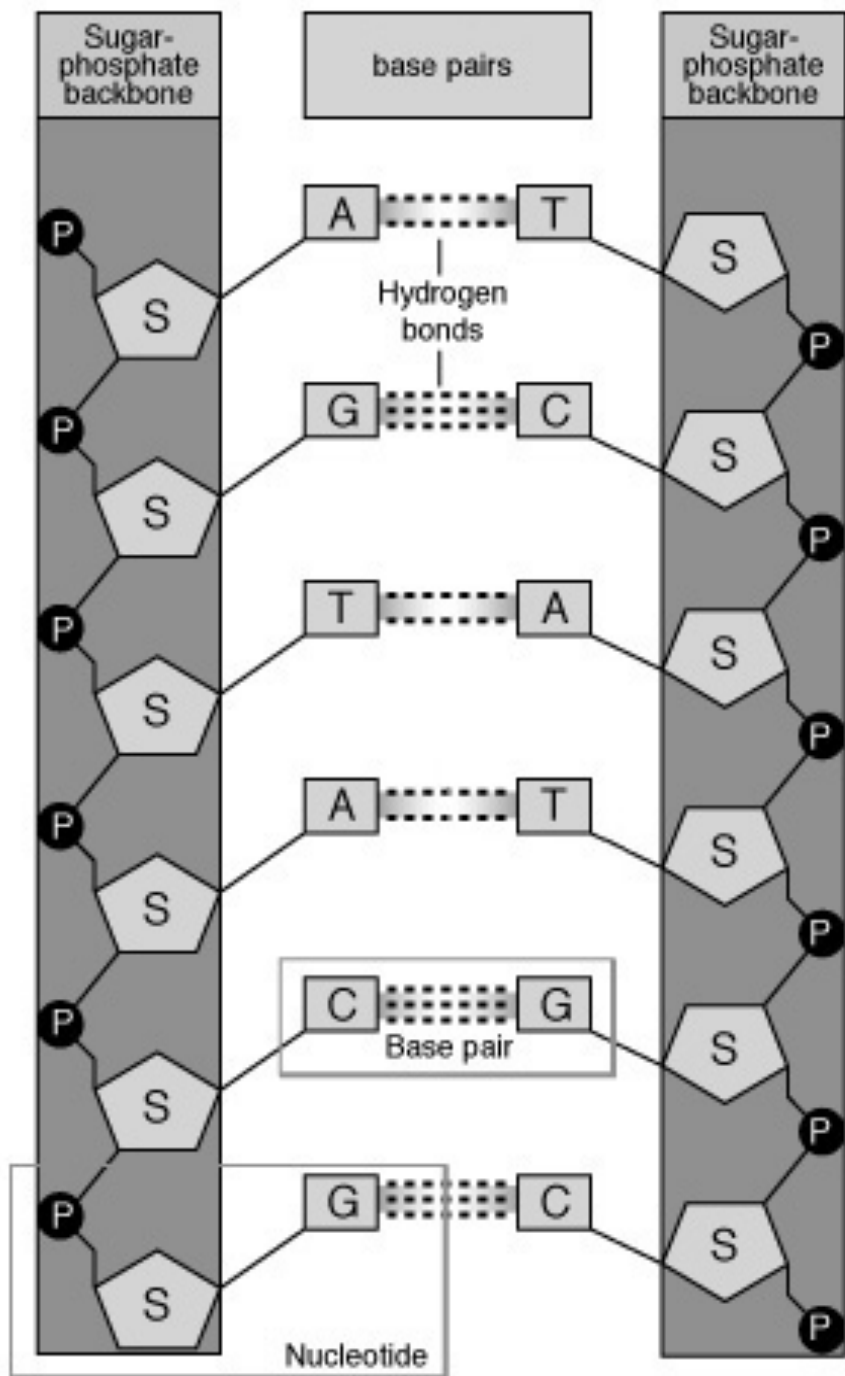
- Fibers are twisted
- Regular pattern of spaces between molecules



1953- James Watson & Francis Crick

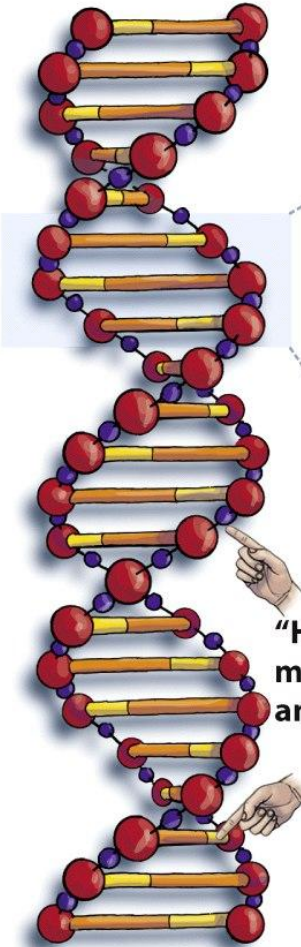
- Used research from other scientists to build a MODEL
- Model Showed:
2 strands twisted around each other
- Adenine paired with T
- Cytosine paired with G
- Hydrogen Bonds between bases
- Shared Noble Prize with Wilkins in 1958





The Structure of DNA

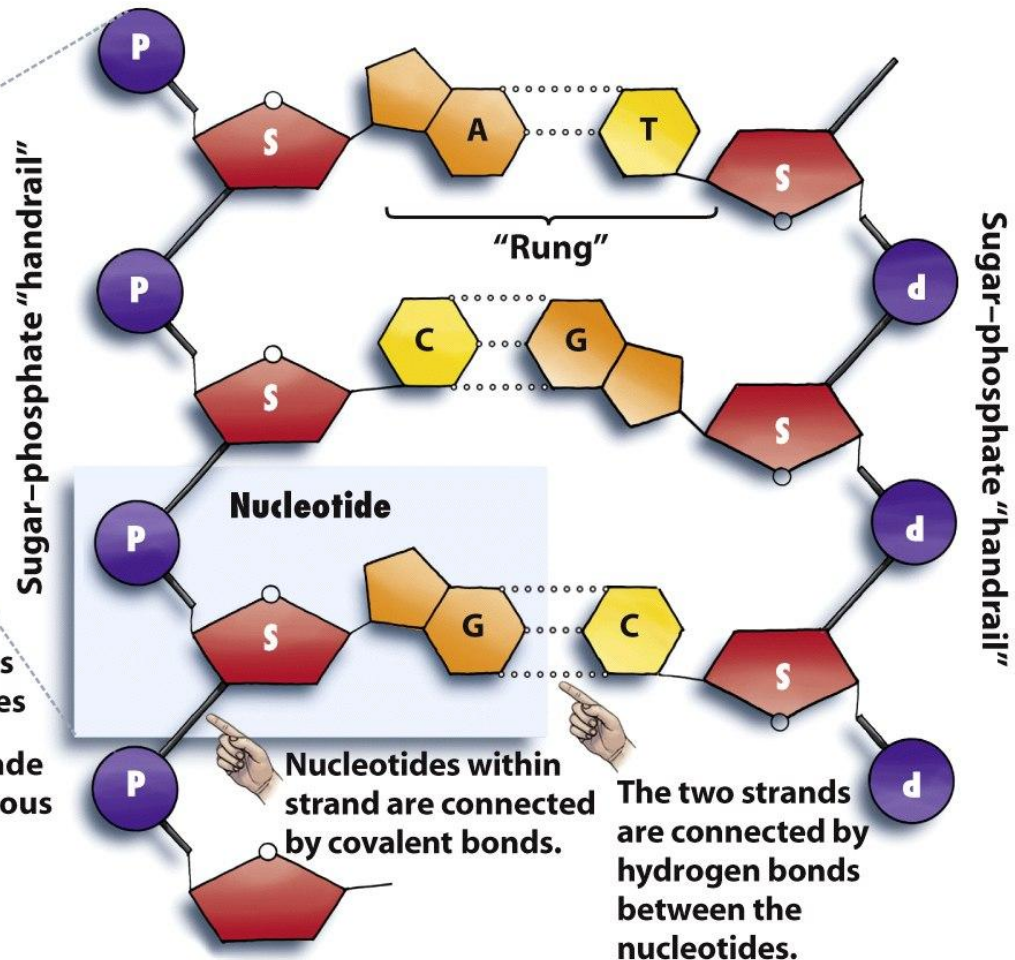
DNA double helix is made of two strands.



"Handrails" made of sugars and phosphates

"Rungs" made of nitrogenous bases

Each strand is a chain of antiparallel nucleotides.



Key Points to Remember

- DNA is made of 2 strands twisted in a “double helix” shape
- Backbone of alternating SUGAR & PHOSPHATE
- Complementary base pairs form “rungs”
 - Adenine with Thymine
 - Cytosine with Guanine
- Hydrogen Bonds hold Base pairs together

