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STUDY NOTES

A1.2 DNA Structure (HL)

Last update: 2024.04.07
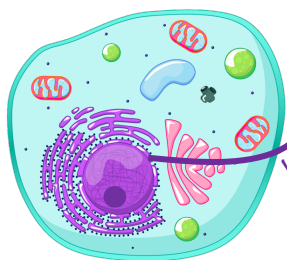
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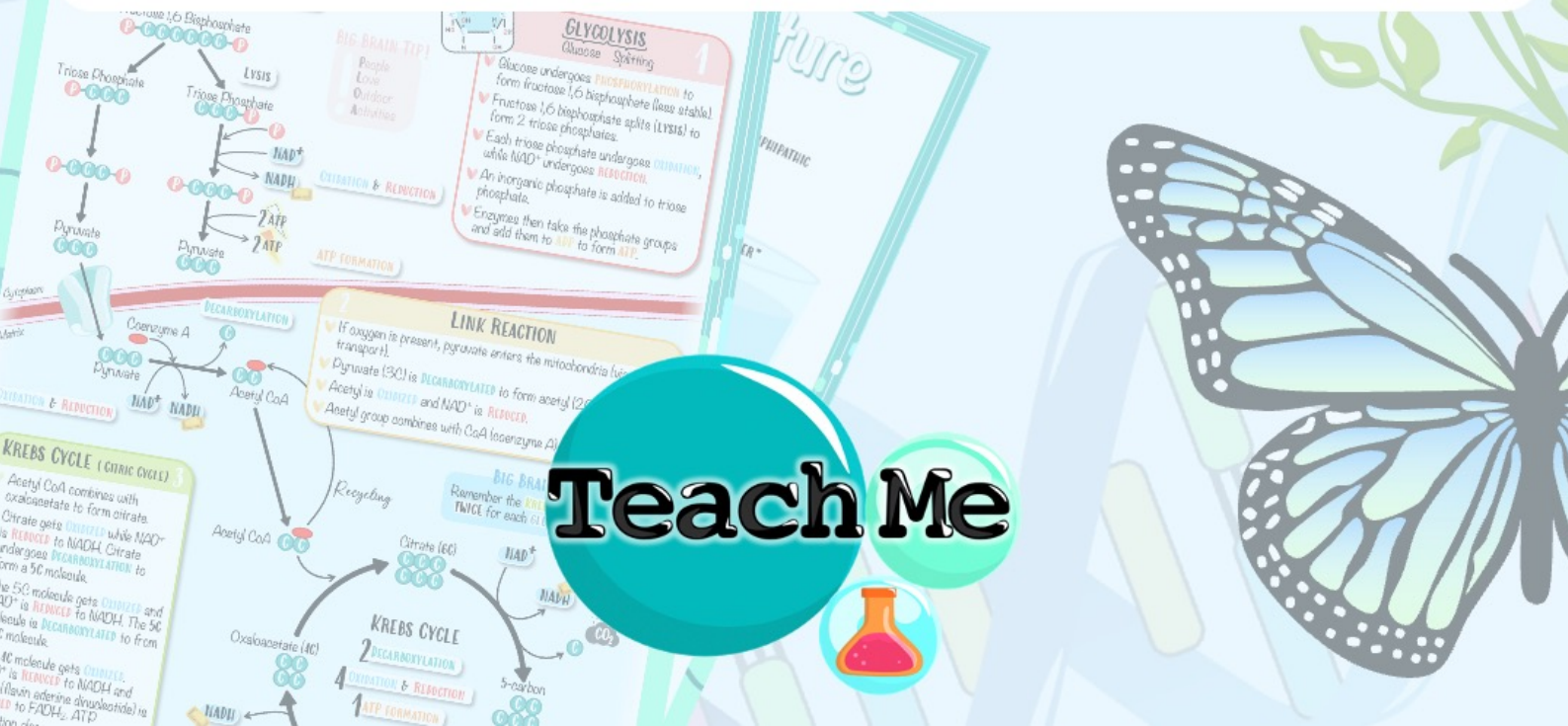
DNA Structure (HL)

Deoxyribo**N**ucleic **A**cid

SUPERCOILING

DOUBLE STRANDED HELIX

BACKBONE

BASES

In the nucleus

Fun Fact!
"The DNA of a single cell is 2 meters long"
...SO HOW DOES IT ALL FIT?

CHROMOSOME
wound-up DNA
(23 pairs per cell)

NUCLEOSOME
(**HISTONES** + **DNA**)

HISTONES
(9)

ANTI-PARALLEL STRANDS

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HYDROGEN bonds

PHOSPHATE

DEOXYRIBOSE
(pentose sugar)

5' end

3' end

C^5

C^4

C^1

BACKBONE

C^3

C^2

BASE
(Nitrogenous Base)

3' end

5' end

COVALENT bonds

NUCLEOTIDE
(monomer)

PYRIMIDINES

PURINES

HOW TO REMEMBER?
P**Y**ramidines have a **Y** in their names!

T
Thymine

C
Cytosine

A
Adenine

G
Guanine
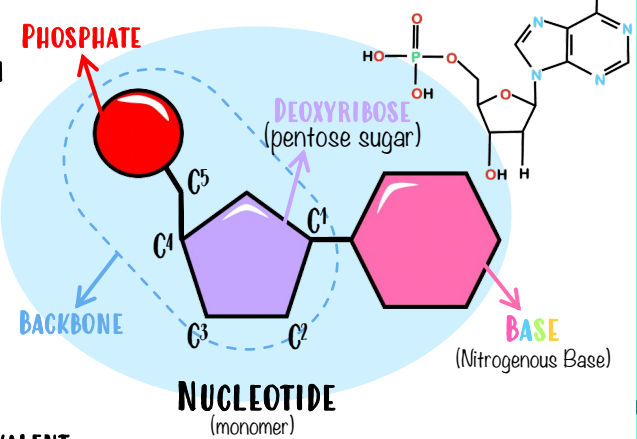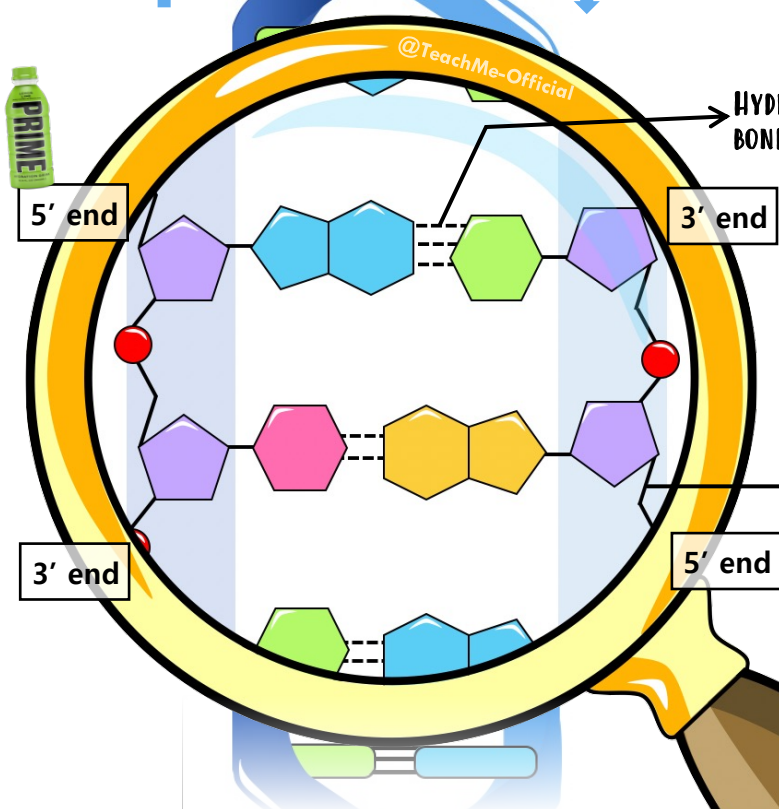
COMPLEMENTARY BASE PAIRING

A

T

C

G
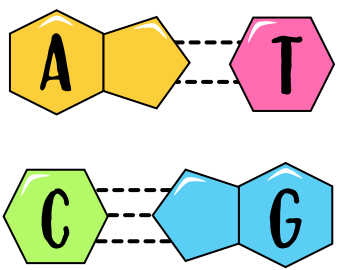
HOW TO REMEMBER?
"A" AND "T" ARE **A**lways **T**ogether

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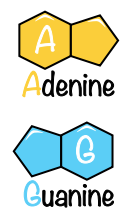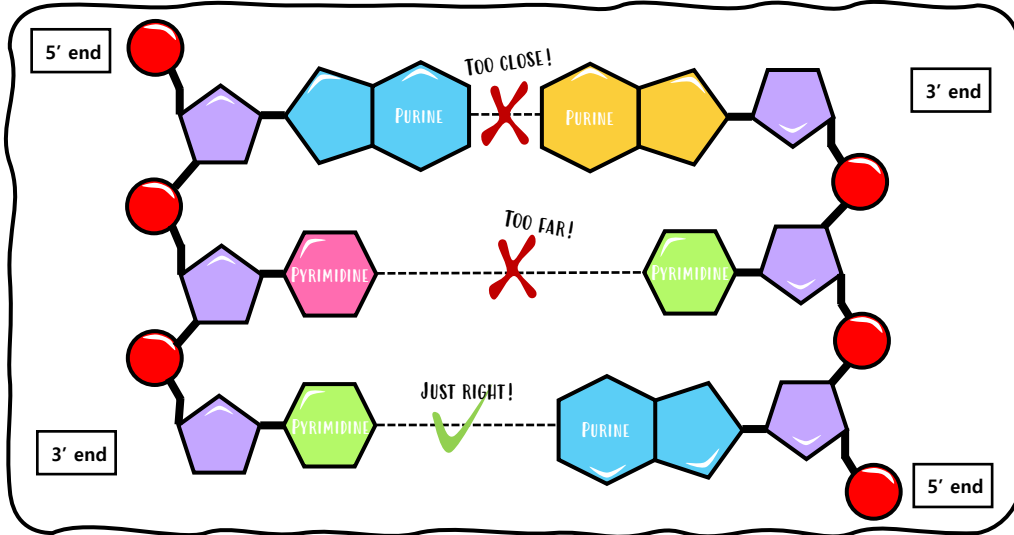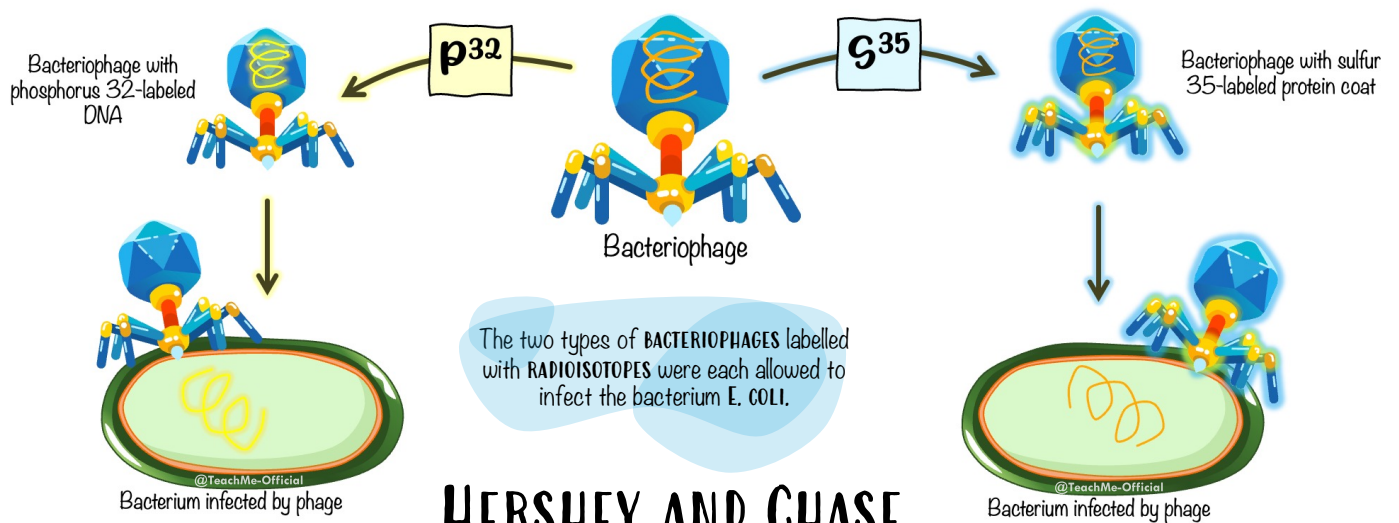
Why can't two purines or pyrimidines bind together? SIZE!

5' end
3' end

TOO CLOSE! ✗ Purine — Purine

TOO FAR! ✗ Pyrimidine ----- Pyrimidine

JUST RIGHT! ✓ Pyrimidine ----- Purine

3' end
5' end

Why can't adenine and cytosine bind? or guanine and thymine?

✗

HYDROGEN BONDING DOES NOT HAPPEN BETWEEN THOSE COMBINATIONS

✗

P^{32}

Bacteriophage with phosphorus 32-labeled DNA

S^{35}

Bacteriophage with sulfur 35-labeled protein coat

Bacteriophage

The two types of BACTERIOPHAGES labelled with RADIOISOTOPES were each allowed to infect the bacterium E. COLI.

Bacterium infected by phage

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Bacterium infected by phage

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HERSHEY AND CHASE EXPERIMENT

Radioactivity inside bacterium

No radioactivity inside bacterium
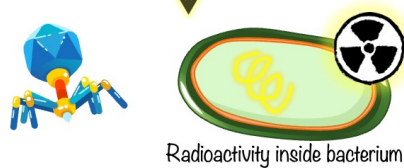
E. coli infected with the phosphorus 32-labelled bacteriophage HAD RADIOACTIVITY detected inside the cells, a location INDICATING DNA.
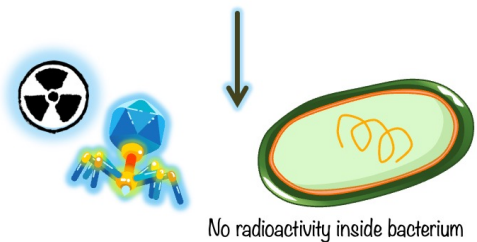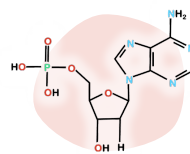
The E. coli infected with the sulfur 35-labelled bacteriophage had NO RADIOACTIVITY inside the cell.

Because DNA contains phosphorus and not sulfur, this allowed Hershey and Chase to conclude that DNA (not protein) was the GENETIC MATERIAL.

Wooden rod
Pin
Chromatography paper

Solvent soaking the paper

Pencil line & sample
Solvent
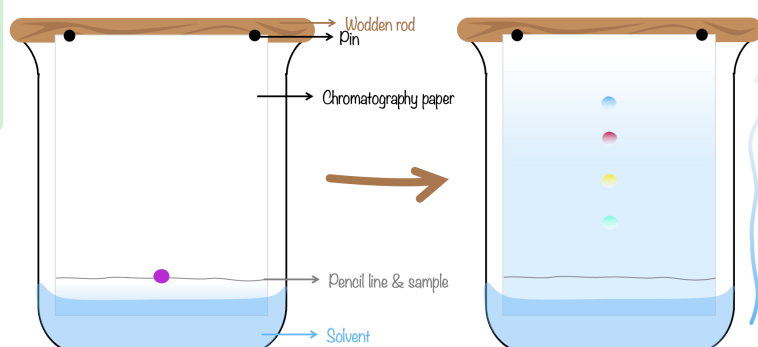
CHARGAFFS RULE

DNA contains the SAME number of adenine as thymine nucleotides, as well as the SAME number of guanine and cytosine nucleotides

(found by paper chromatography)

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Notes