

DNA: The cell's Information system

QUICK REVIEW

- In a eukaryotic cell **DNA** is located in the **nucleus** and **CAN'T** ever **leave!!**

Nucleic Acids - Informational Macromolecules

1. DNA deoxyribonucleic acid (**D=deoxyribose**)
 2. RNA ribonucleic acid (**R = ribose**)
 3. Proteins
- Are often called the three informational macromolecules because of their *functions*

What is a gene?

- It is a **piece of DNA** that stores the code for the sequence of **amino acids** in a **single protein chain**

Where is a gene?

- DNA **always** stays in the Nucleus
- The **gene** is **composed of DNA** and **can be used to make proteins only when decoded** and **moved within the cell by RNA.**

- DNA is **uplicated** through **replication**
- It **creates proteins** (that align with the genetic information) through **protein synthesis** which has 2 parts **transcription** and **translation**.
- *We will learn all about these next week*

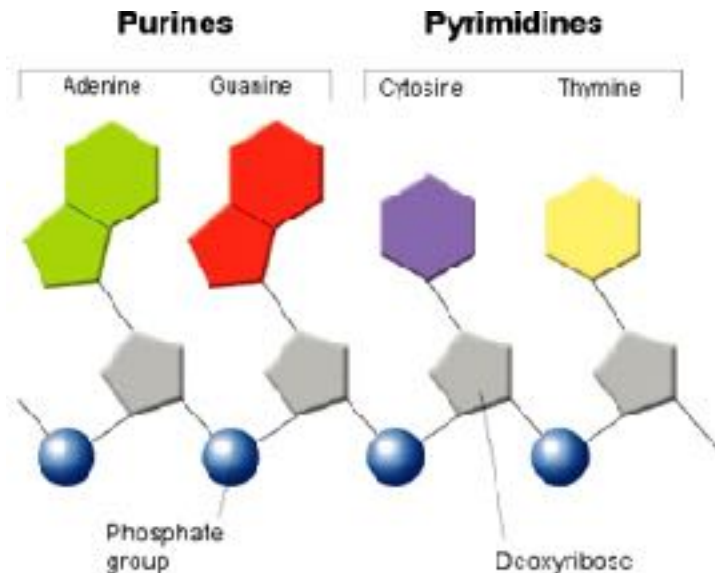
- All cells in an individual have the same DNA (except gametes have half the amount) but NOT all cells use all their DNA to make proteins
 - Different types of cells express different genes and make different proteins.

DNA Structure

- Introduction : <http://youtu.be/54n8DLreEe4>

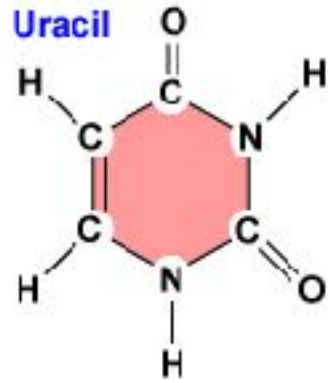
Information

- In DNA the information is encoded into *base sequences* called **purines** and **pyrimidines**

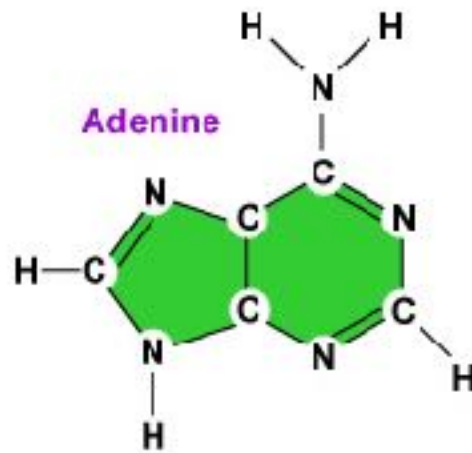


- Two types of pyrimadines
thymine and cytosine
- There are two types of
purines - guanine and
adenine

Pyrimidines



Nitrogenous Bases of RNA



Purines

Shape

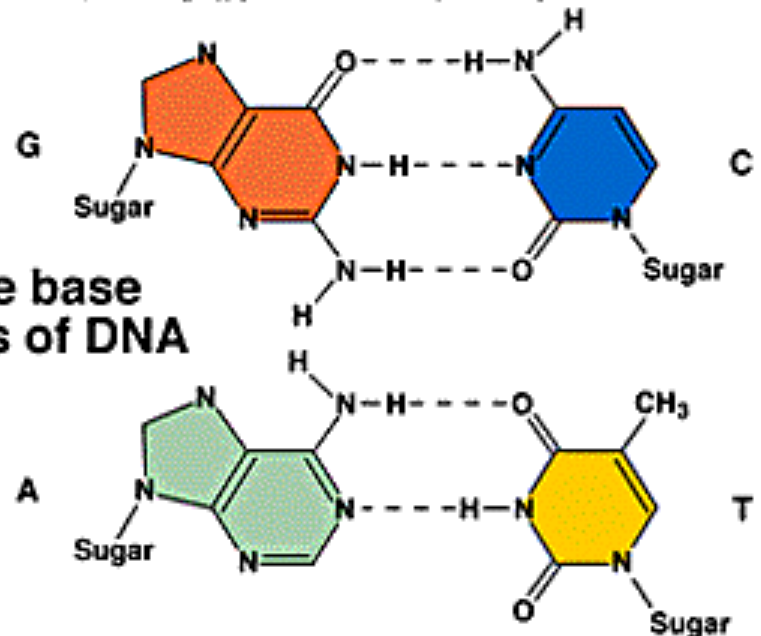
- The basic shape (uncoiled) is similar to a **chemical ladder and called the double helix**
 - The ‘sides’ are made of **Sugars** (big) bonded by small **phosphate** groups
 - The ‘rungs’ are **bases** bonded to the **sugars** with a hydrogen bond connecting them in between

Bonding

1 purine base always bonds with 1 pyrimidine base

- Adenine **always** bonds with thymine
- Cytosine **always** bonds with guanine

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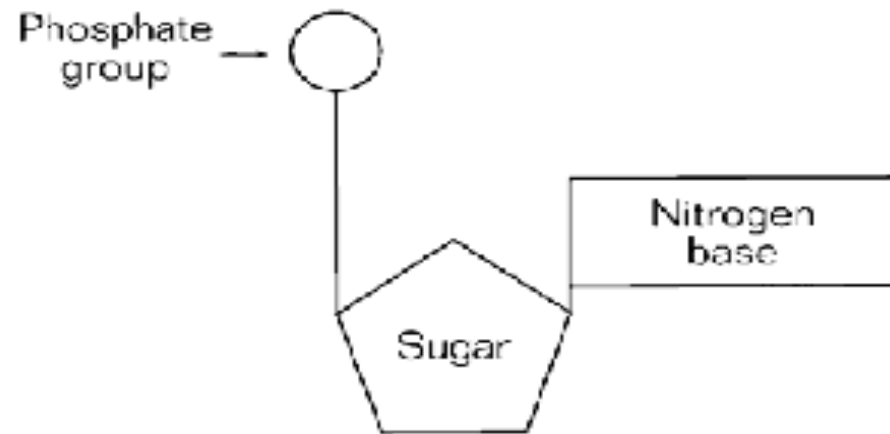


- <http://youtu.be/qy8dk>

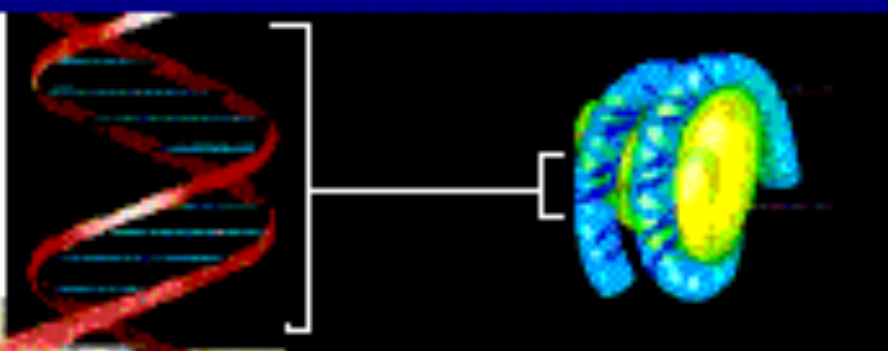
- Why do you think 1 purine always bind with 1 pyridine...

- The sugar, phosphate and nitrogenous base make up a **nucleotide**. Multiple nucleotides bonded together make up **DNA!!**

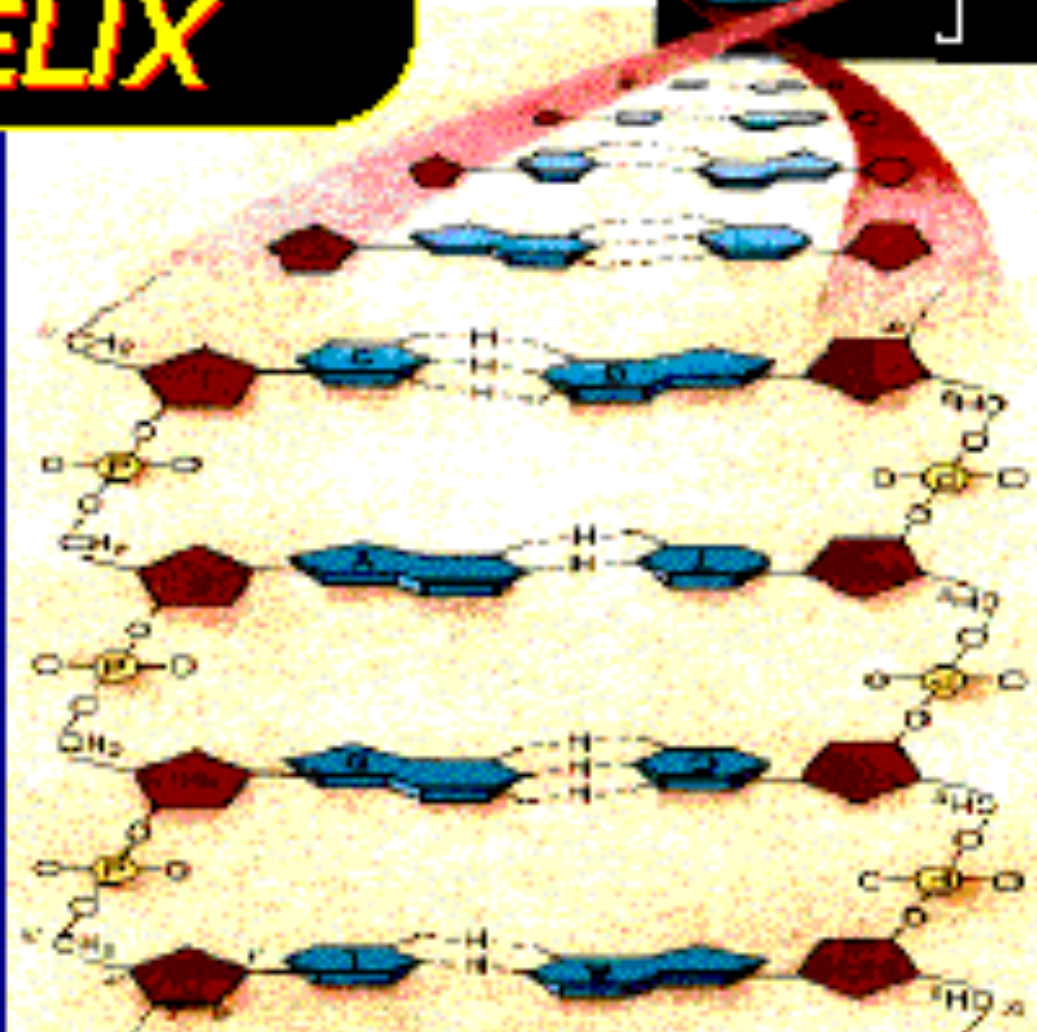
Nucleotide



THE DNA DOUBLE HELIX



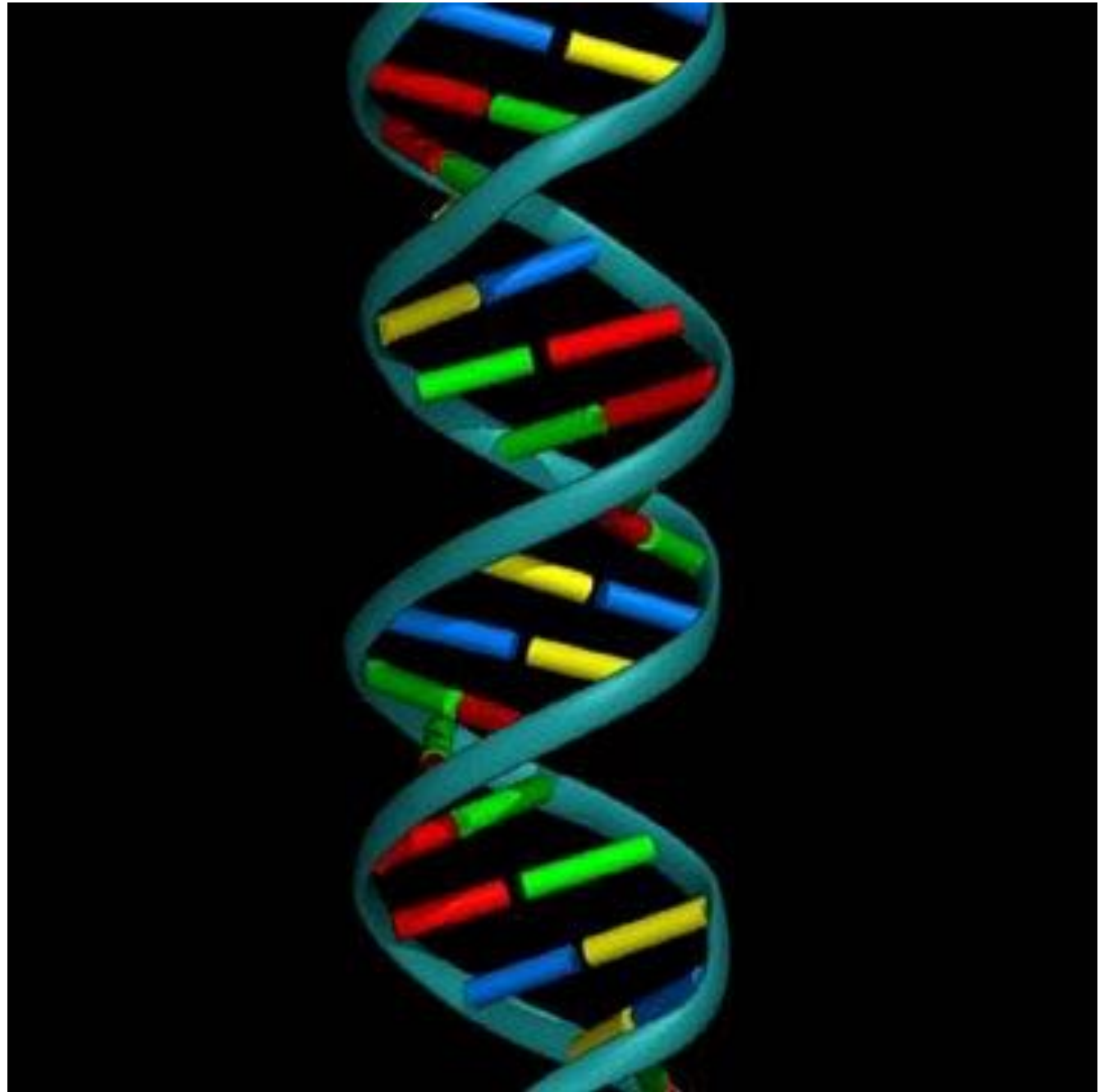
C
A
G
T



G
T
C
A

- The ladder is wrapped in a spiral turning around itself like a spiral staircase.
- The whole structure is called a **double helix**

[http://
www.youtu
be.com/
watch?
v=qy8dk5iS
1f0&feature
=related](http://www.youtube.com/watch?v=qy8dk5iS1f0&feature=related)



DNA at Rest

- When the DNA is not performing its function it is **coiled** tightly into a smaller mass called a **chromosome**.

- <https://www.youtube.com/watch?v=T5gEIViVAPw>
- <https://www.youtube.com/watch?v=VrTGclugG0k>

Quick Quiz

- What does the 'D' in DNA stand for?

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- Deoxyribose

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- Double Helix

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 - Adenine **always** bonds with thymine
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- So if I had a strand of DNA that read:

CGCCAGTAA

on one side... what would the other side read?