

# Section 1.2 - Genes

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SNC2D

MRS. FRANKLIN

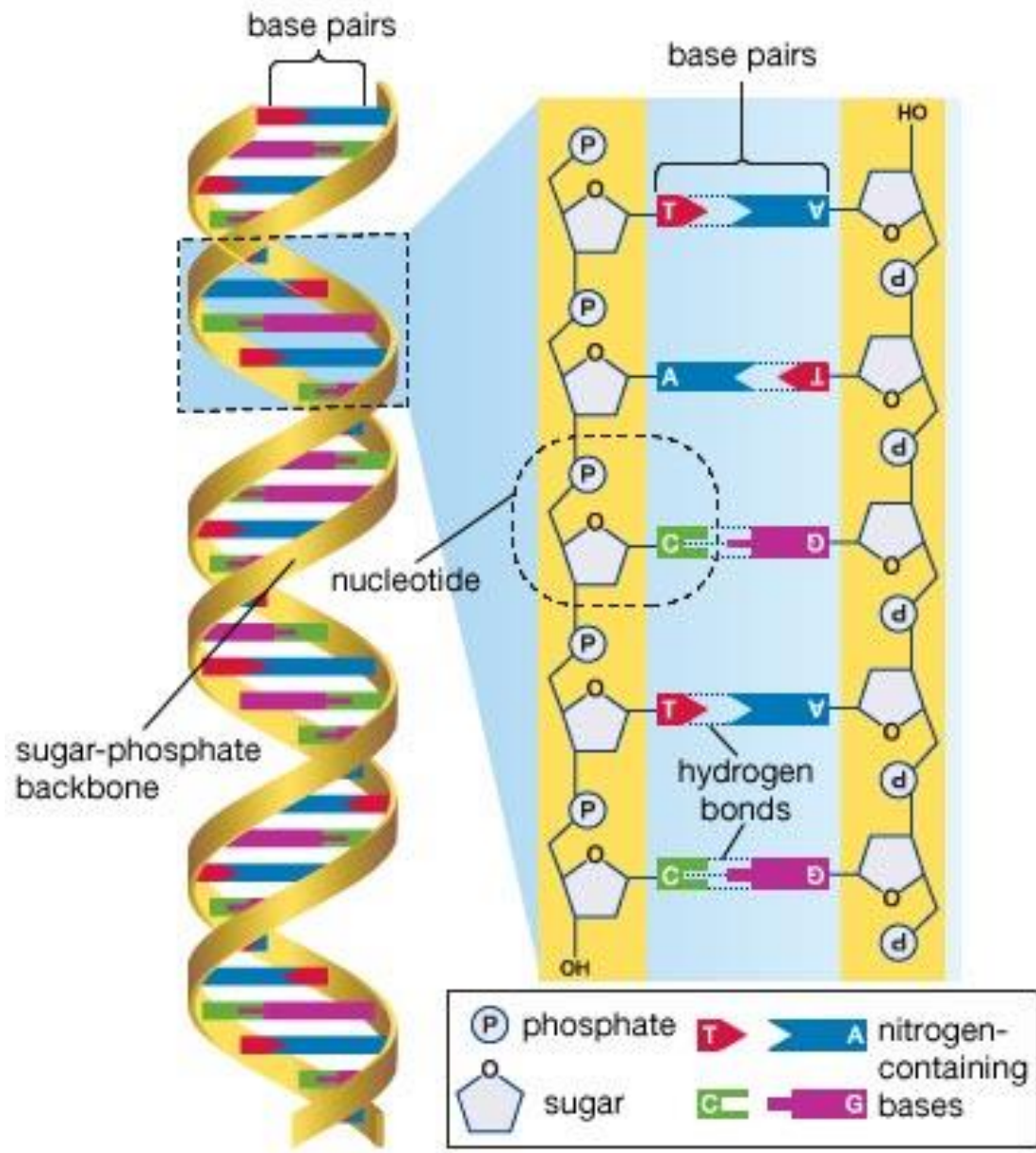
# Location of DNA

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The nucleus in the cell contains the genetic information that codes for the cell's function. All genetic information is in the form of DNA.



*DNA can be in the form of chromatin and condense to become chromosomes.*

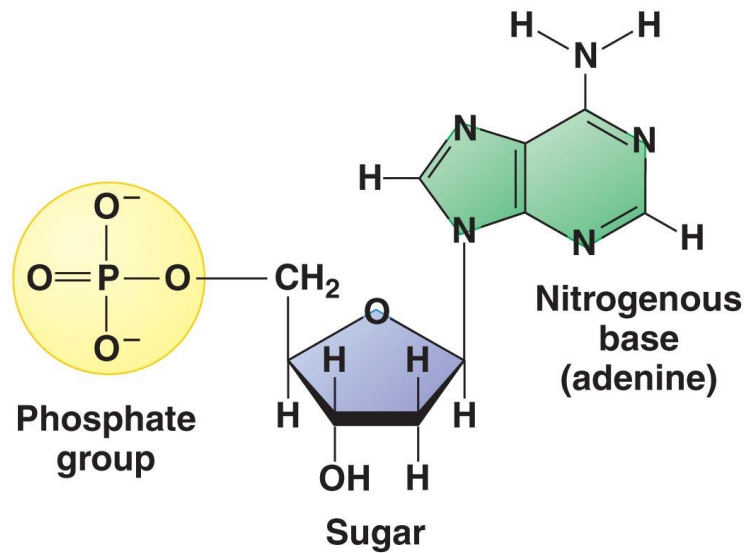


***DNA contains the following features:***

- 1) Two long chains that are similar to a ladder
  - Each row on the ladder contains a \_\_\_\_\_
  
- 2) Nucleotides are composed of three main subunits
  - Sugar, \_\_\_\_\_ and nitrogenous base

# Structure DNA (deoxyribonucleic acid)

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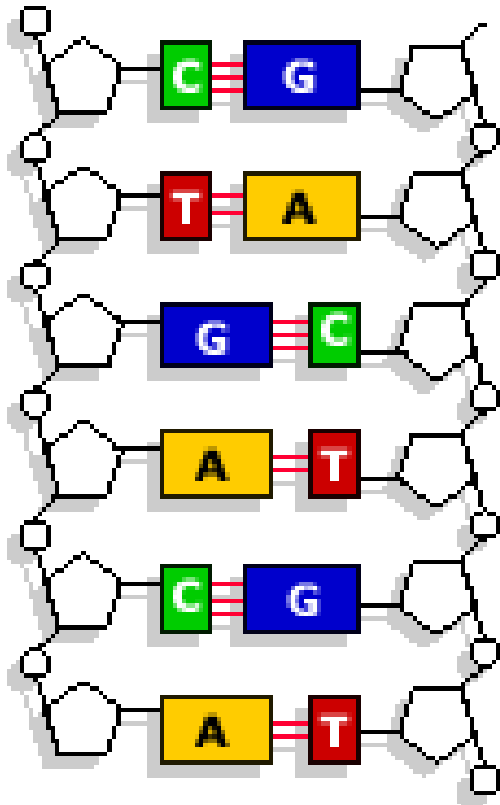
**nucleotide**

There are 4 nitrogenous bases:

- Adenine (A)
- Cytosine (C)
- Guanine (G)
- Thymine (T)

# Structure DNA (deoxyribonucleic acid)

The nitrogenous bases present on each chain will pair with one another in a specific manner.



## Nitrogenous Base Pairing:

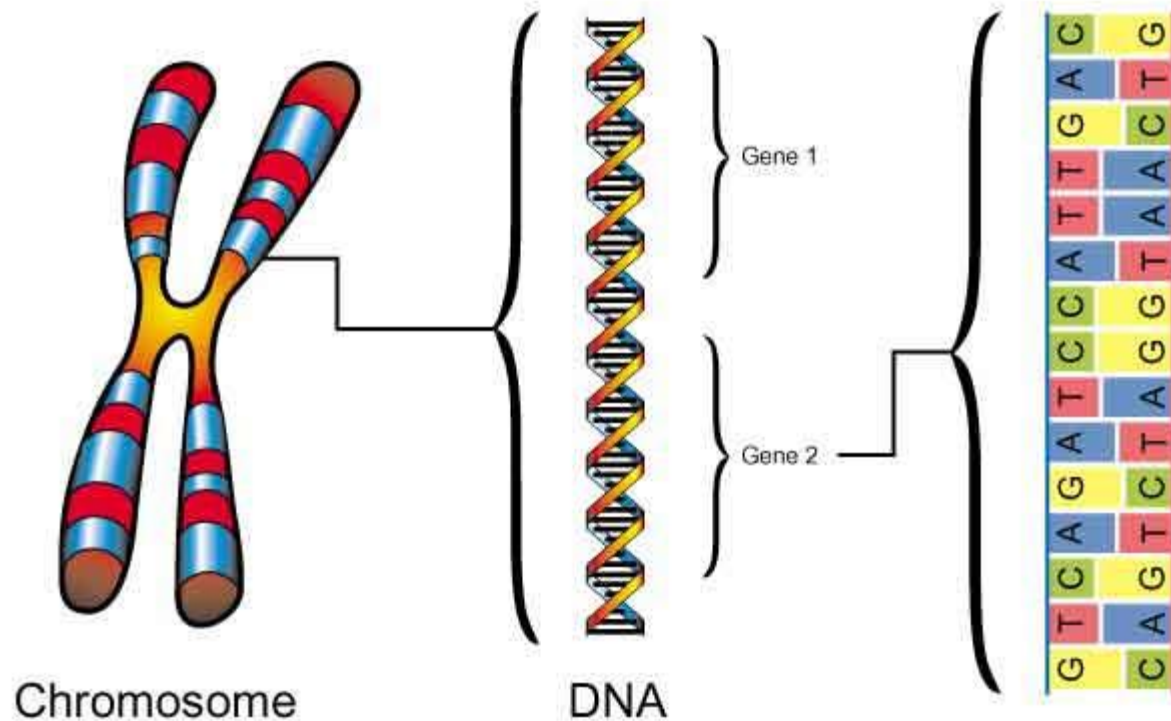
Adenine (A) - Thymine (T)

Cytosine (C) - Guanine (G)

*The backbone is made up of sugar and phosphate.*

# Structure DNA (deoxyribonucleic acid)

The order in which the nitrogenous bases appear create a genetic code that is different in every individual. Each 'code' is known as a \_\_\_\_\_ and are involved in the production of a specific

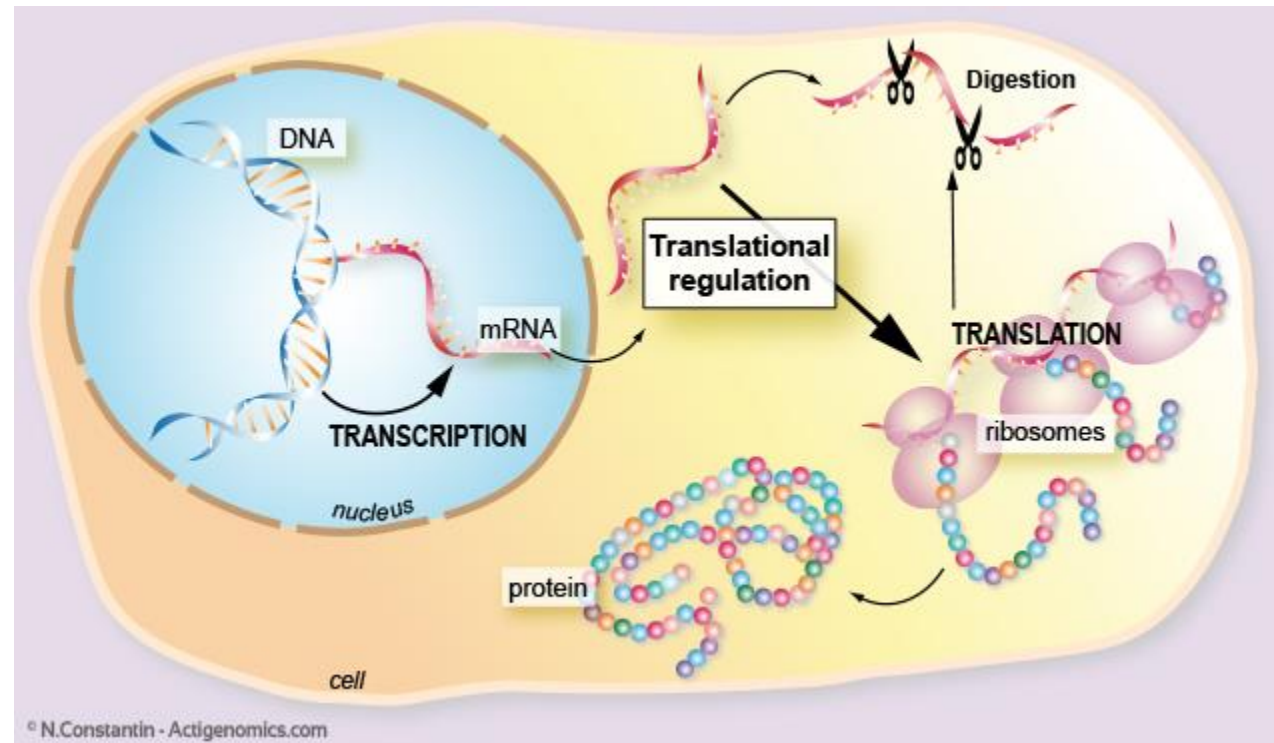


**Gene:** a segment of DNA that controls protein production.

The different versions of genes lead to variation within our population.

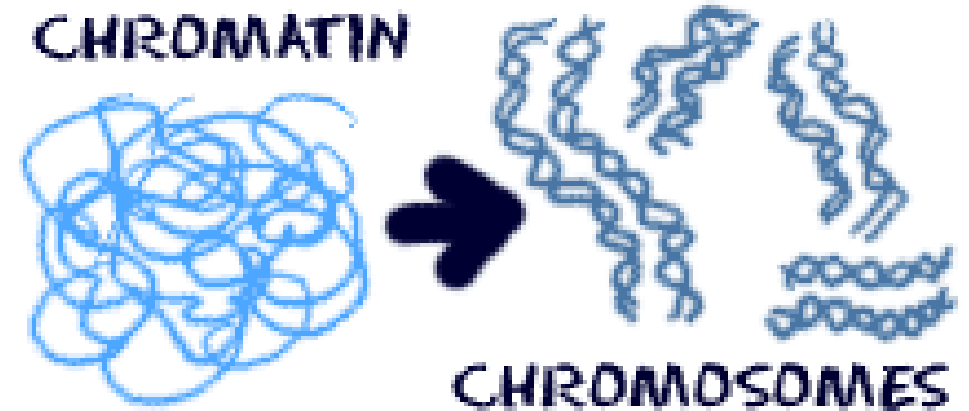
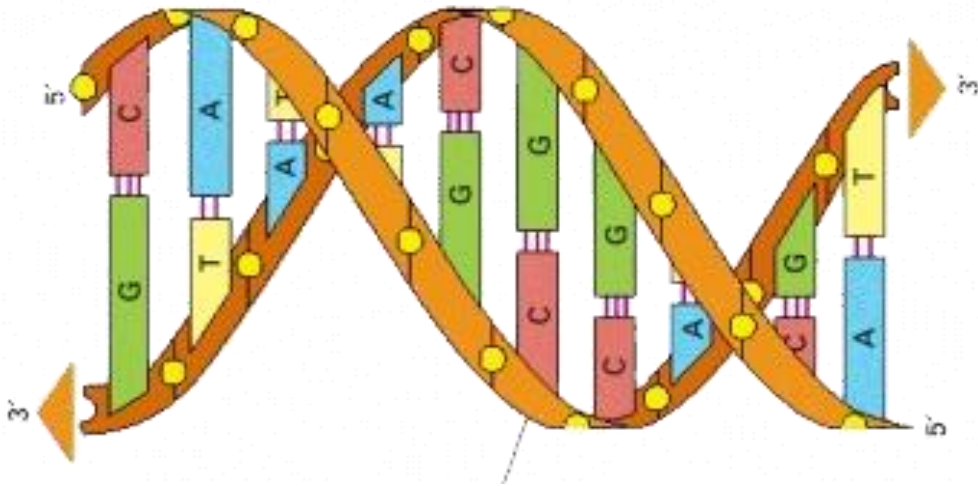
# Importance of Protein Production

All genes produce a particular protein that are important to the functioning of the cell. Proteins help to build parts of your body, communicate with other cells, catalyze reactions etc.



# Structure DNA (deoxyribonucleic acid)

The two chains of the DNA can twist around one another and form what is known as a \_\_\_\_\_.

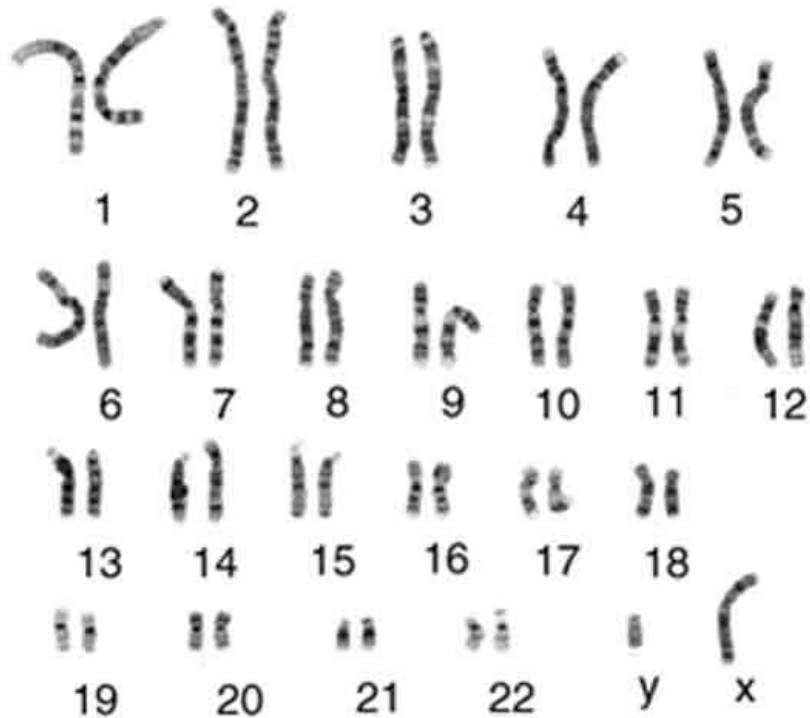


The double helix DNA may be in a condensed ( \_\_\_\_\_ ) or uncondensed ( \_\_\_\_\_ ) state



# Chromosomes and Replicated DNA

When DNA is in a condensed state it is known as a chromosome. All animals and plants each have a specific number of chromosome pairs.

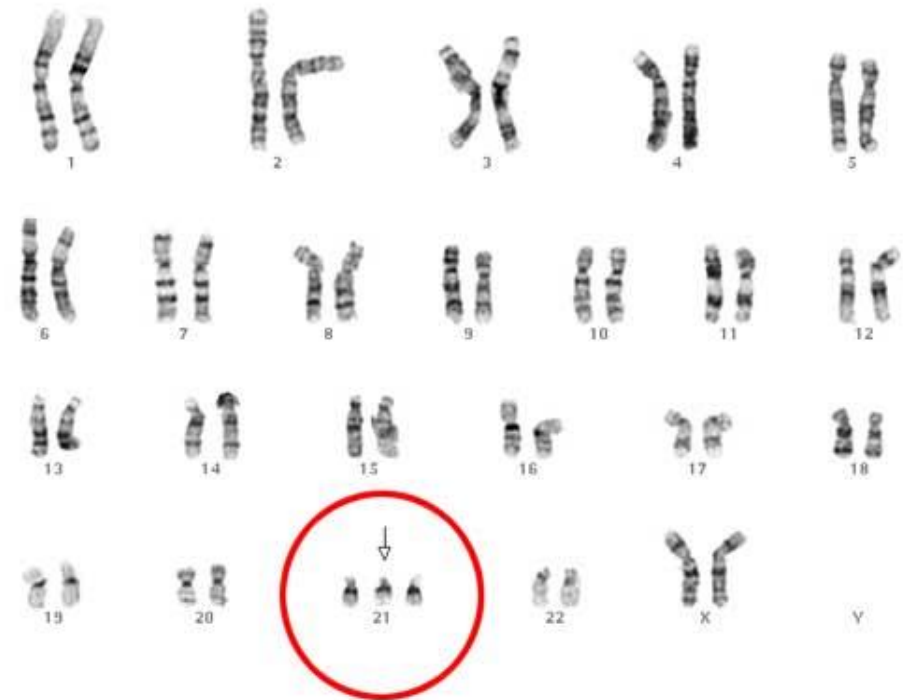
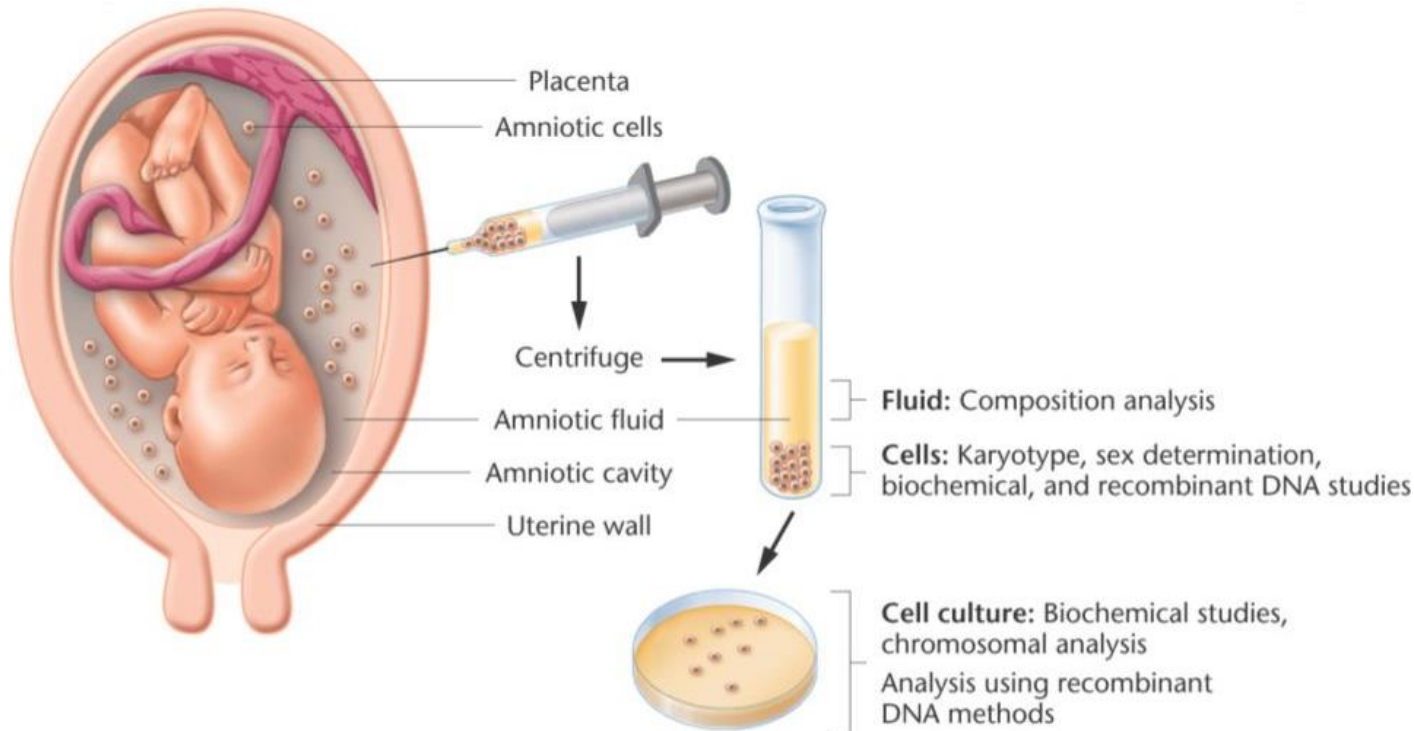


*Humans have 23 pairs of chromosomes that can be arranged in a karyotype. There are 23 chromosomes that are inherited by the egg (mother) and another 23 chromosomes that are inherited by the sperm (father).*

**Karyotype:** *a photograph of the chromosomes in a person's cells.*

# DNA Screening - Amniocentesis

**DNA screening** is the process of testing individuals to determine whether they have the gene or genes associated with certain genetic disorders.



# DNA Screening – Blood Testing

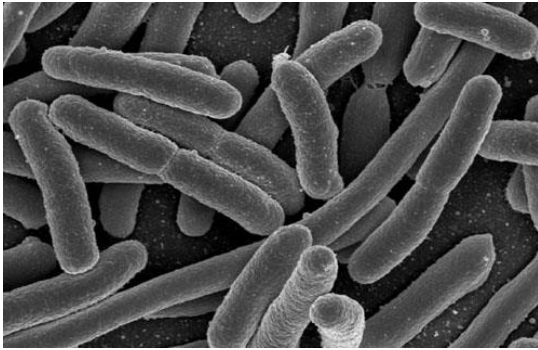
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Many genetic conditions can be detected through blood samples. Doctors may look for particular proteins in the blood sample. If there is a good quantity of the protein in question it means that the gene is functioning normally.



*Blood samples can help detect genetic disorders such as PKU and Huntington's Disease.*

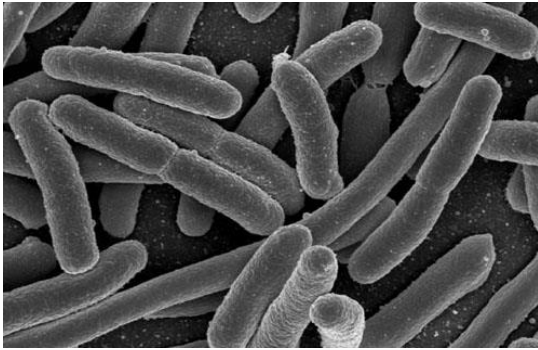
# Altering Genes to Create Transgenic Organisms



## Transgenic Organisms:

- an organism whose DNA has been altered to contain the genes from another species.
- a form of genetically-modified organisms (GMOs)

# Altering Genes to Create Transgenic Organisms



## Possible Uses for GMOs

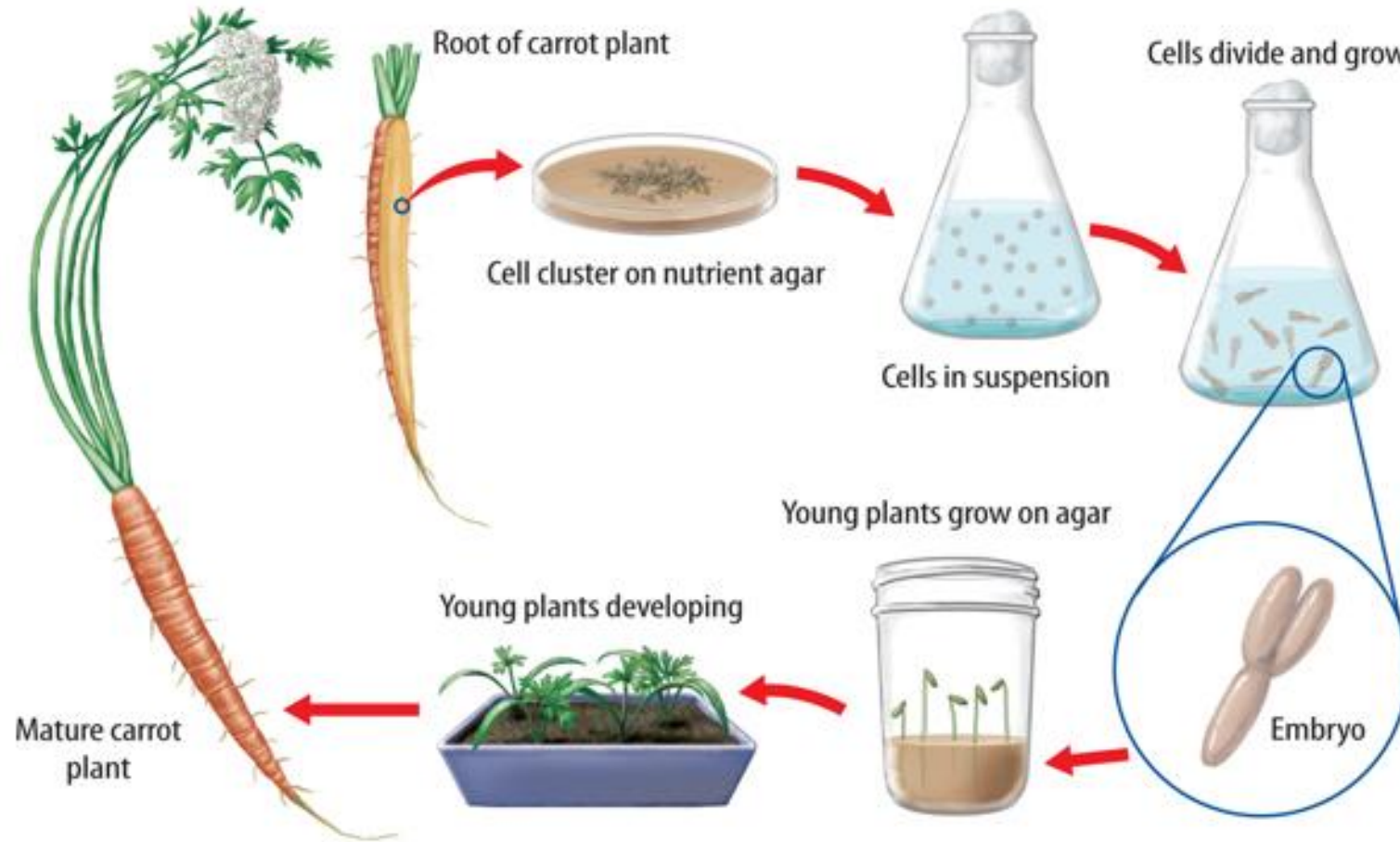
- production of non-allergenic human proteins
- Development of pest-resistant crops
- Increased growth of crops and livestock

## Concerns:

- Spread of disease from GMOs
- Negative effects on ecosystems
- Allergic reactions from eating GMOs

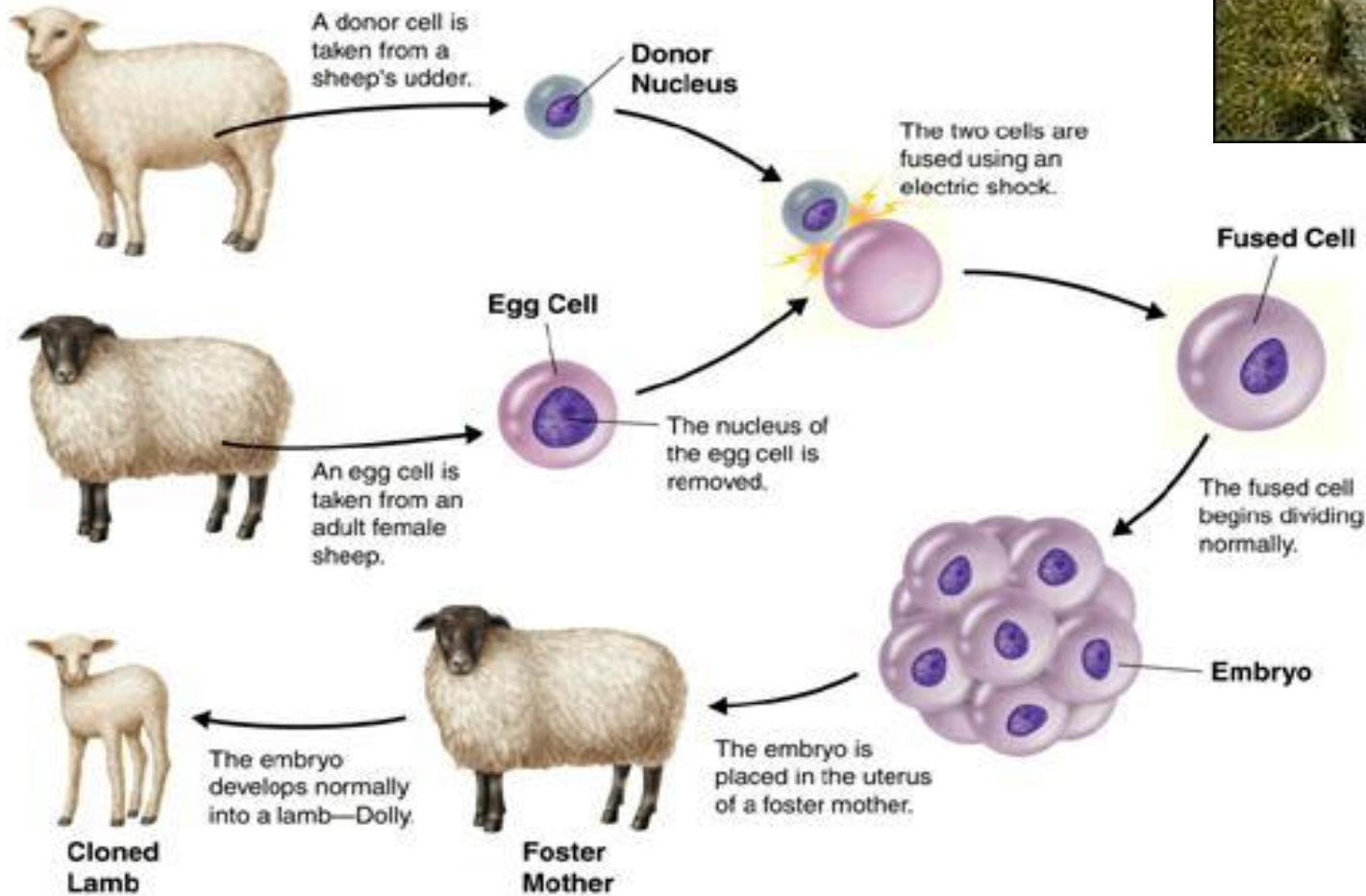
# Cloning

Cloning is the process of creating identical genetic copies of an organism.



*Many plants can be cloned using just a portion of their 'body'.*

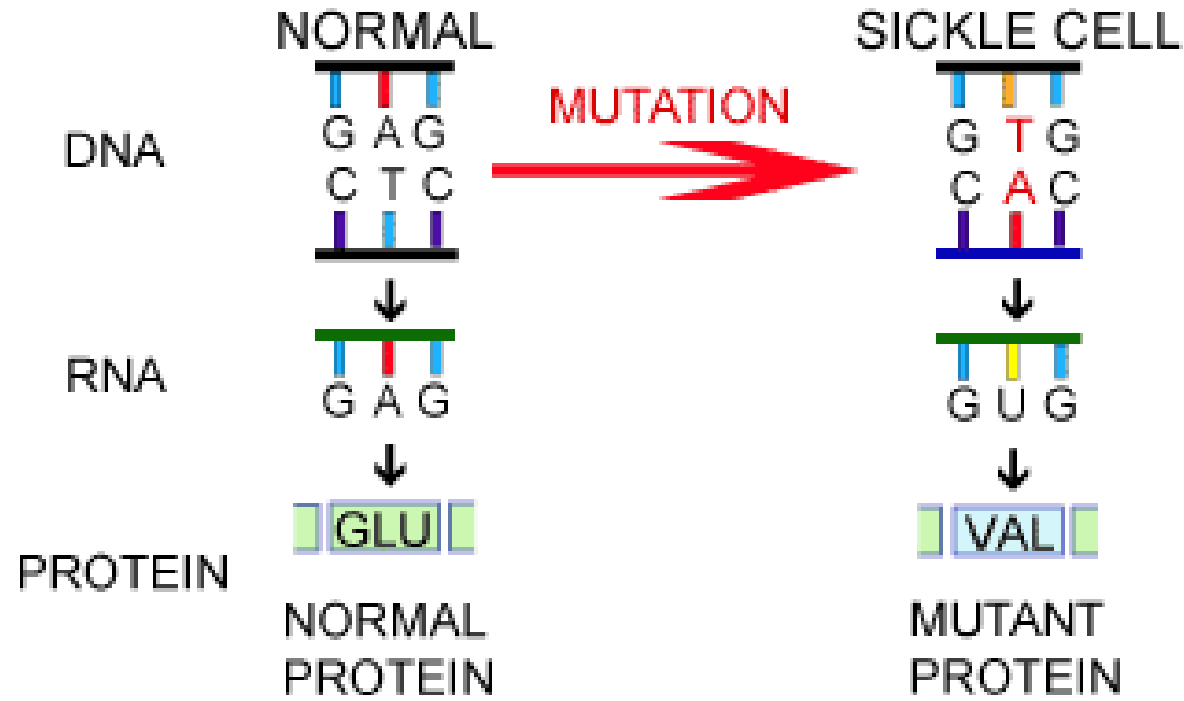
# Cloning Organisms



*Cloning an organism is much more complex.*

# Mutations

Mutation is a change in the DNA of an organism. The change normally occurs in the nitrogenous bases that code for particular proteins/traits.



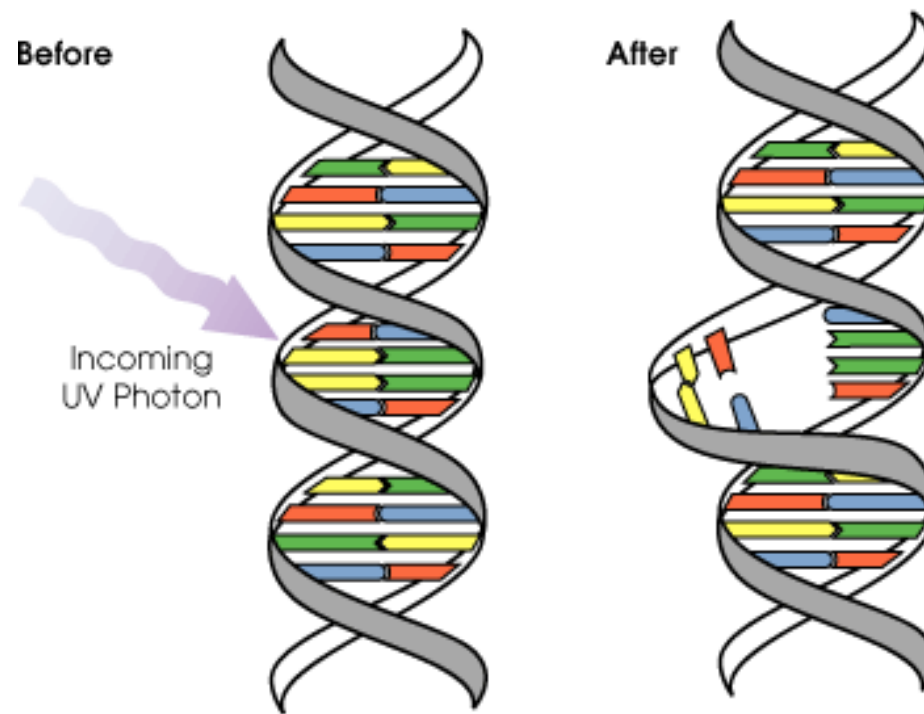


# Mutations

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A mutagen is a substance or factor that can cause a mutation in DNA.

*What examples of mutagens can you think of?*



# Mutations

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*A mutation in a gene may have several types of effects:*

**A. no effect**

- Mutation may have no effect on the final protein

**B. harmful effect**

- No protein, or negatively-altered proteins gets made.

**C. beneficial effect**

- New form of a protein gets made, which gives the individual a survival advantage over other individuals.



# Homework

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## Read Section 1.2

- pg. 18 # 1
- pg. 22 # 6, 7
- pg. 28 # 1, 2, 6, 8