

GCSE Review 3 – DNA & Protein Synthesis

Basic Revision Aims:

- 3.1. The structure of DNA
- 3.3. The causes and effects of mutations

Extending Further:

- 3.2. Protein synthesis

Resources

Use the GCSE Bitesize sections below and your GCSE textbook, class notes and GCSE revision guide.

DNA Structure

<https://www.bbc.co.uk/bitesize/guides/z9pkmsg/revision/5> (AQA)

<https://www.bbc.co.uk/bitesize/guides/z3mbqhv/revision/3> (Edexcel)

Mutations

<https://www.bbc.co.uk/bitesize/guides/z9pkmsg/revision/10> (AQA)

<https://www.bbc.co.uk/bitesize/guides/z3mbqhv/revision/8> (Edexcel)

Protein Synthesis (Extending Further)

<https://www.bbc.co.uk/bitesize/guides/z9pkmsg/revision/8> (AQA) (Watch the video to help)

<https://www.bbc.co.uk/bitesize/guides/z3mbqhv/revision/6> (Edexcel) (Watch the video to help)

3.1. The Structure of DNA

Label the diagram on the right to show the main location and structural features of DNA:

DNA is contained within the cell's

DNA is packaged into

Each DNA strand is sectioned off into genes.

A gene codes for

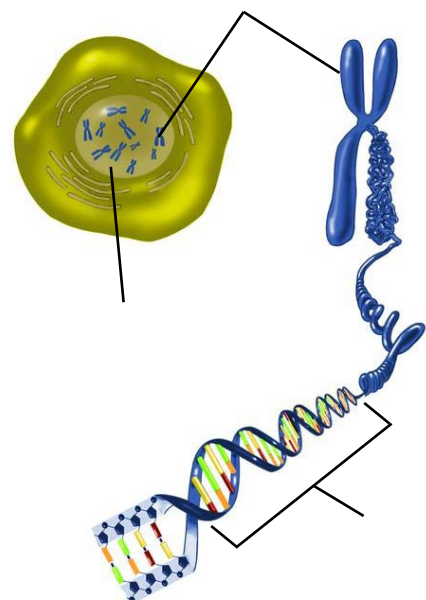
The genome is

DNA is a polymer made from four different monomers

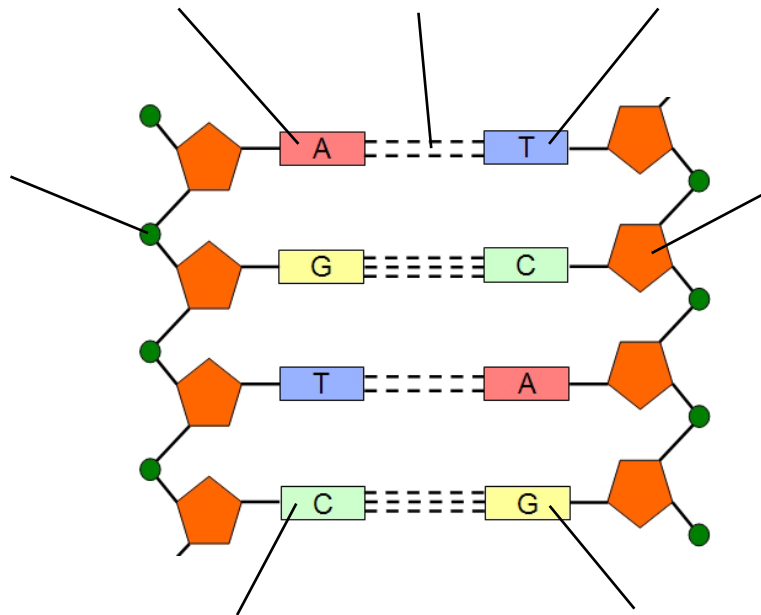
called

Each of these monomers consist of three main parts:

- 1.
- 2.
- 3.



Label the diagram below to identify the main structures in a DNA molecule and to name the four different bases:



When the two strands bond together they automatically twist into a spiral known as the

Describe the way in which the four bases pair up

.....

This pairing is known as

A sequence of three bases is known as a or the

.....

The three bases is also known as a **codon**.

The three bases code for

What does the sequence or order of bases control?

.....



3.2. Protein Synthesis

To make a protein in a cell, the gene for that protein needs to be expressed. This process takes place in a series of steps and stages.

The General Process

During protein synthesis the DNA molecule remains in

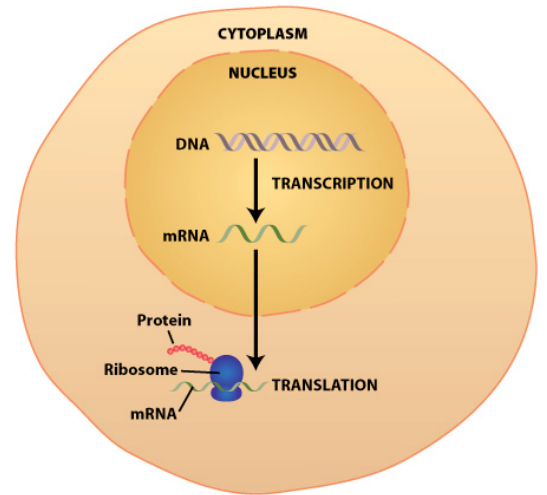
A copy of part of the DNA (a gene) is made. This copy is called

What does it do?

Describe what happens at the ribosome.

What happens to the polypeptide chain (sequence of amino acids) for it to become a protein?

Why is this process very important?



Protein Synthesis (Extending Further)

The process of protein synthesis occurs in two stages:

1. Transcription
2. Translation

Transcription

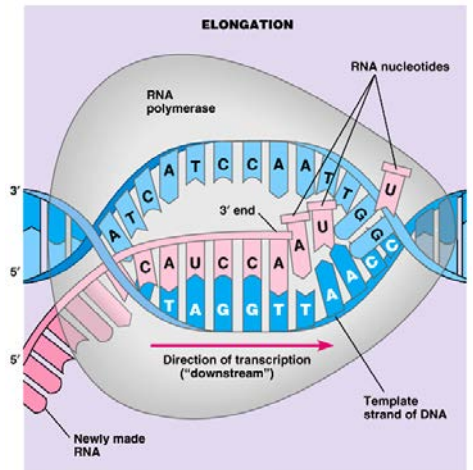
Transcription takes place in the

The process takes place in a series of steps. Describe them below:

1.

2.

3.



What is different between the nucleotides in DNA and RNA?

What base pairs with adenine?

4.

Translation

Translation takes place in the

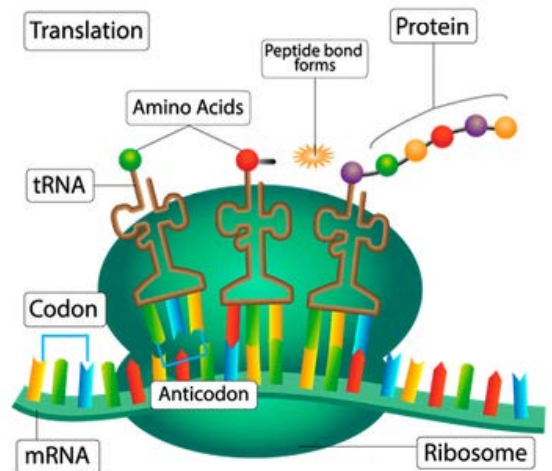
The process takes place in a series of steps. Describe them below:

1.

Every three bases on an mRNA molecule is called a

2.

3.



Every three bases on a tRNA molecule is called an
 (Use the diagram on the right to help you)

The codon and the anticodon will complementary base pair to attach the tRNA to the mRNA.

Once two amino acids are next to each other (adjacent) a bond forms between them.

4.

5.

What happens to the polypeptide chain after translation has ended?

.....

3.3. The Causes & Effects of Mutations

What is a mutation?

.....

What can cause mutations?

.....

There are different types of mutation. Using the click through animation, describe and identify the type in the examples below:

| Example | DNA Sequence | Description of Mutation | Mutation Name |
|-------------------|--------------|-------------------------|---------------|
| Original sequence | TACGAAGCT | | |
| Sequence 1 | TACCAAGCT | | |
| Sequence 2 | TACGGAAGCT | | |
| Sequence 3 | TACGAGCT | | |
| Sequence 4 | TAGCAAGCT | | |

What is the possible consequence of all 4 of the mutations in the table?

.....
.....

What can the mutation cause?

.....
.....
.....
.....
.....
.....

What happens to a cell that has a severe mutation?

.....

Describe what else can happen to a cell.

.....
.....

How might a mutation be beneficial?

.....

What happens if a mutation occurs in our sex cells (gametes)?

.....
.....

Describe what happens to the mutation during the process of natural selection?

.....
.....
.....

Well done! You have completed the third GCSE review pack to help you prepare for the first part of the A-level Biology course! Now move onto GCSE Review 4 - Enzymes.