

A microscopic image showing a dense network of neurons. The neurons are stained with a fluorescent dye, appearing as bright orange and red filaments against a dark background. The filaments are thin and branching, forming a complex web. Some larger, more rounded structures are visible, likely representing cell bodies or nuclei.

“Molecular Genetics”

Class MG 2

Warm-up

Read the directions carefully in order to complete the Origami DNA molecule

Class Work

Complete WSs 24 & 25

21. 1) Glucose
- 2) Ribose
- 3) Glycogen
- 4) Glycerol
- 5) Glucose

Class Work

22. 1) True

2) Neutral fats

3) True

4) Polar

5) True

6) ATP

7) True

8) O

Class Work

23. Thymine (T) and Guanine (G)

1) Hydrogen bonds

2) Double helix

3) 12

4) Complementary

Note that the stippled parts of the backbones represent phosphate units (P) while the unaltered (white) parts of the backbones that are attached to the bases are deoxyribose sugar (d-R) units.

Build a DNA Molecule

<http://learn.genetics.utah.edu/>

Student Teaching

Volunteer needed

Let's talk about the Discovery of the Molecular
Structure of DNA – The Double Helix

and then in the game at the end, you can make copies
of DNA molecules and find out which organism the
genetic material belongs to!

[http://nobelprize.org/educational_games/medicine/dna_double_helix/read
more.html](http://nobelprize.org/educational_games/medicine/dna_double_helix/read_more.html)

Replication of DNA Objectives

- Summarize the role of the enzymes involved in the replication of DNA.
- Explain how leading and lagging strands are synthesized differently.

Replication of DNA

MAIN IDEA

DNA replicates by making a strand that is complementary to each original strand.

DNA Replication

http://www.classzone.com/cz/books/bio_07/resources/htmls/interactive_review/bio_intrev.html

Semi-conservative Replication

In semi-conservative replication, parental strands of DNA separate, serve as templates, and produce DNA molecules that have one strand of parental DNA and one strand of new DNA.

The process of semi-conservative replication occurs in three main stages:

unwinding

base pairing

and

joining

Unwinding

DNA helicase, an enzyme, is responsible for unwinding and unzipping the double helix.

The hydrogen bonds between the bases are broken, leaving single strands of DNA.

Single-stranded binding proteins associate with the DNA to keep the strands separate during replication.

RNA primase adds a short segment of RNA, called an RNA primer, on each DNA strand.

Base pairing

The enzyme DNA polymerase catalyzes the addition of appropriate nucleotides to the new DNA strand.

The nucleotides are added to the 3' end of the new strand.

Each base binds only to its complement.

One strand is called the leading strand and is built continuously by the addition of nucleotides to the 3' end.

Base pairing

The other strand is called the lagging strand.

It elongates away from the replication fork.

It is synthesized discontinuously into small segments, called Okazaki fragments, by the DNA polymerase in the 3'to 5' direction.

These fragments are later connected by the enzyme DNA ligase.

Base pairing

Each Okazaki fragment is about 100-200 nucleotides long in eukaryotes.

Since one strand is synthesized continuously and the other is synthesized discontinuously,

DNA replication is said to be semi-discontinuous as well as semi-conservative.

Joining

In eukaryotic DNA replication, there often are many areas along the chromosome where replication begins.

When DNA polymerase comes to an RNA primer on the DNA, it removes the primer and fills in the place with DNA nucleotides.

When the RNA primer has been replaced, DNA ligase links the two sections.

DNA Replication

<http://www.youtube.com/watch?v=dKubylRiN84>

Crash Course

DNA Structure & Replication

DNA replication rap

<http://www.youtube.com/watch?v=Bju4C5GxeQs>

Student Teaching

Volunteers needed

Let's Review

What is DNA?

What is a gene?

What is a chromosome?

What is inheritance?

What is a protein?

<http://learn.genetics.utah.edu/content/begin/tour/>

DNA Workshop

<http://www.pbs.org/wgbh/aso/tryit/dna/shockwave.html>

DNA Replication Songs

Back Street

Royals

What is DNA?

What is it?

The Secret of Life

The Secret of Life

Cracking the Code of Life

http://www.pbs.org/wgbh/nova/genome/media/2809_qlg_04.html

Ch. 9 Finding Cures is Hard

HW

None for tonight.

<http://learn.genetics.utah.edu/>