

DNA structure

- Nucleosomes are structures made from DNA and histone proteins
- Non(coding regions o DNA could be introns telomeres or regulators
- Regulators of gene expression are parts of the DNA code which control transcription of genes
- Introns are non-coding parts of DNA, removed after transcription
- telomeres are sections of DNA that form the ends of chromoromes
- tRNA genes are genes which code for tRNA molecules

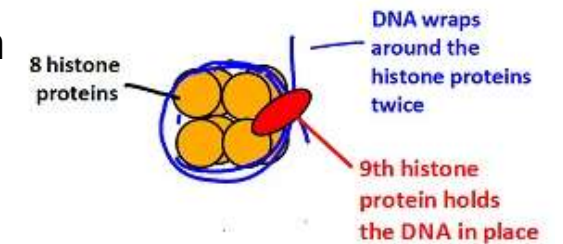
DNA replication (in prokaryotes) – Enzyme functions

- Helicase breaks H-bonds between DNA strands
- DNA gyrase unwinds the DNA strand
- single strand binding proteins protect DNA strands at replication
- DNA primase Attaches RNA primers to DNA strands
- DNA polymerases I Excises RNA primer replaces with DNA
- DNA polymerase III. Adds nucleotides to the growing DNA

What part do nucleosomes play in supercoiling?"

**A Nucleosome**

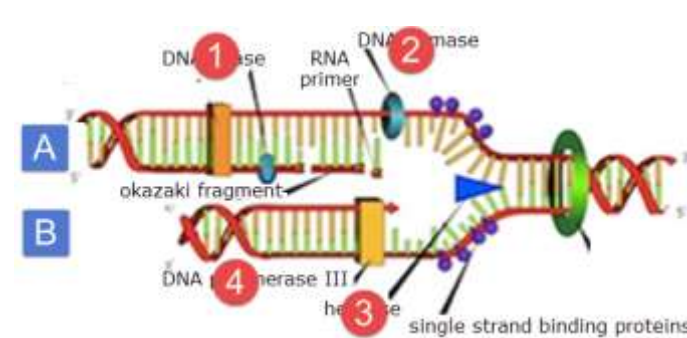
Made from DNA and nine histone proteins.



Applications

- Crossing over during prophase I of meiosis causes gamete chromosomes to more varied than parental chromosomes
- Dideoxynucleic acids are used in base sequencing because they can stop replication at specific places
- Tandem repeats are short blocks of DNA repeated over and over. This makes them useful in DNA profiling because. There is a huge variation of numbers of repeats from person to person.
- Hersey chase experiment used a virus infecting bacteria to provide evidence that DNA was the genetic material of inheritance

Name the four enzymes and the strands A & B



Compare & contrast DNA replication in leading stand with the lagging stand.

polymerase III adds nucleotides on both  
Replication on leading strand is continuous  
whereas on lagging strand it happens in  
sections.  
Okaaki fragments are found on lagging  
strand but not on leading strand.

Transcription & control of gene expression

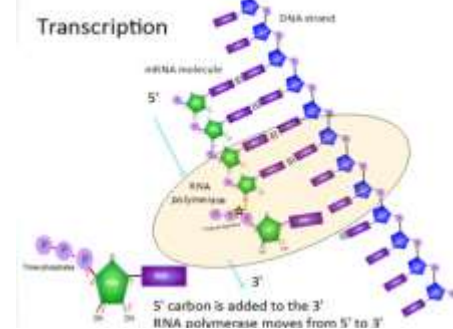
Neucleosomes can regulate transcription by preventing DNA replication when the DNA is coiled around

Gene expression can be regulated using proteins that bind to specific gene / base in the DNA.

The environment of a cell can also affect gene and heritable epigenetic factors.

mRNA is modified by splicing after transcription to remove intron or to increase the number of different protein made by a single gene.

**5' to 3' direction**



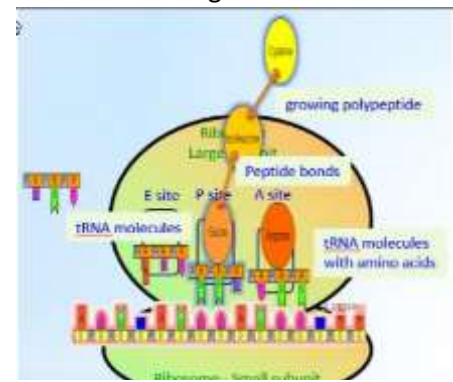
Outline the three stages of translation

Initiation assembly of ribosome parts

Synthesis A repeated cycle on the ribosome uses A, P and E sites makin

Termination the separation of the parts, mRNA polypeptide and the

Ribosome binding sites



Compare & contrast free ribosomes and bound ribosomes

Free ribosomes	Bound ribosomes
<u>in cytoplasm</u>	<u>on rER bound to</u>
<u>proteins synthesised are</u>	<u>proteins synthesised for use in lysosomes or outside</u>

State what makes primary structure in a protein

the sequence of amino

Describe these secondary structures

Alpha helix a helical chain of amino

Beta pleated sheet a flat layer made from a folded chain of amino

Describe tertiary and quaternary structure in proteins using a diagram

tertiary structure is the 3D arrangement

Quaternary structure is the joining of two or more polypeptides together. eg. Haemoglobin has 4 globin molecules.

