

iv. The chromosome having centromere in the centre are called
Meta-centric

v. V-shaped chromosome are called
OR
Chromosome with equal length of its arm is called
Metacentric

Composition of Chromosome

L/1 Describe the chemical composition of chromosome?

A

Chemical Composition of Chromosome

Chromosome are composed of DNA & protein (nucleoprotein). A typical chromosome has the following composition:

• DNA (40%)

• Protein (60%)

• RNA: A significant amount of RNA is also associated with chromosomes, because these are the sites of RNA synthesis.

The DNA of a chromosome is one very long, double stranded fiber. It extends unbroken through the entire length of the chromosome.

Amount of Information in human Chromosome mp/s

Typical human chromosome contains about 140 million (1.4×10^8) nucleotides in its DNA.

The amount of information, a chromosome contains would fill about 280 printed (4)

DNA As Hereditary Material

L/2 How did it proved that DNA is the hereditary material?

A

* Griffith Experiments

- Work of Griffith:

The evidence of hereditary nature of DNA was provided by a British microbiologist Frederick Griffith.

- Two types of Bacteria used in Experiment

i. S-Type Bacteria:

The normal pathogenic form of this bacterium is referred to as S/normal / wild form because it forms smooth colonies. It contains polysaccharide coat.

ii. R-Type Bacteria:

The mutant forms, which lack an enzyme needed to manufacture the polysaccharide coat is called the R/ mutant type because it forms rough colonies.

- Experiment 1

- Griffith infected mice with a virulent strain (S-type) *Streptococcus pneumoniae* bacteria (also known as *Pneumococcus*). The mice died of blood poisoning.
- However when he infected similar mice with a mutant strain (R-type) of *Streptococcus pneumoniae* that lack the

(1)

DNA the Hereditary Material:

It was proved that the hereditary information injected into the bacteria that specified the new generation of viruses was DNA & not protein.

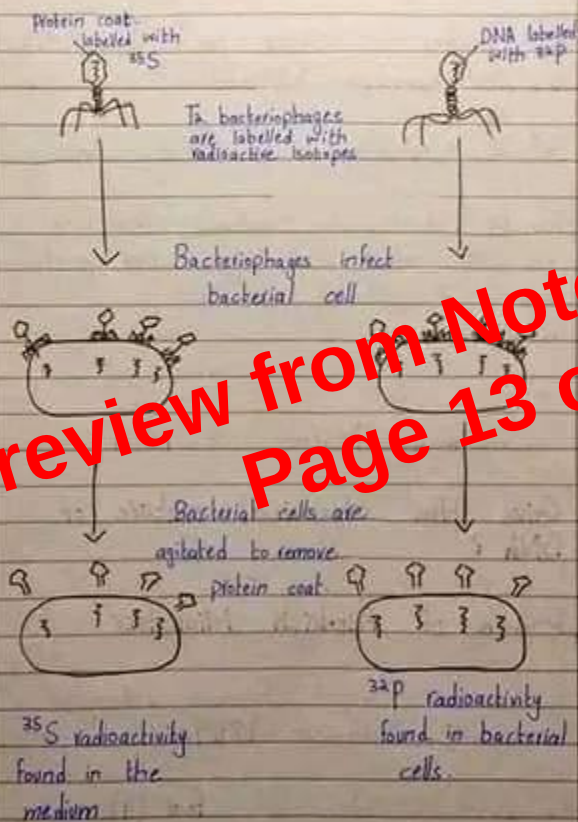


Fig: Hershey & Chase Experiment

eg ATP, ADP, AMP eg Adenosine,
GTP Guanosine, Thymidine

MCQs related to Previous Topics

- i. The 5 carbon sugar in DNA is Deoxyribose
- ii. DNA was discovered in 1869
- iii. The basic structure of human nucleic acid was determined by P.A. Levene
- iv. Repeating units in DNA are called nucleotides
- v. X-ray diffraction of DNA was performed by Franklin & Wilkins
- vi. The two strands in DNA are coiled to each other antiparallel

generated by the ultracentrifuge caused the cesium ions to migrate towards the bottom of the centrifuge tube, creating a gradient of CsCl , & thus of density. Each DNA floats or sinks in the gradient until it reaches the position where its density exactly matches the density of cesium.

- Because N^{15} strands are denser than N^{14} strands, they migrate farther down the tubes to denser regions of the cesium chloride gradient.

Observations

There were following observations of the Meselson & Stahl experiment.

- i. The DNA sedimented immediately after the bacteria was all grown in N^{15} medium.
- ii. The bacteria were allowed to complete their first round of DNA replication in the N^{14} medium. The density of their DNA had decreased to a value intermediate between N^{15} -DNA and N^{14} -DNA.
- iii. After the second round of replication, two density classes of DNA were observed.
 - One intermediate
 - One equal to that of N^{14} -DNA