

DNA AS GENETIC MATERIAL

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1. Even though researchers discovered that the factor responsible for the inheritance of traits comes from within the organisms; they failed to identify the hereditary material.
2. The chromosomal components were isolated but the material which is responsible for inheritance remained unanswered.
3. Griffith's experiment was a stepping stone for the discovery of genetic material.
4. It took a long time for the acceptance of DNA as genetic material. Let's go through the discovery of DNA as genetic material.

Experiments of Hershey and Chase

1. We know about Griffith's experiment and experiments that followed to discover the hereditary material in organisms.
2. Based on Griffith's experiment, Avery and his team isolated DNA and proved DNA to be the genetic material. But it was not accepted by all until Hershey and Chase published their experimental results.
3. In 1952, Alfred Hershey and Martha Chase took an effort to find the genetic material in organisms.
4. Their experiments led to an unequivocal proof to DNA as genetic material. Bacteriophages (viruses that affect bacteria) were the key element for Hershey and Chase experiment.
5. The virus doesn't have their own mechanism of reproduction but they depend on a host for the same. Once they attach to the host cell, their genetic material is transferred to the host.
6. Here in case of bacteriophages, bacteria are their host. The infected bacteria are manipulated by the bacteriophages such that bacterial cells start to replicate the viral genetic material.
7. Hershey and Chase conducted an experiment to discover whether it was protein or DNA that acted as the genetic material that entered the bacteria.

DNA as Genetic Material

Experiment:

1. The experiment began with the culturing of viruses in two types of medium. One set of viruses (A) was cultured in a medium of radioactive phosphorus whereas another set (B) was cultured in a medium of radioactive sulfur.
2. They observed that the first set of viruses (A) consisted of radioactive DNA but not radioactive proteins.

3. This is because DNA is a phosphorus-based compound while protein is not. The latter set of viruses (B) consisted of radioactive protein but not radioactive DNA.
4. The host for infection was E.coli bacteria. The viruses were allowed to infect bacteria by removing the viral coats through a number of blending and centrifugation.

Observation:

E.coli bacteria which were infected by radioactive DNA viruses (A) were radioactive but the ones that were infected by radioactive protein viruses (B) were non-radioactive.

Conclusion:

Resultant radioactive and non-radioactive bacteria infer that the viruses that had radioactive DNA transferred their DNA to the bacteria but viruses that had radioactive protein didn't get transferred to the bacteria. Hence, DNA is the genetic material and not the protein.