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Class 12th

Sub. Biology

Date:- 30.08.2020

The search for Genetic Material

Transforming principle – Frederick Griffith in 1928 conducted experiment on bacteria Streptococcus pneumoniae (bacterium responsible for pneumonia). There are two types of strain of this bacteria, some produce smooth shiny colonies (S) and others produce rough colonies(R). Mice infected with the S strain (virulent) die from pneumonia infection but mice infected with the R strain do not develop pneumonia.

S strain → Inject into mice → Mice die

R strain → Inject into mice → Mice live

S strain (heat-killed) → Inject into mice → Mice live

S strain (heat-killed) + R strain (live) → Inject into mice → Mice die

Griffith concluded that R strain bacteria have somehow transformed by heat killed S strain bacteria. Some transforming principles transferred from S strain to R strain and enabled the R strain to synthesise a smooth polysaccharide coat and become virulent. This must be due to the transfer of the genetic material.

Biochemical Characterisation of Transforming Principle

- **Oswald Avery, Colin MacLeod** and **Maclyn McCarty** worked out to determine the biochemical nature of transforming **principle of Griffith.**
- They purified biochemicals (proteins, DNA, RNA, etc.) from the heat-killed S cells to see which ones could transform live R cells into S cells. They discovered that DNA alone from S bacteria caused R bacteria to become transformed. So, they concluded that DNA is the genetic material.