**Griffith’s Experiment**

In 1928, Griffith performed transformation experiments with two different strains of the bacterium *Diplococcus pneumonia* (the organism is now named *Streptococcus pneumonia*)- virulent strains, which cause pneumonia in certain vertebrates (such as mice, human), and a virulent strains, which do not cause pneumonia. The difference in virulence is related to the polysaccharide capsule of bacterium. Virulent strains have this capsule, whereas avirulent strains do not. The non-capsulated bacteria are readily engulfed and destroyed by phagocytic cells. Virulent bacteria, which possess the polysaccharide capsule, are not easily engulfed. Hence, they are able to multiply and cause pneumonia. Encapsulated bacteria form smooth colonies (S) when grown on ann agar culture plate; whereas non-capsulated strains produce rough colonies (R). Each strain of Diplococcus may be of different serotypes- Is, IIS and IIS or IR, IIR and IIR. Two serotypes of Diplococcus were used in the experiment (IIR and IIS). Serotypes are identified by immunological techniques. Griffith performed experiments with two different strains-IIR and IIS.

Serotype Morphology Capsule Virulence

IIR Rough Absent Avirulent

IIIS Smooth Present Virulent

Griffith injected the different strains of bacteria into mice. The IIS strain killed the mice; the IIR strain did not. He further noted that if the heat killed IIS strain was injected into a mouse (remember neither alone will kill the mouse) that the mouse developed pneumonia and died. Griffith concluded that the heat killed IIIS bacteria were responsible for converting live avirulent IIR cells into virulent IIIS ones and called the phenomenon transformation. He called the genetic information which could be passed from the dead IIIS cells ti IIR cells, the transforming principle.

Live IIR strain → injected into mouse → mouse survives

(Avirulent, non-capsulated)

Live IIIS strain → injected into mouse → mouse dies

(Virulent, capsulated)

Heat killed IIIS strain → injected into mouse → mouse survives

Heat killed IIIS strain → injected into mouse → mouse dies

And live IIR strain

Fig: Griffith’s demonstration of transformation in *Pneumococcus*.