

“DNA as Genetic Material: Revisiting Classical Experiments through an Easy,  
Practical Class”

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In 1928, Frederick Griffith demonstrated a process of transmission of genetic information by transforming *Pneumococcus*. In 1944, Oswald Avery, Colin Munro MacLeod and Maclyn McCarty showed that Griffith's transformation principle is DNA. Here, we intend to revisit these classical experiments by reproducing them in easier adapted forms, for a practical class given to undergraduate students. The Griffith experiment was reproduced by mixing heat-killed, ampicillin-resistant *E. coli* with live ampicillin-susceptible *E. coli*, followed by plating samples in the presence or absence of the antibiotic. Cells were also plated separately as control. Avery's work was reproduced by pre-treating a purified plasmid harboring the ampicillin resistance gene with Dnase I. Treated and untreated plasmids were then used to transform *E. coli* cells, which were plated in culture media containing ampicillin. The students received a class guide with brief theoretical explanations and protocols to perform the experiments. The original papers by Griffith and Avery *et al.* were also provided, along with a list of questions to encourage a discussion on the experimental approach and results obtained. The adapted experiments were successful completed and all expected results were obtained in class. Thus the students effectively revisited the classical experiments which revealed that DNA is the genetic material. Also, the class was very well accepted, as indicated by students' evaluations. Thus, we presented an inexpensive, quick class involving important concepts, which can be easily reproduced in any laboratory with minor resources.

**Keywords:** Genetic material, Transformation principle, Griffith's experiment, Avery's experiment

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