

Chemical Nature and Biological Specificity of the Substance Inducing
Transformation of Pneumococcal Types

ABSTRACT

Maclyn McCarty
Lt. Cmdr. (MC) USNR

The specific substance responsible for the induction of transformation of pneumococcal types has been isolated from three separate types of *Pneumococcus* in the form of desoxyribonucleic acid fractions. Chemical, physico-chemical and serological analysis of the purified material support the view that biological activity is a property of the desoxyribonucleic acid. Further evidence on this point has been obtained by the application of enzymatic techniques. The enzyme desoxyribonuclease has been isolated in purified form from beef pancreas and has been shown to be highly active in attacking polymerized desoxyribonucleic acid from animal sources. In concentrations of less than 0.01 μ g. per cc. desoxyribonuclease causes complete and irreversible loss of biological activity of the transforming substance. The enzymatic evidence is thus confirmatory of the desoxyribonucleic acid nature of the active substance.

While the results obtained with the transforming substance indicate that desoxyribonucleic acids possess biological specificity, the chemical basis of this specificity is not known. The implications of the present studies with respect to the problem of specificity of the nucleic acids are discussed.

The biological properties of the transforming substance present analogies to those of viruses. However, in the case of the pneumococcal agent, the apparent absence of protein and the marked susceptibility to enzymatic destruction provide significant points of difference.

From the United States Navy Research Unit at the Hospital of The Rockefeller
Institute for Medical Research

The Bureau of Medicine and Surgery of the U.S. Navy does not necessarily undertake to endorse the views or opinions which are expressed in this paper.