VIRUS CARCINOGENESIS

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1. Introduction

The title of this discussion, "Virus carcinogenesis," was purposely made general because there are at present differences of opinion both with respect to (1) the nature of the tissue reaction designated as cancer, or neoplasia, and (2) the mechanism through which viruses are thought to act to bring about this peculiar reaction [1]. It is not the purpose here to go into these differences of opinion at length, or to discriminate among them in an attempt to present a final picture of virus carcinogenesis at this time. Rather, the purpose will be to present certain representative quantitative data, together with descriptions of the conditions under which they were derived, so that so far as possible the thinking of mathematicians and the tools of mathematical statistics may be brought to bear on the basic problem of discerning ultimate mechanisms in this area of carcinogenesis.

Since many viruses are known which produce tissue reactions or diseases other than cancer, and since biologically active agents of various types other than viruses are capable of inducing cancer, it is obvious that *virus carcinogenesis* cannot be considered in an isolated fashion, without some reference to the biological responses to agents of these other types. Preliminary discussions will therefore be given of selected quantitative biological data which illustrate the types of results obtained with chemical carcinogenic agents and with viruses other than those which produce cancer.

2. Subcutaneous injections of polycyclic hydrocarbons (chemical carcinogens)

In another paper of this Symposium, Dr. Blum deals with the induction of cancer by ultraviolet light, as well as by repeated doses of polycyclic hydrocarbons applied to the skin of experimental animals. The data to be reiterated here were obtained following the subcutaneous injection of single doses of three different chemical carcinogens (methylcholanthrene, dibenzanthracene, and benzpyrene) into respective groups of inbred mice [2]. In each case subgroups of animals were injected with decreasing doses in a geometric series, prepared by making serial twofold dilutions of a starting concentration which was determined by the upper limit of solubility of the chemical in the oily medium (tricaprylin) used as diluent and injecting vehicle.