

# COMPARABLE MODELS FOR CARCINOGENESIS BY ULTRAVIOLET LIGHT AND BY CHEMICAL AGENTS

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## 1. Introduction

Although there have been many experimental studies of carcinogenesis, using a variety of agents, relatively few have been carried out in such a way as to make them useful for quantitative study. No doubt, in some cases, additional data exist which have not been fully reported because of limitations of means of publication or other reasons. A recent request from the group under which this Symposium has been organized, has called to my attention incompleteness in reporting of my own data on induction of cancer by ultraviolet light, and I have therefore made them available in some detail in mimeographed form. Requests for this material may be addressed to me at the Department of Biology, Princeton University, Princeton, New Jersey. But even with the best planned studies the kinds of data that can be obtained are severely limited by the available means of experiment.

Since the individual cancer cell cannot be distinguished from the cells of the tissue of origin, the moment of emergence of a cancer cannot be directly established; cancers are recognized only after they have grown to masses composed of large numbers of cells. The principal measurement feasible in experimental studies is the time elapsed between the application of a carcinogenic agent and the appearance of a tumor of grossly observable volume. This interval I refer to as the *development time*.

Clearly the development time must be occupied, at least in part, by growth of the tumor. In order to extrapolate back from the terminal volume to the moment of origin of the cancer it would be necessary to know the character of the growth curve. Yet various hypotheses regarding the origin of cancer have tacitly contained this extrapolation without reference to a growth function, and without quantitative support. Some quantitative models also appear to have

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