

**Bernhard W.** The detection and study of tumor viruses with the electron microscope. *Cancer Res.* **20**:712-27, 1960.

**The ultrastructural aspects of all groups of RNA and DNA tumor viruses known at this date are presented on a series of electron Micrographs and their evolutionary cycle is described in detail. The authors compare these findings with biological data on the same agents. They conclude that electron microscopy has now become an indispensable tool for further experimentation with known and still unknown tumor viruses. [The SCF® indicates that this paper has been cited 335 times since 1961.]**

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"Eighteen years after its publication, I believe that the success of this paper may be due to 4 different reasons. The first one was that it appeared *just in time*, where the *receptivity* of the reader for such a topic was suddenly exceptionally favorable. A previous similar paper, although less complete, had already been published in *Cancer Research* two years earlier but did not find a comparable resonance.<sup>1</sup> The decisive psychological turn in favor of the viral origin of cancer took place between 1958 and 1960, a period when a number of important papers was published, particularly on the *in vitro* transformation and improved *in vitro* titration methods.

"The second reason was due to the fact that our work, which we started with Charles Oberling as early as 1948, was published previously in *French* in periodicals such as the *Bulletin du Cancer* and the *Comptes Rendus de l'Academie des Sciences*, which were either not available or not read in the United States. When we published the first paper on C-type particles in 1958, we received from the whole world *two reprint re-*

*quests'* There was an extraordinary skepticism until the late fifties against EM pictures showing so called' tumor viruses. At that time we were, of course, rather desperate that our studies did not find a better echo, but later we understood that this was a unique opportunity to accumulate still more convincing documents, *without too much competition*. Being *ignored* in science—at least for a short time—may sometimes turn out to be an *advantage!*

"Thirdly, during these years of darkness, we could steadily *improve* our techniques and select the very best pictures among many thousands. They had a more convincing effect than the earliest documents we published in French journals. In addition, we could classify the various particles according to merely morphological criteria and demonstrate their *ubiquity* in various strains of rodents or birds (A- and B-type particles in 1954/55, C-type particles in 1955/58). This simple nomenclature was later accepted by an international committee and has been used ever since.

"Finally, I was particularly fortunate to present this review at one of the '*break-through*' meetings for the future of the viral theory, sponsored by the American Cancer Society and held at Rye, NY, November 19-21, 1959. Among the participants, there were most of the early great pioneers in this field: Peyton Rous, R Shope, J.W. Beard, L Gross, J. Furth, Sarah Stewart, J.T. Syverton, and outstanding virologists and phage specialists such as A Lwoff, R Dulbecco, F Jacob, S Luria, E.R. Stanley, A B. Sabin, and other remarkable scientists.

"The contributions were published in a special Symposium volume of *Cancer Research* with the provocative title: *The Possible Role of Viruses in Cancer*, and for this reason were read by an unusually high number of investigators Its publication in June 1960 coincided with the time when I was writing the obituary for Charles Oberling who died of bronchial carcinoma a few months earlier, after fighting with unusual courage throughout his scientific career for the recognition of the importance of oncogenic viruses in cancer research "

1. **Bernhard W.** Electron microscopy of tumor cells and tumor viruses. A review. *Cancer Res.* **18**:491-509, 1958.