THE EFFECT OF RADIUM ON THE MALIGNANT CELLS OF SPONTANEOUS CARCINOMA OF THE MOUSE GROWN IN TISSUE CULTURES

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The tumors used in these experiments were obtained through the kindness of Dr. Lionel C. Strong of the Jackson Memorial Laboratory They consisted of different types of mammary gland carcinoma which had been present in the mice for periods of time varying from one to several weeks.

The radium used was in the form of a 50 mg. tube of radium filtered through .5 mm. of silver, and of a half strength 10 mg. plaque of radium. It was applied directly on the cover slip to which the culture was attached so that the distance was never more than one or two mm.

The cultures were exposed to radium for periods of time varying from five minutes to 24 hours. The radium was applied to the cultures in some instances as soon as they were prepared, in others after growth had taken place for 24 hours, and in others not until the extensive growth of cancer cells which is reached in 48 hours had been attained.

The cultures were studied as soon as the radium was removed and at intervals following the removal of the radium. A few cultures were fixed and stained shortly after the radium was removed, but most of the radiated cultures were fixed four days after explantation.

The cultures were grown in electric incubators kept at a temperature of 37.5° C. - 39° C. During microscopical observations and exposure to radium the cultures were kept warm.

The tube and plaque of radium were used in the treatment of patients suffering with cancer so that some comparison of results of practical applications of radium as a therapeutic measure and of the experimental exposure of growing cancer cells removed from the body could be obtained.

The experiments were by no means completed during the summer and more investigation is needed before conclusions can be arrived at.

However, one striking result obtained was that while the size of the growth reached in some of the cultures exposed to radium was as large as that of the control cultures, the radiated cultures failed to contain figures of mitotic division while the control cultures had many such dividing cells. Also if at the end of four days radiated as well as control cultures were explanted into fresh medium the radiated cultures failed to survive.

Exposure to the amount of radium used did not kill the cancer cells immediately, even those cells undergoing mitosis completed the division, but it brought about some changes in the cells or their environment which rendered them less viable and many of the cancer cells died as growth progressed so that at the end of four days the radiated cultures exhibited more necrosis than the control cultures.

There was no evidence of stimulation of growth or mitosis in any of these experiments.