

tant gamma radiation, in both normal and neoplastic tissue. Methods of minimizing unwanted gamma radiation will be investigated.

Stone, Robert S. AT(11-1)-GEN-10
J1D751 USEFULNESS OF 70-Mv X-RAYS IN
THE TREATMENT OF CANCER IN MAN.
California. Univ., San Francisco. School of Medicine. Radiological Lab. SP 4; MYr 3.7.

We are using X-rays from a 70-Mev synchrotron to treat patients with cancer. Treatments started in July 1956, and are continuing. The synchrotron operation, radiation dosimetry, and assistance in planning treatments are responsibilities of the physicists. The radiologists have the responsibility for patient management. This synchrotron runs with great regularity; only 2 treatment days have been lost in 6 years.

The advantages center around the physical distribution of the energy transfer from the X-ray beam to the tissues. The maximum level of energy absorption is between 6 and 14 cm. Single or simple double-field crossfiring technics are all that is needed. The treatments are tolerated well. The whole tumor-bearing area gets a uniform dose every day the patient is treated. We are concentrating on tumors of the uterus, urinary bladder, and brain because in these locations the peculiarities of the beam can be utilized best, but we treat lesions in other locations.

Years are required to evaluate effects on cancer, 5-year survival being a common measure. Up to the end of June 1962 we had treated 310 patients—most of them with advanced lesions not likely to be cured by routine methods. Some results have been very gratifying. More years and more patients are needed for our statistics to be meaningful.

Lawrence, J. H. W-7405-Eng-48
J1D1098 EFFECTS OF HEAVY PARTICLE RADIATION ON TUMORS AND ABNORMALLY FUNCTIONING TISSUES.
California. Univ., Berkeley. Lawrence Radiation Lab. MYr 8.8.

The purpose of this project is to investigate and explore the direct and indirect effects of heavy particle irradiation on tumor and other tissue.

The availability of the many accelerators of the Lawrence Radiation Laboratory makes this study possible. Of particular interest are the high energy particle beams of the 184-In. Cyclotron whose unique properties of lack of scatter and great penetration enable the localization of large doses of ionizing radiation in deep-lying tissues. Currently the pri-

mary effort is to learn the modifying and therapeutic influence of pituitary hormones and their effect on the target and organs. Hypophysectomizing as well as suppressive doses of irradiation can be given. Remissions and regressions are effected in some patients with advanced cases of certain malignant tumors (e.g., metastatic mammary carcinoma and prostatic carcinoma) and certain disease syndromes, such as acromegaly and Cushing's disease which result from primary pituitary tumor. Diabetes mellitus with retinopathy and malignant exophthalmos also appear to be beneficially influenced. A total of 271 patients have received pituitary irradiation at the present time. The majority of the group comprising 158 patients have had advanced mammary carcinoma. A series of 77 patients with diabetic retinopathy and 20 with acromegaly constitute the next two largest series. Sixteen patients with other disease entities of interest to the purpose of this study have received pituitary irradiation.

The 900 million volt alpha particle beam has been used to irradiate brain tumors in three patients by employing the Bragg ionization peak.

K SELECTED BENEFICIAL APPLICATIONS

K1A Medical Research

See also A1F1116, A1F1118, A2B885, C1A1126, C1B659, D1D66, D1E646, J1A645, J1B879, and J1D1098.

Kappas, Attallah AT(11-1)-69
K1A618 STEROID STUDIES IN MAN.
Argonne Cancer Research Hospital, Chicago.
SP 1; MYr 1.

Studies on the cytotoxic and thermogenic properties of 5 β -H steroids continue, and it appears that this class of hormonal and cholesterol metabolites has potent hemolytic as well as cirrhosis producing activity. The latter biological action is demonstrated in several experimental species; it is pertinent to human liver disease by virtue of the well known bile acid and steroidal abnormalities noted in the plasma of patients with liver cirrhotoses, certain of which steroids comprise cytotoxic metabolites of the 5 β -H type. Their potential relation to initiator