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1968

1:1605 CLINICAL APPLICATION OF RADIOISOTOPES IN DIAGNOSIS AND TREATMENT. Harper, P. V. (Argonne Cancer Research Hospital, Chicago, Ill.). Contract AT(11-1)-69.

Work is oriented toward the development of as yet clinically unavailable radioisotopes and new methods of their application in interstitial therapy and in diagnosis; and to the optimum collection of information available from in vivo nuclides, together with its most meaningful display. <sup>99m</sup>Tc is being used in studies of normal and diseased thyroids which we hope will give functional data of possible diagnostic value about the ion concentrating mechanism. Additional preparations of <sup>99m</sup>Tc are being sought for use in situations not presently accessible to scanning. The following short-lived isotopes may be tested in the clinics: fluorine-18 and indium-113m. A 3-dimensional image reconstruction system and a total-body imaging system are being constructed.

The <sup>90</sup>Sr-<sup>90</sup>Y needle sources are still being used effectively for hypophysectomy in patients with metastatic carcinoma of the breast, diabetic retinopathy, and acromegaly. Approximately 100 patients have been treated in this way in the past two years. A kidney localizing preparation of <sup>99m</sup>Tc is receiving clinical trial, and a preparation of <sup>99m</sup>Tc-albumen for perfusion scanning has been developed.

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1966

WJB 621 CLINICAL APPLICATION OF RADIOISOTOPES  
IN DIAGNOSIS AND THERAPY. Paul V. Harper, Jr.  
(Argonne Cancer Research Hospital, Chicago). Contract  
AT(11-1)-69.

This on-going project is concerned with the use of radioisotopes as interstitial sources of radiation for the treatment of malignant tumors and as detectors for the location of tumors.

Studies with palladium-103 have continued as patients present themselves, and the availability and usefulness of  $^{103}\text{Pd}$  should be increased by the improved methods of rough processing cyclotron targets that are being investigated at the Oak Ridge National Laboratory. The  $\text{Sr}^{90}$   $\text{Yb}^{90}$  applicator that has been used for severing nerve tracts in the relief of pain has now superseded the yttrium implants formerly used for destruction of the hypophysis. A commercial firm is considering production of the applicator.

Exploration of the application of  $\text{Tc}^{99\text{m}}$  as the isotope of choice in scanning problems continues. It is being used as the pertechnetate for thyroid and brain scanning and as a sulfur colloid for liver and spleen scanning. Other diagnostic studies using external counting are being pursued from the point of view of better isotopes, better detectors, better analytical electronics and computer analysis of results. It is anticipated that the linear accelerator will, with its new electron gun (which should increase the average beam current by a factor of between 100 and 1000) become a significant source of short-lived radioisotopes such as  $\text{O}^{15}$  and  $\text{I}^{123}$ . This will open up new avenues of investigation in therapy and diagnosis.

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