

CLINICAL APPLICATIONS OF COLLOIDS CONTAINING RADIOACTIVE YTTRIUM

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Experiments with animals have demonstrated that some control of selective localization of radioisotopes can be obtained by varying the state of physical dispersion of the compound used. With yttrium and zirconium it has been shown that certain colloids can be prepared localizing and remaining localized in the bone marrow, liver and spleen whereas other colloids localize in the liver and spleen. It appears that size of particle and number of particles injected are important factors influencing the distribution.

Based upon this animal work a colloid of yttrium hydroxycitrate was prepared which, it was anticipated, might localize primarily in the bone marrow, liver and spleen. Radio-yttrium  $Y^{90}$ , a 2.6 day  $\beta$ -emitting isotope (upper energy limit = 2.2 MEV) was incorporated into this colloid. Such colloids have now been used by us (Lawrence, Gofman, and Falconer) for approximately two years in the therapy of hematopoietic disorders such as polycythemia vera and the leukemias. From the experience gained to date it appears that  $Y^{90}$  in the form of the colloid is as effective as  $P^{32}$  in polycythemia vera, remissions having been obtained in every case studied without any untoward effects. A much longer experience will be required to determine whether there is or is not a real long-term advantage of such therapy as compared with the highly effective  $P^{32}$  program. In the chronic leukemias the results of therapy to date indicate  $Y^{90}$  can produce palliation, but it is not possible to say yet that it is as good as  $P^{32}$ . The possible theoretical advantages of a shorter half life and more specific localization in diseased tissues using

$Y^{90}$  colloid are being evaluated. Specific case histories demonstrating dosage, response times, and length of remissions will be presented in detail.

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