

Clinical Uses of Radioactive Colloids

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Radioactive colloids are useful in therapy because under some circumstances they provide selective radiation to localized areas. This localization is achieved partly by means of the purely mechanical factor of the site of injection but also partly by the reaction of the body, particularly the reticulo-endothelial system, to the colloid. Thus the colloids stand somewhere between the metabolically localized radioisotopes and those localized by mechanical placement.

At least three different types of administration are used clinically, and the behavior of the colloid is different for each method of administration. Generalizations about their dosage, tissue distribution, and effects may be misleading unless the specific route of administration is stated. Figure 1 shows diagrammatically the types of administration useful for therapy and the resulting tissue distribution.

CHARACTERISTICS OF COLLOIDS

A large number of radioisotopes can be prepared as colloids. In this form the various elements lose most of their individual biological behavior and show a surprising similarity of distribution. The relatively slight differences in distribution that do appear depend more upon particle size than upon the properties of the elements. Thus colloids offer a rather standard type of distribution pattern, which can be achieved for a wide variety of radioisotopes, and give the physician the opportunity to choose those with half lives and radiation characteristics believed most desirable.

The behavior of radioactive colloids in the body might be summarized as follows: When injected directly into tumors or into solid tissues of the body a large proportion of the colloid stays localized at or near the site of injection. An unpredictable amount may reach the blood stream and localize in liver, spleen, and bone marrow; a significant proportion may also find its way to lymph nodes draining the site of injection.

When the colloidal material is injected into a body cavity the great bulk of it is deposited on the surfaces of the cavity, with smaller fractions reaching lymph nodes adjacent to the cavity and the blood stream.

When injected intravenously the colloid is removed from the blood stream chiefly by the liver but also significantly by the spleen and bone marrow and to a less extent by other tissues having reticulo-endothelial function. After this route of injection lymph nodes show relatively slight concentration of the material.

COLLOIDS AVAILABLE FOR CLINICAL USE

Figures 2 and 3 give data on four isotopes used as colloids.

Radioactive gold-198 has the advantage of being easily prepared and offers rather uniform