THE USE OF GAMMA SCINTIGRAPHY FOR THE IN VIVO ASSESSMENT OF COLLOIDAL DOSAGE FORMS INTENDED FOR PARENTERAL USE

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Colloidal dosage forms are administered for a variety of purposes. These include diagnostic radionuclide imaging (Rhodes and Croft, 1978), intramuscular injection of vaccines in depot preparations (Hilleman,1966), and the treatment of rheumatoid arthritis by intra-articular injection, for example with radioactive Yttrium (^{90}Y) (Webb, 1969) and microcrystallised steroids (Hollander, 1955). Formulation factors such as the nature of the colloidal particles, the surface charge, and the particle size, have been shown by previous workers to influence the kinetics of elimination. The use of non-invasive techniques such as gamma scintigraphy in these studies allows the time course for the deposition and fate of the preparations to be followed in individual animals with minimal intervention to normal physiology.

Some typical results of the use of gamma scintigraphy to investigate the clearance of colloidal suspensions administered by intramuscular, intra-articular or subucutaneous routes are tabulated below:

Route of Administration	Particle Nature	Particle Size (nm)	Radionuclide Material	Time for clearance of 50% activity from injection site (h)
IM	Polystyrene	220	^{131}I	680
IM	Polystyrene	1090	^{131}I	880
IA	Sulphur	400-600	^{99m}Tc	10.5
IA	Antimony Sulphide	3-15	^{99m}Tc	8.8
SC	Sulphur	400-600	^{99m}Tc	9.1
SC	Antimony Sulphide	3-15	^{99m}Tc	6.8

These studies will allow for the development of a more rational approach to the design of parenteral dosage forms intended for local effect or for the targetting of drugs to specific sites in the body.

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