

# Biodistribution and Imaging Studies of Technetium-99m-Labeled Liposomes in Rats with Focal Infection

Beth Goins, Robert Klipper, Alan S. Rudolph, Richard O. Cliff, Ralph Blumhardt and William T. Phillips

*Radiology Department, University of Texas Health Science Center at San Antonio, San Antonio, Texas and Center for Biomolecular Science and Engineering, Naval Research Laboratory, Washington, D.C.*

We have recently developed a procedure to label liposomes containing reduced glutathione (GSH) with  $^{99m}\text{Tc}$  using the lipophilic chelator, hexamethylpropyleneamine oxime (HMPAO). In the present study, we evaluated the use of  $^{99m}\text{Tc}$ -liposomes to detect focal infection sites in rats. Rats were infected in the thigh by intramuscular injection with *Staphylococcus aureus* followed 24 hr later by an intravenous injection of  $^{99m}\text{Tc}$ -liposomes,  $^{67}\text{Ga}$ -citrate, or  $^{99m}\text{Tc}$ -human serum albumin (HSA). The animals were imaged under a gamma camera and subsequently killed at 4, 24 or 48 hr for tissue biodistribution studies. In contrast to infected rats receiving  $^{67}\text{Ga}$ -citrate or  $^{99m}\text{Tc}$ -HSA, abscesses were prominently localized within 2 hr in rats after  $^{99m}\text{Tc}$ -liposome injection, and continued to increase in activity up to 24 hr. Abscess-to-muscle ratios calculated from 24-hr biodistribution data obtained from tissue sampling were  $35.3 \pm 7.6$  for  $^{99m}\text{Tc}$ -liposomes,  $4.1 \pm 0.7$  for  $^{67}\text{Ga}$ -citrate and  $8.0 \pm 1.0$  for  $^{99m}\text{Tc}$ -HSA. These studies show the potential of using  $^{99m}\text{Tc}$ -liposomes to localize infection.

**J Nucl Med 1993; 34:2160-2168**

gamma camera  
increased ac-  
cumulation of  $^{99m}\text{Tc}$ -liposomes in a rat with  
a *Staphylococcus aureus* thigh abscess  
over a 24-hr period.

