

**$^{99m}\text{Tc}$ -DTPA PREPARATIONS**

In the December 1970 issue of the *Journal of Nuclear Medicine* two articles describe a compound named " $^{99m}\text{Tc}$ -DTPA" (1,2). This suggests that the compounds described in the two articles are identical. We would therefore like to point out that despite the similar name there are major chemical and biological differences between these two compounds. A more thorough evaluation is published elsewhere (3).

Despite having DTPA as part of its formulation, the end product of the Squibb  $^{99m}\text{Tc}$ -DTPA kit (1) does not behave chemically as a high-yield, metal DTPA chelate, as does the "Instant  $^{99m}\text{Tc}$ -DTPA" (2). Although the chromatography system of Brookeman and Williams (descending paper chromatography using n-butanol:ethanol:water, 2:2:1) disclosed only two peaks—the DTPA complex and free  $\text{TcO}_4^-$ —it can be shown by gel chromatography (Sephadex G 25 M) that the Squibb  $^{99m}\text{Tc}$ -DTPA also has a third component which is adsorbed strongly to Sephadex. The data shown in Table 1

**TABLE 1. GEL FILTRATION YIELD DATA FOR  $^{99m}\text{Tc}$  CHELATES**

	Percent yield of $^{99m}\text{Tc}$ appearing in chelate fraction	Percent yield of $^{99m}\text{Tc}$ appearing in pertechnetate fraction	Percent* $^{99m}\text{Tc}$ adsorbed on Sephadex
Instant $^{99m}\text{Tc}$ -DTPA	>95	—	< 5
Squibb $^{99m}\text{Tc}$ -DTPA	12	16	61
	22	9	69
$^{99m}\text{Tc}$ -Fe-ascorbate	26	3	71

\* Percent adsorbed is that fraction of  $^{99m}\text{Tc}$  activity which was not eluted from a 35-cm Sephadex G 25 column in 80-ml nitrogen purged isotonic saline.

indicate that the Squibb kit product behaves chemically overall much more like an  $^{99m}\text{Tc}$ -iron ascorbate complex (4).

Furthermore, there are differences in the biological behavior between the Squibb  $^{99m}\text{Tc}$ -DTPA and the Instant  $^{99m}\text{Tc}$ -DTPA, a fact which Brookeman and Williams also indicate in their article. Nevertheless, they accept the statements about radiation dosimetry supplied in the prescribing information by Squibb. In this point and several others the prescribing information implies the identity of Renotec™ (Squibb  $^{99m}\text{Tc}$ -DTPA) with the previously described compound  $^{99m}\text{Tc}$ -DTPA (5,6) which is very similar to Instant  $^{99m}\text{Tc}$ -DTPA. This is certainly not the case

**TABLE 2. ABSORBED RADIATION DOSE ESTIMATES (IN RAD/mCi)**

	Renotec™	Instant $^{99m}\text{Tc}$ -DTPA
Kidneys	0.243	0.036
Total body	0.009	0.006

(3). About 5–10% of the Squibb  $^{99m}\text{Tc}$ -DTPA is retained in the kidneys while Instant  $^{99m}\text{Tc}$ -DTPA is rapidly excreted from the body. As a result the 24-hr total-body retention is  $30 \pm 2\%$  for Squibb  $^{99m}\text{Tc}$ -DTPA and  $11 \pm 5\%$  for Instant  $^{99m}\text{Tc}$ -DTPA. Radiation dosimetry calculations based on these data of the biological behavior of the two compounds give the values for the average radiation doses shown in Table 2.

These points are not made to discourage the use of the Squibb  $^{99m}\text{Tc}$ -DTPA as an agent for brain tumor localization. Certainly Brookeman and Williams show that the compound is useful in that respect. We rather concern ourselves with the possible use of the Squibb  $^{99m}\text{Tc}$ -DTPA as a true technetium chelate in glomerular filtration rate studies, a mistake which seems inevitable (7) with the confusion caused by the Squibb kit misnomer.

WILLIAM C. ECKELMAN  
POWELL RICHARDS

WOLFGANG HAUSER  
HAROLD L. ATKINS  
Brookhaven National Laboratory  
Upton, New York

## REFERENCES

1. BROOKEMAN VA, WILLIAMS CM: Evaluation of  $^{99m}\text{Tc}$ -DTPA acid as a brain scanning agent. *J Nucl Med* 11: 733–738, 1970
2. ECKELMAN WC, RICHARDS P: Instant  $^{99m}\text{Tc}$ -DTPA. *J Nucl Med* 11: 761, 1970
3. ATKINS HL, CARDINALE KG, ECKELMAN WC, et al: Evaluation of  $^{99m}\text{Tc}$ -DTPA prepared by three different methods. *Radiology*, 98: 674–677, 1971
4. ECKELMAN WC, MEINKEN G, RICHARDS P: The chemical state of  $^{99m}\text{Tc}$ . *J Nucl Med* 12: 596–600, 1971
5. RICHARDS P, ATKINS HL: Technetium-99m labeled compounds. *Jap Nucl Med* 7: 165–170, 1968
6. HAUSER W, ATKINS HL, NELSON KG, et al: Technetium-99m DTPA: a new radiopharmaceutical for brain and kidney scanning. *Radiology* 94: 679–684, 1970
7. TREVES S, SPENCER RP: Kinetic and clinical comparison of  $^{99m}\text{Tc}$ -diethylenetriamine pentaacetic acid,  $^{125}\text{I}$ -orthiodohippurate and  $^{125}\text{I}$ -iothalamate. *J Nucl Med* 11: 645, 1970