same components. They might therefore also have different biologic properties. It has become the practice of journals to refer to the radiopharmaceutical used just as ^{99m}Tc-sulfur colloid. In order to be able to correlate preparation data with clinical results, we should like to urge authors to give preparation details as long as it is not possible to describe completely the composition and structure of a ^{99m}Tc-sulfur colloid.

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THE AUTHORS' REPLY

We share the concern of Kristensen and Pedersen over the need for a clear statement of the method of preparing the radiopharmaceutical in any reports of unusual observations obtained when using that particular radiopharmaceutical. A review of the preparation procedures for various ^{99m}Tc-labeled radiopharmaceuticals published in the *Journal* in the last few years reveals that there are a number of different preparative procedures for most commonly used ^{99m}Tc radiopharmaceuticals. In order to establish the significance of any particular result, it is helpful to know what preparation technique was used and what quality control, if any, was carried out. In this way it is possible to predict the likely byproducts of the preparation technique and whether or not the quality control would have detected those byproducts. However, in this respect the discussion on lung retention (*1–9*) of ^{99m}Tc-sulfur colloid cannot be faulted, since each author in his original article either gives a reference for his preparation procedure or details it in the article. It is interesting to note in this respect that each investigator(s) reporting lung retention of ^{99m}Tc-sulfur colloid in the *Journal* has used a different procedure for preparing the labeled colloid. In addition, we have also seen rare cases of lung retention of ^{99m}Tc-sulfur colloid associated with severe liver disease. We use a preparative procedure based on that of Webber, et al (*10*) which is again different from these other reports. The quality control on our sulfur colloid involves thin-layer chromatography on silica gel with an 85% methanol solvent, the required purity being greater than 95%, and an inspection of a sample of the preparation on a hemacytometer slide to insure that no particles are larger than 2 microns in size. In order to compare our preparation with those described by Kristensen and Pedersen, we carried out a gel filtration separation using Sephadex G-25 and found that 90 ± 10% (this being the mean value and standard deviation of three determinations) migrated as colloid with the remainder being bound to the top of the column. Thin-layer chromatography indicated a 97% incorporation of the ^{99m}Tc into the sulfur colloid. This would suggest that our preparative procedure results in a ^{99m}Tc-sulfur colloid in which the ^{99m}Tc is firmly bound to the colloid.

Because of the wide variation of preparations used in these studies, and the demonstrated relatively firm binding of the ^{99m}Tc to the colloid in our preparation, we believe that the reason for the lung uptake is not of a chemical nature, but rather of a physiologic one which manifests itself in a small fraction of patients with severe liver disease.

It is also interesting to note that last year three cases were reported in the *Journal* (*11,12*) in which renal uptake of sulfur colloid was observed. All three patients were suffering from congestive heart failure. It would therefore seem that uptake of ^{99m}Tc-sulfur colloid by an unusual organ may be a disease-related phenomenon.

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THE AUTHOR'S REPLY

Relative to the comments of Kristensen and Pedersen about the quality of ^{99m}Tc-sulfur colloid, we investigated the ^{99m}Tc-antimony sulfide colloid (*1,13*) by the technique of Persson and Strand (*5*) and by filtration through Millipore filters (0.45 micron). After developing a 30-cm Sephadex G-25 column with 0.9% NaCl solution, we obtained the results shown in Table 1. The gel filtration showed a good yield of the ^{99m}Tc-antimony sulfide.

Filtration of the colloid solution three times through a Millipore filter (0.45 micron), using a new filter each time, gave the results shown in Table

TABLE 1. GEL CHROMATOGRAPHY COLUMN SCANNING OF ^{99m}Tc-ANTIMONY SULFIDE

Column (cm)	Percent of total activity
0–6	5.0
6–10 ($^{99m}TcO_4^-$)	5.5
25–30 (^{99m}Tc-Sb_2S_3)	82.0

TABLE 2. REPEATED MILLIPORE FILTRATION OF ^{99m}Tc-ANTIMONY SULFIDE

Filtration (No)	Percent remaining on filter
1	9
2	4
3	6

2. A control with $^{99m}TcO_4^-$ gave only 0.9% on the filter.

The filtration showed that about the same amount was attached to the filters after each filtration. The filters had nearly the same color on each side. The solution was clear before and after each filtration. The explanation may be a precipitation in the filters because of the vigorous mechanical influence of the filter. We must not forget that all lyophobe colloids are more or less stabilized suspensions of insoluble compounds with a particle size between coarse suspensions (≅ 1 micron) and true molecular solutions.

As a final conclusion from the previously mentioned and earlier investigations (*13*) I would like to emphasize from a chemicophysical point of view that antimony sulfide colloid is of a better colloidal quality than the sulfur colloid.

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SIMPLE CONSTRUCTION OF A LEAD-BAR PATTERN

A check with a bar test pattern can provide considerable information about the performance of a scintillation camera (*1*). The bar pattern recommended by Powell is not available commercially but can be made easily and at relatively little cost. Strips of Masonite (¼ × ¼ × 12 in.) were cut with a band saw and glued ¼ in. apart on a slab of Masonite (12 × 12 × ¼ in.). The ¼-in. voids were filled with lead shot (1/32 in. diam) which are commonly used for mantles in radiation therapy. To avoid spilling of the lead shot, the top of the bar pattern was covered with clear adhesive tape. X-ray films were taken to assure that the bar pattern was as planned. Figure 1 shows a typical scintiphoto taken with the bar test pattern.

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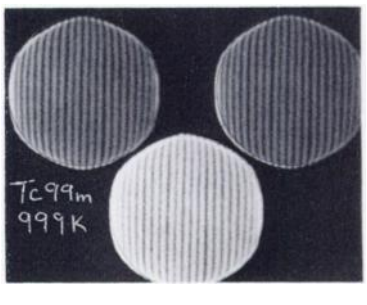

FIG. 1. Scintiphoto taken with bar test pattern. Bar pattern was placed on inverted crystal and irradiated from above with point source of ^{99m}Tc approximately 1.5 meters away. No collimation was used. Searle Radiographics Pho/Gamma IV was used to obtain total count of 999K.

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