facturer during preparation. We also failed to note any significant effect of reconstitution time upon Sn(II) content.

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Reply

Kowalsky and Chilton have shown that the desired oxidation state of tin is maintained in Sn-PPi kits at various times after reconstitution and kits more than 90 days old. However, they have not shown that the Sn(II) is a chemically viable species. In fact their results would be similar whether stannous chloride, stannous oxychloride colloid, or stannous pyrophosphate were evaluated. Our *Journal* letter of October, 1982 (*1*), expressed concern regarding the status of pyrophosphate as an effective masking agent (*2*) in kits more than 90 days old. We did not base our comments on the oxidation state of Sn(II), but on its chemical state in Sn-PPi kits and on the incidence of hydrolytic by-products of Sn(II) secondary to ineffective masking.

Historically it has long been known (A. Reynoso-1852; H. Giren-1903) that pyrophosphate suffers from entropic doom and that this hydrolytic degradation is governed by pseudo-first-order kinetics (*2-4*). Lyophilization, unfortunately, does not remove all water. Furthermore, the effect of pH has been studied (*5,6*) as well as addition of neutral salts (*5-7*) and the influence of strongly coordinated cations (*7*).

For these reasons, and having investigated the properties of Sn-PPi kits (*8*), we limit Sn-PPi use to 30 days after manufacturing and 30 min after reconstitution with pertechnetate. This product is further limited to in vivo RBC labeling that requires a Sn(II) content of 15 μg to 20 μg per kg body weight. In vitro RBC labeling is performed using Sn-MDP or Sn-citrate. Myocardial infarction studies are performed very successfully using imidodiphosphonate (IDP).

Perhaps a more effective analytical technique to evaluate this compound would involve the use of HPLC and ion chromatography HPLC.

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Perchlorate Blocking for Radioimmunodetection

Tumor detection using radiolabeled antibodies (RAID) is an important new technique (*1*) that is being applied in many centers. To date iodine isotopes have been the labels of choice because of their useful physical and biological characteristics and the simplicity of attaching them to proteins. However, the iodine is rapidly split from the antibody in the tissues, and unless preventative steps are taken it accumulates in the thyroid, stomach, salivary glands, and other organs, giving confusing results. Furthermore, damaging radiation doses to these organs may occur.

The usual technique for blocking radioiodine uptake is to give a large oral dose of stable iodide (KI) of ~ 500 times the normal daily intake of iodine (0.5 mg), but in practice, perhaps for reasons of poor intestinal absorption, this is insufficient to block all radioiodine uptake (*2*). Furthermore, pertechnetate (TcO_4^-), which is used as a subtracting tracer in RAID, has a much higher affinity (times 50 to 100) than iodine for the transport mechanisms (*3*) so blocking with iodide is even more difficult. This adds to the difficulties of both scan interpretation and radiation dose.

To overcome these problems we give potassium perchlorate ($KClO_4$) in addition to KI. $KClO_4$ has an affinity similar to TcO_4^- for the iodide transport mechanisms, and can block stomach and salivary uptake of both radionuclides.

We use the following regimen: 30 min before the antibody injection, 420 mg of KI is given and thereafter 60 mg every 4 hr, with 120 mg at night, for 2 days; 2 hr before each study, 1 g of $KClO_4$ is given, which can split into four doses daily. After the last study the KI is reduced to 60 mg twice daily for 1 wk and no further $KClO_4$ is administered.

Using this regimen we have found that there is minimal radioiodine uptake in the stomach and salivary glands and little iodine accumulation in the gut. This gives us much greater confidence when interpreting images of the head and neck, stomach, pancreas, left lobe of the liver, and other abdominal organs. The only notes of caution are that the patients may experience nausea (in which case the $KClO_4$ doses should be divided) and allergic manifestations may rarely occur if the doses are extended beyond the period suggested.

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