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and less labor intensive because the secreted viral antigen can be detected by a standard, commercially available ELISA test.

The use of a viral antigen is less likely to produce a background noise that could interfere with detection. Although it may be possible to use transfected cells in ELISAs, the experimental procedures for recovery of viable cells will be more difficult and may produce a higher background. Our method for signal peptide trapping using the HIV-1 p24 antigen is highly sensitive. As we have demonstrated, as little as 0.05 µg of a positive expression construct or when the construct is present at a ratio 1:100 in a mixed pool readily yields a detectable signal two days after transfection. We expect that optimizing the codon usage of the viral protein marker will further enhance the sensitivity of detection.

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LAB SAFETY TIP

Method to Reduce the Volatility of Radioactive Iodine Waste

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Solutions containing the radioactive salts, sodium iodide Na¹²⁵I and Na¹³¹I, are commonly used to label tyrosine and histidine residues on proteins and peptides (3). The resulting labeled molecules, although radioactive and requir-

ing appropriate handling precautions, are relatively safe to handle. On the other hand, labeling requires reagents and creates waste solutions, which contain free iodine. These liquids are more hazardous (1,2).

Waste that contains free iodide poses several risks: (i) Being a liquid, spills can result from handling or compromised containers; (ii) Free iodine, which is continuously generated through the oxidation of iodide, is highly reactive and can become incorporated into surfaces that it contacts, which makes effective decontamination difficult; and (iii) Once generated, free iodine has an appreciable vapor pressure and, as a radioactive gas, poses a significant contamination hazard to personnel and radiation-sensitive equipment such as scintillation counters.

A waste receptacle that dramatically reduces these risks can be easily assembled from a 50 mL conical bottom tube, a tightly packed cotton plug or tampon and a small quantity of glycerol, disodium phosphate and activated charcoal. The tampon is dipped into a mixture consisting of 10 parts glycerol, 3 parts charcoal and one part disodium phosphate and then placed into the conical bottom tube. The tube can then be used as a waste receptacle for up to 18 mL of liquid waste and up to 20 pipet tips.

The cotton plug quickly absorbs and immobilizes liquid waste, reducing the risk of a spill; the disodium phosphate slows the acid-catalyzed creation of free iodine, the reduced levels of free iodine are absorbed by the charcoal and the glycerol eliminates the risk of creating radioactive dust, should the container become damaged and the contents be allowed to dry.

To test the effectiveness of this device in reducing the liberation of iodine gas, iodine levels in the headspace of the device were measured for 24 h following the introduction of Na¹²⁵I in solution. Therefore, 50 mL conical bottom tubes were prepared as described above, while the control tubes were left empty. To each tube, we added 10 mL of a solution containing 20 mM sodium acetate, pH 5.0 and 200 µCi of Na¹²⁵I. Next, we packed a pipet tip with an aerosol guard with 120 mg of activated charcoal and suspended it in the headspace of each tube using a paper clip.

Each tube was then sealed and allowed to stand at room temperature. After 24 h, the pipet tips containing the activated charcoal were collected and placed into glass test tubes for gamma counting.

A typical result obtained from one of several experiments was as follows: the median CPM in the headspace of tubes ($n = 2$) containing absorbent was 6905 (range 5871–7939), while the median CPM in the head space of tubes without absorbent was 2 894 012 (range 2 706 275–3 081 748). This translated to a 419-fold reduction in the levels of radioactive iodine gas when the waste was absorbed by the cotton plug/charcoal/glycerol device. Additionally, the entire 10 mL of radioactive solution were quickly absorbed, thereby greatly diminishing the risk of accidental contamination. In this state, the contents of the container can safely decay until radiation levels are sufficiently reduced to allow for disposal.

We have used this convenient and inexpensive method to solidify and reduce the volatility of radioactive waste generated in the iodination of proteins using the IODOGEN method (Pierce Chemical, Rockford, IL, USA). Because the suggested method is based on limited data, and the fact that chemical and physical properties of iodination procedures do vary, we recommend that other researchers check our procedure with actual waste solutions from their own laboratories before putting it into routine use.

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