

# IODINATION SAFETY TIPS

Revised June, 1995

Iodinations are performed commonly at MSU; however, with safe practices exposures do not occur. Air monitoring may be done during iodinations by ORCBS to assure that room air is not contaminated. Additionally, bioassays detect any uptakes which may occur. These bioassays are required for all workers performing iodinations.

Iodination labeling, however, can create potential exposures to the thyroid in workers performing iodinations if proper safety precautions are not followed explicitly.  $^{125}\text{I}$  in the  $\text{Na}^{125}\text{I}$  chemical form is volatile, and exposure through inhalation routes can occur. Most iodinations are done with quantities of 1.0 mCi or greater, so very little airborne release of this concentrated material may cause a significant  $^{125}\text{I}$  uptake.

The following list of safety precautions will assist workers in preventing unnecessary exposures to  $^{125}\text{I}$  during iodinations. If you have questions, or would like assistance in iodination procedures, please call 5-0153.

1. All iodinations and use of  $\text{Na}^{125}\text{I}$  must be conducted in a fume hood certified for radioisotope use. Work should be done at least 6 inches back from the front of the fume hood. Fume hoods should be free of clutter, and large objects should be placed on blocks to elevate them 2 inches from the floor of the fume hood. The sash of the fume hood should be brought down to the lowest possible height while still maintaining ample room for manual dexterity.
2. The fume hood should be covered with poly-backed absorbent paper to absorb possible spills, drips or airborne activity.
3. Double gloves should be worn. Latex or N-Dex gloves are preferable because they have a tighter fit, allowing good dexterity while wearing two or three pairs.
4. Poly-backed absorbent paper should be taped to the floor in front of the fume hood to prevent contamination and spreading in the event of an accidental spill or release.
5. Lab coats and film badges must be worn.
6. A GM rate meter with a low energy gamma probe must be used during the iodination. It should be placed near the iodination hood (not inside the hood) with the audio on. A noticeable and substantial change in the audible count rate during the iodination is an indicator that will alert the worker to possible release from the fume hood. Procedures should then be implemented to prevent further release into the breathing air in the room. Call the ORCBS for advice on handling the situation.
7. To remove the  $\text{Na}^{125}\text{I}$  from the shipping vial, use an adapter to provide a conduit for the syringe used to withdraw the aliquot. A short 16 gauge cannula needle, available from General Stores, makes an excellent adapter. This prevents the syringe needles from bending, possible skin punctures and vents the fumes before withdrawing the solution.
8. Mix the reaction vial with a gentle tapping motion rather than shaking. Fumes are released in higher quantities with vigorous mixing; gently tap the reaction tube to provide gentle mixing. Hold the vial well up inside the hood so that fumes are drawn up through the hood, rather than into the room air.
9. NEVER collect iodination fractions outside the fume hood. High amounts of free iodine are contained in these fractions, and intakes can occur if the tubes are not collected in the hood.
10. NEVER count fractions from iodinations in tubes or vials which are not tightly capped. Dispose of counting tubes or vials with caps on in the iodination waste, not in the regular  $^{125}\text{I}$  waste.
11. Contain all waste from the iodination as it is generated. Tape double plastic bags to the wall of the fume hood in an accessible location. Place dry waste in these bags. Liquid waste should be deposited in plastic bottles with screw-top caps to contain release. When

- the iodination is finished, place both dry and liquid waste in double ziplok plastic bags, and label the waste with radioactive waste tags. Denote "Free  $^{125}\text{I}$ " on the waste tag.
12. Store all syringes, glassware and other equipment that is reused in the iodination fume hood between uses. Label all iodination equipment thoroughly.
  13. Thyroid scans must be performed on workers after each iodination. A baseline thyroid scan is done to determine a background for each iodinator prior to conducting iodinations at MSU. Post-iodination thyroid scans are done no less than 24 hours after the iodination, and no longer than 1 week after the iodination. Thyroid scans are required by law, and not obtaining them may cause a violation of our NRC license conditions. Call the ORCBS to obtain a thyroid scan.
  14. If a spill occurs inside the fume hood during an iodination, close the hood sash completely. If a spill occurs outside the fume hood, place absorbent on the spill and evacuate personnel from the room. Call the ORCBS immediately to notify that the spill has occurred.
  15. After every iodination, thoroughly survey the entire area, including floors, hood, equipment, outer waste container surfaces, hands, feet and clothing.

### **EMERGENCY PROCEDURES FOR FREE $^{125}\text{I}$ ACCIDENT**

In the event of an accident with free iodine outside the hood, don't panic. Immediately get everyone out of the room. If possible, grab the rate meter on your way out. To minimize the spread of contamination, the people involved should go to a single, pre designated location and close the door. (A desirable location would have available a telephone, sink, hood and be in a "low traffic" area. The hallway outside the room may be the only choice if there are no adjacent rooms with closing doors.)

It is recommended that some disposable lab matting or other absorbent paper be placed on the floor for people to stand on, until they can be surveyed and found free of contamination or decontaminated. If you have any contamination on your skin, wash it off. If your clothing is contaminated, remove the affected articles and place in the hood. Be sure the hood is turned on.

During regular work days and hours call the ORCBS at 5-0153 and request to speak to a health physics staff member. Tell the person answering the phone that you are reporting a radiation emergency. Then call your PI and let him/her know exactly what has happened and what you have done thus far.

If an accident occurs after regular working hours, dial 911, tell the dispatcher that you have a radiation emergency and need Radiation Safety assistance. (They will call the ORCBS emergency pager.) Be prepared to provide the following information:

1. Medical services required, if any (paramedics, ambulance)
2. Your name
3. Building name and room number
4. Your phone number - where you can be reached
5. Name of lab's principal investigator
6. Isotope involved
7. Chemical form of isotope or say it is an iodination accident
8. Estimation of amount of activity involved
9. Number of people involved
10. What has been done thus far

Then call your PI, if possible, and give the same information.