

Virginia Commonwealth University
Office of Environmental Health & Safety
Chemical and Biological Safety Section

Ethidium Bromide

(Revised 11/18/09)

I. General Information. Ethidium bromide (EtBr) is commonly used as a biological stain based upon its affinity for cellular DNA, fluorescence under ultraviolet light, and is hazardous due to its mutagenic and possibly carcinogenic nature. At high concentrations, EtBr is also irritating to the eyes, skin, and upper respiratory apparatus. This stain is usually sold or obtained in powder form, which is the most concentrated available form and consequently the most hazardous form. Based upon the toxicity and mutagenic potential of EtBr, VCU's Chemical and Biological Safety Section (CBSS) recommends that EtBr be obtained in pre-made gels or pre-mixed liquid preparations. Alternatively, EtBr substitute systems are available and are considerably less toxic. CBSS classifies ethidium bromide as a hazardous waste and requires that personnel working with EtBr and EtBr-contaminated debris dispose of such material in accordance with CBSS's [Chemical Waste Management](#) procedures and guidelines (see *Handling and Disposal* below).

II. Handling and Disposal.

A. Personnel handling EtBr should obtain and maintain a material safety data sheet (MSDS) specific for the EtBr product procured. Safe work practices and personal protective equipment can help reduce hazardous exposure to EtBr. Protective gloves, eye, and skin protection must be worn at all times when handling EtBr. Wash hands thoroughly with soap and water after removing gloves. To prevent inhalation exposure, all work with EtBr technical-grade powder or crystals must be conducted in a properly functioning chemical fume hood currently verified by the CBSS fume hood assessment program, or as an administrative control, premixed EtBr solutions can be purchased to avoid handling the powder directly. As with all hazardous chemicals, to avoid exposure through ingestion, eating, drinking, or application of cosmetics is prohibited where EtBr is handled, processed, or stored. If an accidental exposure occurs, the following procedures should be conducted:

1. If ingested, seek medical attention immediately.
2. If inhaled, move individual fresh air and seek medical attention.
3. For skin contact, remove any contaminated clothing and wash skin with soap and water immediately.
4. For eye contact, eye(s) should be flushed with water for at least 15 minutes. Seek medical attention as follow-up.

B. Unwanted EtBr reagent and EtBr wastes can be disposed of by calling CBSS at (804) 828-1392 and making a waste appointment. Note; however, that although EtBr can be neutralized at an elementary level, VCU policy prohibits EtBr disposal through sinks, sewers, or drainage. All EtBr and EtBr wastes will be disposed of through the university's hazardous waste disposal program.

C. Ethidium bromide-contaminated debris such as gloves, pipettes, towels, etc., should be properly containerized and labeled. Contact CBSS to arrange for disposal OR debris can be placed in an incineration box for incineration. Please contact the VCU Control Center at (804) 828-9444 for incineration boxes, locations, and additional information. Needles, scalpels, blades, broken glass, etc., should be placed in sharps containers prior to disposal.

D. There are several alternatives to EtBr, which can be considered based upon departmental needs. CBSS strongly encourages principal investigators to explore the suitability of these safer, less toxic EtBr substitutes. For further information on other products, please contact CBSS.

For any other questions/concerns, please contact the Chemical and Biological Safety Section at (804) 828-1392.