

MEDICAL UNIVERSITY OF SOUTH CAROLINA (MUSC)
GUIDELINES FOR LABORATORY USE
OF CHEMICAL CARCINOGENS

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FOREWORD

The Medical University of South Carolina (MUSC) Guidelines for the Laboratory Use of Chemical Carcinogens are based upon the guidelines of the National Institute of Health and provide recommendations and requirements governing the use of chemical carcinogens in MUSC programs. All personnel using chemical carcinogens in the laboratories of MUSC are expected to become familiar with these guidelines and to conduct their operations accordingly.

The principle purpose of these guidelines is to assist the laboratory investigator in the selection and use of safeguards that will ensure a safe and healthful environment in the use of chemical carcinogens at MUSC. The recommendations are designed to permit the necessary beneficial use of chemical carcinogens with minimum exposure to personnel, and are based upon established principles of safety for research laboratories.

INTRODUCTION

The Occupational Safety and Health Administration defines a potential occupational carcinogen as "any substance, combination, or mixture of substances which causes an increased incidence of benign and/or malignant neoplasm's, or a substantial decrease in the latency period between exposure and onset of neoplasm's in humans or in one or more experimental mammalian species as the result of any oral, respiratory or dermal exposure, or any other exposure which results in the induction of tumors at a site other than the site of administration. This definition also includes any substance which is metabolized into one or more potential occupational carcinogens by mammals." Investigators must give specific attention to the quantity of the chemical carcinogen to be used, the physical properties of the agent, the comparative carcinogenic potency, the type of experimental procedures that will be involved in the proposed use of carcinogens, and the engineering controls in the laboratory.

POLICY AND RESPONSIBILITIES

The use of chemical carcinogens shall be planned and performed in a manner to ensure that a safe and healthful environment is maintained. The objective of this policy is to reduce employee and environmental exposures to chemical carcinogens used in laboratories to the lowest practicable level.

The principal investigator has the primary responsibility of: 1) Acquiring the knowledge and information needed to recognize and control chemical hazards in the laboratory. 2) Selecting and employing laboratory practices and engineering controls that reduce the potential for exposure to chemical carcinogens to the lowest practicable level. 3) Obtaining approval when required from his/her department chairman to conduct high-risk operations. 4) Informing employees for whom the investigator is responsible of potential hazards and instructing them in the use of laboratory practices. 5) Supervising the safety performance of the staff to ensure that required laboratory practices and engineering controls are employed. 6) Reviewing material safety data sheets with affected employees, and maintaining in an accessible location.

Each employee is responsible for: 1) Knowing and complying with safety guidelines, regulations and procedures for the task assigned. 2) Reporting unsafe conditions to the principal investigator. 3) Reporting to the principal investigator or immediate supervisor all facts pertaining to every accident resulting in exposure to chemical carcinogens.

MEDICAL SURVEILLANCE

A medical program has been established to comply with OSHA regulations. Anyone whose work involves regular and/or frequent handling of toxicologically significant quantities of a chemical should consult with the Employee Health Services physician to determine if a regular schedule of medical surveillance is desirable. If air sampling is performed and the action level is exceeded, medical surveillance will be required annually. If the chemical carcinogen is regulated by OSHA, all prescribed medical surveillance requirements will be performed by Employee Health Services. Individuals requiring first aid should report to Employee Health Services. EMS should be summoned by calling 911 in those

cases where individuals, because of their injury, are incapable of transporting themselves.

Employee Health Services insures that the following information is included in each employee's medical record when occurring: reports of accidents which have resulted in inoculation of chemical carcinogens through skin penetration, swallowing of chemical carcinogens, and inhalation of chemical carcinogens; the results of any surveillance procedures employed; and the results of environmental measurements of chemical carcinogens which have been made within the work environment.

EMPLOYEE EDUCATION

All employees working with, or who may be potentially exposed to, chemical carcinogens should receive sufficient information and training to enable them to work safely and understand the relative significance of potential hazards as they relate to them personally. This information is to be provided by persons qualified by training and experience such as supervisors and/or principal investigators. A review of the material safety data sheet is a required component of employee education.

LABORATORY PRACTICES AND ENGINEERING CONTROLS PERSONAL PRACTICES

1. Laboratory clothing that protects street clothing shall be worn.
2. Gloves, which are appropriate for the procedure, shall be worn.
3. Disposable gloves shall be discarded after each use.
4. Eye protection shall be available and used in the laboratory area.
5. There shall be no eating, smoking, drinking, chewing of gum, application of cosmetics or storage of food or food containers in the laboratory.
6. Mechanical pipetting aids shall always be used.
7. Personnel shall wash their hands immediately after the completion of any procedure in which a chemical carcinogen has been used.
8. Personnel shall wash, or if appropriate, shower, after an unscheduled exposure to a carcinogen.

9. An emergency eyewash and shower shall be located within the confines of the laboratory using the chemical carcinogen.

OPERATIONAL PROCEDURES

1. The entrance to each work area where chemical carcinogens are used or stored shall be marked by a warning sign: Caution, Potential Cancer Hazard and Authorized Personnel Only.
2. Work areas where chemical carcinogens are used or stored shall be entered only by persons authorized by the principal investigator or his/her designee. Maintenance, housekeeping, and emergency personnel shall be advised of potential problems and hazards.
3. Access doors to work areas shall be kept closed while experiments are in progress.
4. Work surfaces on which chemical carcinogens are used shall be covered with stainless steel, plastic trays, dry absorbent plastic-backed paper, or other impervious material. Protective surfaces shall be decontaminated or disposed of after the procedure.
5. Procedures involving volatile chemical carcinogens or solid or liquid carcinogens which may result in the generation of aerosols shall only be conducted in a chemical fume hood, a Class I Biological Safety Cabinet, a glove box or other suitable containment equipment.
6. Tissue culture and other biological procedures involving chemical carcinogens may be conducted in Class II type B Biological Safety Cabinets.
7. Vapors or aerosols produced by analytical instruments when used with chemical carcinogens shall be captured through local exhaust ventilation or be vented into a chemical fume hood or a Class I Biological Safety Cabinet.
8. All employees who wear respirators, or who may be required to wear respirators, must pass a pulmonary function test administered by Employee Health Services, be fit tested by Occupational Safety and Health, and attend a Respiratory training course offered by Occupational Safety and Health.

9. Chemical carcinogens shall be stored in an area or cabinet marked with the warning "Caution - Potential Cancer Hazard".
10. An inventory of stored chemical carcinogens shall be maintained indicating the quantities and dates of requisition.
11. Storage vessels of chemical carcinogens shall be marked with the warning "Caution - Potential Cancer Hazard".
12. Chemical carcinogens in the work area shall be limited to a one-week supply if not contained in storage areas or cabinets.
13. Chemical carcinogens to be transported must be placed in double containers with the outer container marked "Caution -Potential Cancer Hazard".
14. Housekeeping procedures, which suppress the formation of aerosols, such as use of a wet mop or a vacuum with a high efficiency particulate filter, shall be used.
15. Vacuum services, including water aspirators, shall be protected to prevent entry of chemical carcinogens into the system.
16. Contaminated materials shall be decontaminated or removed for subsequent disposal in compliance with federal, state and local regulations.

FACILITY RECOMMENDATIONS

1. Handwashing facilities with liquid soap and foot or elbow opened faucets shall be provided.
2. An emergency eye wash and shower unit must be provided in each laboratory.
3. Exhaust air from glove boxes shall be treated by filtration, reaction, absorption, electrostatic precipitation or incineration.
4. Mechanical exhaust ventilation systems should provide airflow from areas of lower contamination to areas of higher contamination and should not be recirculated to other areas of the building. When directional airflow cannot be provided, the use of chemical carcinogens

should be restricted to lower risk activities.

ANIMAL EXPERIMENTATION RECOMMENDATIONS

1. Contaminated feed, feces, urine and bedding shall be handled in a controlled fashion.
2. Animal care personnel shall wear a completely closed jumpsuit, shoes or booties, head cover and gloves.
3. Personnel should shower when they leave animal care or dosage preparation areas.
4. Suitable respiratory protection should be worn when exposure to particulates or vapors exists.

SITUATIONS REQUIRING SPECIAL CONSIDERATIONS

Risks of exposure to chemical carcinogens are proportional to the quantities and hazardous properties of the materials used. The degree of toxicity and potency of the materials can be critical. For this reason, approval is required for laboratory use of specified chemicals. These approval levels are listed in Appendix A. Requests to exceed these levels should be submitted on the form contained in Appendix B. Department heads should provide a copy of approved requests to the Director of Occupational Safety and Health.

APPENDIX A

Request for Special Use of a Chemical Carcinogen

Date of Request _____

Principal Investigator _____

B/I/D _____

Laboratory/Branch _____

Building/Room _____

Phone _____

CARCINOGEN TO BE USED

Name _____ CAS No. _____

Synonyms _____

Location of Use _____

Use Condition _____

Location of Storage _____

Period/Frequency of Use _____

Quantity to be Procured _____

PERSONNEL PROPOSED FOR THIS PROJECT

EXPERIMENTAL PROCEDURES

Briefly describe the procedures that will involve the use of this carcinogen.

In the event of environmental contamination (spill):

MONITORING PROCEDURES (IF REQUIRED)

Medical and/or personnel monitoring procedures for evidence of personnel exposure.

Monitoring procedures to detect environmental contamination:

ANIMAL EXPERIMENTATION

If animals are to be used in this research activity, provide the following information concerning the safeguards that will be employed in conjunction with their use:

Personal Protective Equipment (gloves, respirator, approved clothing, booties, goggles, etc.):

Facility Operational Procedures (access control, traffic patterns, decontamination procedures, waste management, and species isolation requirements)

CONTROL PROCEDURES

Describe any additional controls not specified in the MUSC Guidelines for the Laboratory Use of Chemical Carcinogens that will be employed to protect the individuals participating in this research.

DECONTAMINATION AND DISPOSAL

Decontamination Procedures (surfaces, materials, instruments, equipment, etc.)
