Safety Guideline: Bromo-Deoxyuridine (BrDu)

Description:
Bromo-Deoxyuridine (BrDu) is a white crystalline water-soluble compound that is frequently used in cancer treatment/research for inducing increased susceptibility to radiation therapy, and as a topical anti-viral treatment. BrDu is a halogenated nucleoside analog and its major vehicle of action involves incorporation (binding) into tissue DNA through acting as a thymine analogue.

Physical Hazard:
BrDu is a probable combustible compound. When heated to decomposition, the compound emits very toxic fumes of carbon monoxide, carbon dioxide, nitrogen oxides, and hydrogen bromide gas.

Health Hazard:
BrDu is anticipated to be a human carcinogen. Research has also indicated that BrDu has cytotoxic, strongly teratogenic, and mutagenic properties.

Occupational Exposure Hazard:
These potential health hazards makes BrDu exposure a significant health and safety threat to laboratory staff, animal handlers and other personnel who may be accidentally exposed to BrDu.
Primary routes of occupational exposure to BrDu include inhalation, ingestion, accidental injection and tissue/transplacental absorption.
Available industrial hygiene and epidemiology case studies are quite limited.

Signs and Symptoms:
Acute exposure: wheezing, coughing, shortness of breath, burning in the mouth, throat, or chest. Harmful if swallowed, inhaled, or absorbed through skin
Chronic exposure: may cause reproductive disorders and may alter genetic material.
Target organ(s) is immune system. Symptoms observed in laboratory animals are decreased pulse rate and blood pressure, respiratory depression, muscle weakness, changes in the spleen and weight loss or decreased weight gain.

Safe Work Methods:

Administrative Controls
- Other potentially less hazardous chemicals must be considered before working with BrDu.
• Laboratory personnel will develop and implement standard operating procedures by which laboratory staff will prepare/administer BrDu with minimal or no exposure.
• All tasks having potential for occupational BrDu exposure – mixing of doses, dose preparation, administering of injections, etc.) should be conducted by only competent staff whom have been authorized by PI and properly trained for BrDu safe handling.
• Protocol involving the use of BrDu must be registered with EHS Chemical Safety and may need further review by the Institutional Biosafety Committee.

Engineering Controls
• Tasks involving BrDu should be conducted in a well engineered location such as fumehood and Type B biological safety cabinet utilizing sash for added splash protection.
• Syringes used for BrDu injection must be safety engineered – retractable, sharp point shielding.
• Animals should be appropriately restrained and/or sedated prior to administrating injections and other dosing methods.

Personal Protective Equipment
• Wear safety glasses or face shield in combination with a lab coat and appropriate gloves.
• Examine gloves before using.

Waste Disposal:
• Surplus BrDu must be disposed of as a hazardous chemical through the EHS.
• The limited available research has not concluded how extensively BrDu is metabolized making it imperative that all potentially contaminated carcasses, bedding, and other nonsharps materials be disposed of as Regulated Medical Waste through incineration (National Institutes of health 1988).
• All contaminated sharps waste materials must be placed in proper sharps container and disposed of as RMW.

Spills:
• For small spills, wipe-up or absorb Excel liquid using paper or absorbent pads. Dispose of contaminated spill materials in plastic bags for chemical waste disposal. Clean spill area using a soapy water solution. Label with Hazardous waste ID tag and request for pick up through EHS. For large spills, evacuate and control access to the affected area and contact EHS at 323 442 2200 for assistance.

BrDu Use in Animals:
• Contamination may be present on the animal fur, waste, and beddings. Therefore rooms housing animals treated with BrDu must meet the same containment and engineering controls as required for laboratories.
• All animal care, including feeding and cage changing, should be performed by trained laboratory personnel.
• Principal Investigator must prepare an Animal Room Door Sign summarizing the potential hazards and precautions and warning related to caring for animals including appropriate protective equipment and waste handling.
• Cages for animals that have been treated with BrDu should be identified with “Cancer Suspect Agent” label.

For Additional Information, Contact Michelle Lee, Chemical Safety Specialist, at EHS-323 864 3188 or mlee@caps.usc.edu.