Principal Investigator: **AUP#** **Date Approved:**

This Standard Operating Procedure (SOP) document covers basic chemical safety information for Tamoxifen and Bromodeoxyuridine use in animals. The use of these chemicals in animals must be explicitly documented and approved in the investigator's Animal Use Protocol (AUP) before work can proceed.

Tamoxifen, Bromodeoxyuridine, and other non-radioactive DNA precursors

Tamoxifen is a selective estrogen receptor modulator used to treat breast cancer and commonly administered to animals in studies. It is a known human **carcinogen**, **teratogen**, and **mutagen**.

Bromodeoxyuridine (BrdU) is an artificial nucleoside that substitutes for thymine during DNA replication and is commonly used to identify replicating cells in living tissue. Because BrdU can displace thymine in replicating DNA it is a **mutagen**.

The potential health hazards of Tamoxifen and BrdU require specific procedures to be followed when handling the reagents or used in animal studies.

Personal Protective Equipment & Personnel Monitoring

Lab Coat

Traditional lab coat

Gloves

Double Nitrile gloves or chemical-resistant gloves. Static-free gloves should be used when handling dry chemical.

Eye Protection

Face Shield

ANSI Z87.1-compliant safety glasses, or safety goggles if a splash hazard is present.

Transport & Storage

Tamoxifen and BrdU should be transported in a sealed, plastic, labeled, non-breakable secondary container labeled with the health hazard pictogram and PI name and contact information. Avoid the use of glass containers. Handling and transport must only be done by trained personnel.

Follow any substance-specific storage guidance provided in **Safety Data Sheet** documentation.

Cautions & Considerations

Avoid breathing in the powder when measuring and resuspending. It may be appropriate to wear an N95 when handling Tamoxifen or BrdU powder without proper engineering controls. All N95 respirator use must be cleared through EH&S (ehslaboratory@ucr.edu or x2-5528).

Avoid direct contact with skin and mucous membranes.

Always wash hands before leaving the laboratory or vivarium.

The highest risk of human exposure is via accidental parenteral injection. Always be careful when handling sharps. Avoid recapping needles and follow needle and syringe safety guidelines.

Hazards of aerosol exposure are unknown.

Engineering Controls, Equipment & Materials

Fume Hood	All handling of Tamoxifen should be done inside a working, currently certified chemical fume hood (preferably) or **ducted** Class II-B biosafety cabinet (BSC). Contact ehslaboratory@ucr.edu if a chemical fume hood or ducted Class II-B biosafety cabinet are not available.
Class II-B Biosafety Cabinet (BSC)	If a fume hood is not available, Tamoxifen and BrdU work may be performed in a Class II-B ducted BSC.
Disposable Cages	Animals are recommended to be housed in disposable cages for the entirety of the tamoxifen or BrdU experiment. Animals can be moved from disposable caging back to regular caging after 72 hours or more post-exposure. If disposable cages are not available, move the treated animals from the contaminated cage to a clean cage 72 hours or more after exposure. Food and bedding from the contaminated cage should be placed into a yellow trace chemo waste bag. Contaminated caging supplies should be heavily sprayed with Virkon-S and allowed to sit for a 10-minutes contact time. After the contact time, place the caging supplies on the dirty cage cart for vivaria staff to bring to the cage wash.

Housekeeping

Spills	Any visible contamination or spills should be cleaned with a 10% bleach solution and then washed with soap and water. Any contaminated wipes must be disposed of as hazardous waste.
Solid Waste	All solid waste, including disposable cages, must be double-bagged in yellow trace-chemotherapy waste bags. The outer bag must be labeled with 1. Name of Hazard 2. PI name 3. Laboratory Building/Room
Liquid Waste	Follow WASTe procedures to create labels, affix to waste container, and request pickup.
Sharps Waste	All sharps must be disposed of in a chemical sharps container (contact EH&S if container is needed). Avoid recapping needles and follow safety guidelines.

First Aid & Emergencies

Fire	Call 911 (or (951) 827-5222 for non-emergencies) for assistance with all fires, even if extinguished. If you are trained and feel comfortable to do so, extinguisher the fire with a dry chemical fire extinguisher (classes ABC or D). CO2 type extinguishers are **not** acceptable. **DO NOT** attempt to use water to put out a fire of this type.
Skin or Eye Contact	Remove contaminated clothing and accessories; flush affected area with water for a minimum of **15 minutes** in the safety shower or eyewash. If symptoms persist, get medical attention.

Special Handling

- Do not work alone;
- Be cognizant of all of the SDS and safety information presented in this document;

- Follow all related SOPs in the laboratory SOP bank (PPE, syringe techniques, waste disposal, etc. as appropriately modified by any specific information in the SDS information presented in this document);
- Discuss ALL issues or concerns regarding Tamoxifen or BrdU with the PI prior to its use;
- A sign should be posted on the door stating "Restricted Area – Tamoxifen / BrdU in Use – Toxic/Mutagen" whenever working with Tamoxifen or BrdU.

Preparation

All handling of powder must be performed within a fume hood or ducted BSC. Listed PPE must be worn at all times when handling Tamoxifen or BrdU.

The fume hood/BSC will be posted as "Restricted Area -Tamoxifen/BrdU in Use - Toxic/Mutagen" whenever working with Tamoxifen or BrdU. Decontaminate work surfaces with detergent solution followed by water as soon as the procedure is done.

Always use an absorbent pad inside of the fume hood/BSC during handling. Dispose pads as hazardous waste.

Powder will be resuspended by pipetting, using a filter tip. If aliquoting samples, resuspension of the agent will be performed with extremely careful and slow titration, rinsing down the walls of the tube in the process avoiding foaming and aerosolization. Pipette tips used for this procedure will be discarded into the trace chemo sharps in the fume hood/BSC.

Animal Administration of Tamoxifen, BrdU, and other non-radioactive DNA precursors

Sharps should be adapted for BSL-2 precautions. Safety-engineered sharps such as syringes with retractable needles are strongly recommended.

Cages should be clearly labeled with chemical and treatment administration date.

Unincorporated reagents can be excreted and spread through the feces/urine of animals up to 72 hours post-administration.

Bedding and disposable cages (including water bottles) from animals treated with Tamoxifen or BrdU must be treated as chemically contaminated up to and including the first cage change that occurs at least 72 hours following the final administration.

The feeding, care of animals, and handling of animal cages (including bedding) will be the responsibility of the researcher(s) during the first 72 hours and first cage change after final administration.

After the first cage change occurring at least 72 hours after final administration, the chemical hazard labeling may be removed, and the cage and bedding may subsequently receive standard care.

Contaminated bedding must be double-bagged in yellow trace-chemo waste bags, and labeled with the name of the hazard, the PI name, and location and disposed of in approved trace-chemo waste bins. Care should be taken to avoid exposure to contaminated bedding dust when handling exposed animals and their waste materials.

All surfaces and racks that may be contaminated will be decontaminated with detergent solution followed by water as soon as the procedure is over.

Pregnancy, Lactation, and Reproductive Health Precautions (Occupational Health Requirements)

Date: 12/05/2025

Tamoxifen, and Bromodeoxyuridine (Brdu) Addendum

Pregnancy, Lactation, and Reproductive Health Precautions (Occupational Health Requirements)

Tamoxifen is a known human teratogen, reproductive toxin, endocrine disruptor, and carcinogen.
BrdU is a mutagen capable of incorporating into replicating DNA.

Because of the significant risks these agents pose to a developing fetus, germ cells, and reproductive function, the following requirements apply:

1. Mandatory Reproductive Health Consultation

Personnel who are pregnant, planning pregnancy, undergoing IVF/fertility treatment, or breastfeeding must be offered a confidential reproductive health and exposure-risk consultation through Occupational Health *before* participating in work involving Tamoxifen or BrdU.

How to Contact UCR Occupational Health

UCR Occupational Health
✉️ *ehsocchealth@ucr.edu*
📞 *951-827-5528*

Supervisors and PIs must maintain confidentiality and coordinate with HR Disability Management as needed for formal accommodations.

2. Restrictions for Pregnant, Potentially Pregnant, or Lactating Personnel

Pregnant individuals, those attempting to conceive, undergoing fertility treatment, or breastfeeding must not:

- Handle Tamoxifen or BrdU powders, solutions, or syringes.
- Perform injections, oral gavage, or any animal dosing procedure.
- Handle or perform cage changes on animals treated with Tamoxifen or BrdU during the hazardous period (first 72 hours post-administration and first cage change).
- Handle contaminated bedding, cages, waste, or sharps.
- Enter animal rooms or procedure areas where Tamoxifen or BrdU work is actively underway.
- Clean equipment, biosafety cabinets, or work surfaces contaminated with these agents.

If these duties are part of an employee's normal assignment, temporary reassignment must be provided.

3. Additional Considerations for People Who Can Become Pregnant

Even without disclosure of pregnancy:

- Skin contact, inhalation of bedding dust, accidental injection, or aerosol exposure may pose reproductive or developmental risks.

- PPE alone is not sufficient to mitigate teratogenic risks.
- Engineering controls (chemical fume hood or ducted Class II-B BSC) reduce but do not eliminate reproductive hazards.
- Personnel may request reassignment at any time.

4. Required Posting and Communication

Post the following on the room or hood whenever Tamoxifen/BrdU is in use:

"Danger Toxic Chemicals: Harm Fertility and Cause Birth Defects or Damage Unborn Children"

PIs must notify ULAR husbandry staff of hazardous periods so pregnant husbandry workers are not exposed.

5. Waste Handling Precautions During Pregnancy (Required Addition)

Because untreated Tamoxifen and BrdU can be present in animal excreta for up to 72 hours post-administration (and through the first cage change), the following restrictions apply:

Pregnant, potentially pregnant, and breastfeeding personnel may NOT:

- Handle bedding, cages, water bottles, or racks from Tamoxifen- or BrdU-treated animals during the hazardous period.
- Handle carcasses or tissues from treated animals.
- Handle contaminated pads, wipes, or materials used inside the fume hood/BSC.
- Transport, bag, or dispose of trace-chemotherapy waste bags, chemical sharps containers, or any hazardous waste associated with Tamoxifen or BrdU.

Vivarium Cage Wash Operations (Required Clarification)

- Cage Wash personnel who are pregnant or potentially pregnant must not receive contaminated cages, bedding, racks, or water bottles from Tamoxifen/BrdU experiments until the hazardous period has ended and the first post-treatment cage change (≥72 hours) has been completed by the researcher.
- ULAR supervisors must ensure work assignments are adjusted so that pregnant cage wash staff do not encounter contaminated items.
- All contaminated cages, racks, and bottles must be clearly labeled with hazardous agent name, PI name, date of last administration, and 72-hour clearance date so staff can avoid exposure.
- Pregnant, potentially pregnant, and breastfeeding personnel may NOT: Enter cage wash areas or handle equipment (e.g., rack washers, tunnel washers) where contaminated cages or waste are staged.

6. Exposure Incidents Involving Pregnant or Potentially Pregnant Personnel

Any exposure (injection, splash, inhalation, skin contact, bedding dust exposure) must be treated as a high-priority incident:

1. Wash the affected area immediately.
2. Contact UCR Occupational Health immediately for medical evaluation.

3. Supervisor must file an incident report and ensure accommodations.

7. Additional PPE Guidance Specific to Reproductive Hazards

Recommended additions:

- Double nitrile gloves
- Impermeable disposable gown
- Face shield if splashes are possible

Pregnant personnel should never rely on PPE alone; reassignment is required.

DANGER

TOXIC CHEMICALS

HARM FERTILITY AND CAUSE BIRTH DEFECTS OR DAMAGE UNBORN CHILDREN

ALL PERSONNEL MUST FOLLOW POSTED SAFETY PROCEDURES AND WEAR REQUIRED PROTECTIVE EQUIPMENT.

If you are pregnant, planning a pregnancy, breastfeeding, or undergoing fertility treatment, you are **strongly encouraged** to contact Occupational Health for a free confidential reproductive health consult before working in this area:

UCR Occupational Health contact: ehsocchealth@ucr.edu **or (951) 827-5528**

Acknowledgement

Title: Tamoxifen/BrdU SOP

By signing below, I acknowledge that I have read, understood, and agree to abide by the contents, procedures, and practices outlined in this Standard Operating Procedure (SOP):

Name	Identification*	Signature	Date

***Identification:** Enter your Student ID, Employee ID, UCR NetID, or UCR Email.*