USTUR 020: Handling Biohazardous Material

Purpose	Safe handling of biohazardous material	**Method Number**	USTUR 020
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1. Introduction

The following is a brief outline of the operations of the USTUR Radiochemistry Project which involve possible exposure to bloodborne pathogens. All operations involving handling of human tissues shall be carried out as described in the "Exposure Control Plan for Bloodborne Pathogens" for the WSU Nuclear Radiation Center and the USTUR, pursuant to 29 CFR 1910.1030 [Bloodborne Pathogens] and State of Washington WAC 296-62-08001, dated 7/19/95.

The USTUR Radiochemistry Project is located at the WSU Nuclear Radiation Center and occupies approximately 2000 sf of laboratory and instrumentation space. The principle activity of the USTUR Radiochemistry Project involves the determination of plutonium, americium, uranium and other actinide elements in human autopsy tissues and excreta. Potential exposure to bloodborne pathogens occurs during receipt of frozen tissues, thawing, preparation and weighing of tissues prior to ashing of the tissues at 450^{o}C. After ashing, the tissues are treated as non-hazardous material and are processed chemically for analysis.

The tissues are obtained at autopsy of registrants enrolled in the United States Transuranium and Uranium Registries which is operated by WSU under a grant from the US Department of Energy. Registrants are people who were exposed to actinides during their occupational history and who agreed to donate post-mortem tissue samples. The autopsy tissues are prepared and selected for analysis at the USTUR facility at WSU Tri-Cities and are stored in Richland. USTUR policy requires that tissues are not accepted from HIV positive donors, but there is potential exposure to Hepatitis B and Hepatitis C. Frozen tissues are shipped to the USTUR Radiochemistry Project at the Nuclear Radiation Center for analysis and are stored in the freezer in Room 215 at the WSU NRC. Room 215 is designated as a Biohazard area and is the only room at the WSU NRC in which human tissues will be handled and processed.

Levels of actinide radioactivity in the human tissues are generally orders of magnitude below the levels which require labelling of samples or posting of the room (WAC 246-221-300). As a precaution, however, the laboratory is posted as a "Radioactive Materials" area in the event that tissue levels from a highly exposed individual are to be processed.

Processing of the tissues by the USTUR Radiochemistry Project involves unpackaging, thawing, weighing and transferring the tissues to covered beakers. Tissues are then dried slowly to a final temperature of 120^{o}C over several days and then are ashed in a muffle furnace to a final temperature of 500^{o}C over a period of several days.

2. Apparatus

2.1. Upright freezer with lock for storage of frozen tissue samples.

2.2. Biological Safety Cabinet: Room 215 has been equipped with a NuAire NU 426-600 class II A/B biological safety cabinet for the exclusive use by the USTUR Radiochemistry Project. This cabinet will be used to thaw tissues, weigh tissues into beakers which will then be placed in the drying oven.

2.3. Drying Oven: Although not designed as a protective device, a 24.0 cf drying oven will be used to dry samples to 120^{o}C. The oven will provide a mechanical barrier between samples and personnel.

2.4. Muffle Furnace: Although not designed as a protective device, an 8.0 cf muffle furnace will be used to ash samples to 500^{o}C. The furnace will provide a mechanical barrier between samples and personnel.

3. Training Needed and Who Will Provide Training

Training will be necessary in order to use the biological safety cabinet. Training will include proper operation of the cabinet, use of safety shield, use of UV sterilization lamps and decontamination of surfaces using a 10% bleach solution after every use. Training will be provided by the senior personnel of the USTUR Radiochemistry Project. Training on the correct operation of the drying oven and muffle furnace will be provided by the same personnel and will be documented for all employees.

4. Maintenance Needed and Who Will Provide

For the biological safety cabinet, regular maintenance will consist of inspection of surfaces, checking operational status of fans and UV lights and condition of filters. Filters will be replaced as per manufacturer's recommendation by USTUR Radiochemistry Project personnel. Maintenance of the drying oven is normally restricted to cleaning and replacing shelves. The muffle furnace will be labelled as containing biohazard materials but will only contain samples that have been heated for an extended period at 120^{o}C.

5. Access to Room 215

Room 215 is keyed specially so that only USTUR Radiochemistry Project personnel with biohazard training and Hepatitis B vaccinations have access, except for WSU emergency

personnel. The USNRC reactor license requires that reactor operating staff have a key and access in the event of an emergency. A list of USTUR Radiochemistry Project contact personnel is posted on the door of Room 215.

6. Universal Precautions to Prevent Exposures to Bloodborne Pathogens

The following precautions to prevent exposure to bloodborne pathogens will be mandatory for use in Room 215, Nuclear Radiation Center as part of the USTUR Radiochemistry Project

6.1. Washing of hands after removal of protective gloves and clothing before leaving Room 215 is mandatory. Facilities for hand washing and for washing other skin areas are maintained in Room 215. Current facilities for hand washing include a sink with foot-controlled faucets. Soap and paper towels are provided at this location. Also maintained in Room 215 is an overhead emergency shower and an eye-wash station for use in the event of contamination.

6.2. Eating, drinking, smoking, application of cosmetics or lip balm and handling of contact lenses is forbidden in Room 215.

6.3. All contaminated needles, razor blades or utility knife blades used to remove packaging material from tissue samples, broken glassware or other sharp objects which are to be discarded must be placed in the sharps container, labelled for biohazard material, in Room 215.

6.4. No food or drink shall be brought into, consumed, or stored in room 215, including the freezer in which tissue samples are stored.

6.5. All procedures for handling and ashing tissue samples shall be carried out in such a manner as to minimize splashing, spraying, spattering or droplet formation. Thawed tissues shall be removed from plastic bag containers and transferred to weighed glass beakers in the biological safety cabinet. Care must be taken to avoid spillage of water and other fluids from the plastic containers during transfer of tissues. Glass beakers containing tissues must be covered when transferring to the drying oven. Containers used for frozen sample storage must be discarded as biohazard waste after removal of the sample.

6.6. No pipetting or use of any suction device by mouth is permitted. Appropriate mechanical transfer devices will be provided if contaminated liquids must be transferred to waste containers.

6.7. All human tissue samples shall be double-bagged during storage in the freezer in Room 215. If tissues are to be moved to another location they must be transferred in a sealed container labeled according to WAC-296-62-08001(7)(a).

6.8. Contaminated equipment must be labeled with biohazard labels in prominent locations. Labels have been affixed to the biological safety cabinet, the drying oven, the freezer and the muffle furnace. Any portable equipment used in Room 215 for tissue preparation (e.g. balances) must be labelled with a biohazard label. The surfaces of the biological safety cabinet and the interior of the drying oven must be decontaminated after each use with 10% bleach. Maintenance of the equipment will be normally provided by USTUR Radiochemistry Project personnel. Calibration of balances used in Room 215 will performed by an outside contractor and balances must be decontaminated prior to re-calibration. Any repair of the ductwork from the oven and muffle furnace to the exhaust fan on the roof of the building will be performed by Physical Plant employees. Biohazard labels shall be posted on appropriate ductwork as well as on equipment.

6.9. No person shall work with human tissues without appropriate personal protective equipment provided by the USTUR Radiochemistry Project. Persons working with exposed tissues must wear laboratory coats or disposable plastic gowns which are provided in Room 215 and which must be stored there after use. Laboratory coats must be laundered when necessary in the NRC washing and drying facilities for contaminated laundry. Plastic or latex gloves shall be worn at all times and safety goggles or face shields must be worn when handling exposed tissues. Gloves must be discarded as biohazard waste after use. Gloves should not be washed and re-used. Goggles or face shields shall be decontaminated with 10% bleach solution after use if exposed to splattering or if they come in contact with contaminated tissue or gloves. All protective clothing must be removed in Room 215 prior to exiting the room.

6.10. All bench or equipment surfaces (e.g. biological safety cabinet surface, benchtops), storage containers, etc, shall be decontaminated after tissue handling procedures are completed, or when leaving at the end of the day. Any floor surfaces shall be decontaminated as soon as feasible after contamination. The laboratory floor will be mopped on weekly schedule by laboratory personnel. No cleaning services will be performed by WSU custodial staff.

6.11. Waste from USTUR Radiochemistry Project operations shall be placed in approved biohazard containers for dispposal. No wastes of any kind will be placed in normal trash containers for pick up and normal custodial services will not be permitted in Room 215. Wastes from preparing tissues will not be treated as radioactive waste because the levels of actinides present in such wastes will be orders of magnitude lower that the levels specified in WAC 246-221-300. If there is evidence that these levels will be exceded, then the wastes will be treated as radioactive biohazard waste and will be delivered to the Radiation Safety Office for disposal.

7. Hepatitis B Vaccination

7.1. All USTUR Radiochemistry Project personnel who are working with human tissue preparation, handling and ashing shall be offered the opportunity to be vaccinated for Hepatitis B at USTUR expense.

7.2. Employees shall complete Worksheet 5A in which Hepatitis B vaccination is requested or declined. Persons who request the vaccination series shall complete Worksheet 5B. Vaccination can be scheduled through Pullman Memorial Hospital and is provided at no expense to the employee. Records of Worksheets 5A and 5B shall be retained in the employee's personnel record.

7.3. The USTUR Radiochemistry Project reserves the right to assign an employee who declines vaccination to tasks that do not involve handling of biohazard material.

8. Post Exposure Evaluation and Follow-Up

8.1. If any employee is exposed to human tissue material in the USTUR Radiochemistry Project, a post-exposure evaluation and follow-up as described in the WSU Post-Exposure and follow-up procedure described in the attached WORKSHEET 6.

ATTACHMENT 1

WASHINGTON STATE UNIVERSITY'S EXPOSURE CONTROL PROGRAM FOR OCCUPATIONAL EXPOSURES TO BLOODBORNE PATHOGENS

POST EXPOSURE EVALUATION AND FOLLOW-UP

See WAC 296-62-08001 (6) for more details and procedures for the following items. After an exposure incident the employee shall immediately be provided a confidential medical evaluation and follow-up which includes the following:

1. The routes of exposure and circumstances of the incident.

2. The identity of the source individual, testing of the source individual's blood (after consent) or verification of infection with HBV/HIV.

3. The results of the blood test or information about the HBV/HIV infection must be made available to exposed employee.

4. Collection and testing of the exposed employee's blood after consent.

5. Post exposure prophylaxis, counseling, evaluation of reported illness.

6. Information provided to the Healthcare Professional includes:

    a. A copy of WAC 296-62-08001.

    b. A description of the exposed employee's duties during exposure.

    c. Documentation of routes of exposure and the circumstances of the incident.

    d. Results of the source individual's blood testing if available.

    e. All medical records relevant to the appropriate treatment of the employee.

7. The employer shall obtain and provide the employee with a copy of the health care professional's written opinion within 15 days of the completion of the evaluation. The written opinion, for the purposes of this evaluation shall be limited to that the empoyee has been informed of the results of the evaluation and any medical conditions resulting from exposure to _____ or other potentially infectious materials _____ require further evaluation _____. All other findings shall remain confidential and shall not be _____ written report.