Safe Operating Procedure of using Streptozotocin for Animal Research

NOTE: You must read this entire document and both you and the Principal Investigator must sign it before commencing any work.

Project Number (e.g. Tick@Lab): _____{ University SOP}_____
Principal Investigator/Supervisor: _____{ University SOP}_____
Room and Building where SOP is used: Wet labs, LAF labs_____

Summary of How the Material/Equipment/Process will be Used

Streptozotocin is an antineoplastic agent and has been used in experimental animals to induce diabetes. It can cause developmental toxicity, female reproductive and male reproductive toxicity.

The processes associated with the use of Streptozotocin include:
1) Preparation of Streptozotocin solution
2) Transport of Streptozotocin from research lab to LAF for administration
3) Administration of Streptozotocin into animals
4) Housing and handling of Streptozotocin administrated animals
5) Cage changing and washing of Streptozotocin contaminated cages
6) Disposal of Streptozotocin contaminated waste

Potential Hazards

Human Carcinogen Exposure and / or Genetic Defects (Process 1-6)
- May cause genetic defects (hazard statement H341)
- May cause cancer (hazard statement H351)

Sickness or Irritation due to Ingestion, Inhalation or Skin Contact (Process 1-6)
- Flammable solid (hazard statement H228)
- Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking (precautionary statement P210)

Needle Stick Injury due to Injection (Process 3)

Animal Bite (Process 3-5)

Streptozotocin SDS weblink: https://www.sigmaaldrich.com/HK/en/sds/sigma/s0130

Safety Installations

Engineering Control Measures
- Certified fume hood (FH) for Streptozotocin preparation (e.g. open, weight, reconstitute and dilute)
- Certified Class II Biosafety cabinet (BSC) for injection, animal handling and cage changing
- Secondary container for transport
- Luer lock syringes for administration
- Animal restraint devices for administration (if applicable)
- Forceps for animal handling
- Animal cage changing station for cage changing
- Individually ventilated cage (IVC) and air handling unit for housing
- Cage liners for housing
- Cage washing machines for washing
- Streptozotocin waste bin for disposal of contaminated waste
- Streptozotocin sharp box for disposal of contaminated syringes
- Eye wash station for emergency use
- Availability of Streptozotocin Safety Data Sheet (SDS) in handling areas

Work Practices

LAF Notification
- Inform LAF prior to using Streptozotocin in LAF for better arrangement

Medical Surveillance Program
- Enroll in medical surveillance program and indicate “toxic chemicals injected ”

Training
- Complete Streptozotocin specific safety training provided by the PI
- Complete HSEO MC03 Chemical I, MC07 Chemical II, MC06 Biological Safety Training
- Complete general animal user training and animal handling training provided by LAF

SOP
- Establish and follow in-house SOPs for specific process (e.g. Streptozotocin administration, waste collection, cage washing, etc.)

Labelling and Warning Sign
- Complete LAF blue cage card “Health Hazard Card” with administration information and place in each Streptozotocin administrated animal cage until 72 hours post-administration.
- Affix a Streptozotocin warning sign with hazard information on each of the Streptozotocin administrated animal holding room
- Label all Streptozotocin tubes, containers, waste bin, waste bag with appropriate hazard warnings and chemical identification.
- Post a “Streptozotocin Hazard” sign on the FH and BSC which used for Streptozotocin preparation and administration

Proper Storage
- Store Streptozotocin in a lockable secondary container, away from light and avoid strong oxidizing agents
- Use zipper bags and secondary containers during transport to avoid spillage

Good Hygiene Practice
- Minimize exposure by implementing control measures and wear adequate PPE
- Clean work surfaces with detergent and water, followed by 10% sodium hypochlorite and rinse thoroughly
- Wash hands immediately after handling Streptozotocin and Streptozotocin-contaminated waste

Specific Experimental Procedures

Preparation, Transportation and Administration of Streptozotocin (process 1-3)

- Purchase only the necessary quantity of Streptozotocin
- Wear adequate PPE when handling Streptozotocin
- Inspect the outer package of Streptozotocin to make sure it is intact
- Open, weigh and prepare Streptozotocin solution inside a certified FH
- A plastic-backed absorbent pad should be placed under the work surface during preparation and administration process to avoid contamination
- Place a waste bag on the work surface for collection of contaminated wastes
- Aliquot the Streptozotocin solution into leak-proof, screw cap tubes and place inside a secondary container labelled with chemical name and hazard warning labels. Store the container in a fridge.
- During transportation, Streptozotocin solution tubes must be stored in a zipper bag inside a secondary container (only bring the required amount to LAF)
- Conduct the administration inside a certified BSC
- Do not recap the syringes. Dispose of syringes used into Streptozotocin sharp box inside BSC
- Dispose of all contaminated wastes (e.g. tubes, tips, absorbent pad, syringes, etc.) into a waste bag inside FH/BSC and then discard into designated Streptozotocin chemical waste bin
- Clean work surfaces with detergent and water, followed by 10% sodium hypochlorite and rinse thoroughly.

Housing and Handling of Streptozotocin-Administrated Animals (process 4)

- Complete LAF blue cage card "Health Hazard Card" with administration information and place in each Streptozotocin administrated animal cage
- Conduct cage changes within a BSC or Cage Changing Station (CCS)
- Each Streptozotocin administrated animal should return to a cage with cage liner and "Health Hazard Card", then house in designated animal holding room

Cage Changing and Washing of Streptozotocin-Contaminated Cages (process 5)

- After 72 hours of last administration, the contaminated cage/water/feed can be changed inside a BSC or CCS
- Dispose all contaminated disposable waste into the cage liner inside BSC/CCS, and bag the cage liners into chemical waste bag (refer to waste disposal for more details)
- After disposing wastes, the "Health Hazard Card" can be removed and considered free of Streptozotocin
- Bag the non-disposable cage accessories' (e.g. lid, cage base, wire bar, etc.) in a bag for LAF collection
- LAF staff collect the bagged cage accessories to cage washing area for normal washing process

Personal Protective Equipment

Skin Protection, Eye Protection, Face Protection and Respiratory Protection

- Wear double layer gloves. One glove should be placed under the coat / coveralls and one over.
- Lab coat or coveralls
- Sleeve covers if wrist is exposed
- Safety glasses or chemical goggles or face shield
- N95 mask or PAPR if work is not conducted in BSC or fume hood

Waste Disposal

Streptozotocin-Contaminated Waste Disposal (process 6)

- Discard all contaminated wastes during preparation and administration into waste bags.

Double bags all wastes.

- Tie up the waste bags and place in designated Streptozotocin chemical waste bin for HSEO collection
- The waste bin should be kept closed at all times
- For contaminated sharps waste box, place the sharp box in designated Streptozotocin chemical waste bin for HSEO collection
- For Streptozotocin-administrated animal carcasses, **double bags** before placing in clinical waste fridge for contractor collection

Bedding and Cage Liner Disposal (process 6)

- Place the bedding and cage liners in a chemical waste bag, and tie up the bag
- Place the waste bag in designated Streptozotocin chemical waste bin for HSEO collection

Spills and Incidents

Minor Spill of Streptozotocin

- Absorb the spill with absorbent pad or paper towel with adequate PPE
- Cover, Clean work surfaces with detergent and water, followed by 10% sodium hypochlorite and rinse thoroughly
- Collect the wastes in a plastic bag and dispose in a Streptozotocin-contaminated waste bin

Major Spill of Streptozotocin

- Avoid inhalation and generating dust
- Remove contaminated clothing with gloved hands, remove gloves and place near the spill
- Remove all ignitable sources. If a fire is visible, DO NOT turn on the emergency ventilation.
- Evacuate other workers within the laboratory.
- Call Security Control Center Ext 8999 for assistance and do not allow anyone to enter the affected area
- HSEO will be notified by Security Control Center to clean up the spill

Bites by Animals Treated with Streptozotocin

- Wash bite area with running water for 15 minutes
- Seek medical attention. Bring SDS to the clinic / doctor.

Emergency Procedures

Exposure

• If Streptozotocin comes into contact with the eye, face and skin, wash the area with running water for 15 mins using the nearest emergency facilities and seek medical advice immediately.

• Notify HSEO of any exposures.

Emergency Response

• Notify the Security Control Center by dialing ext. 8999 and provide information on the incident, including the chemical involved, the location, and any injuries.

References

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