

STANDARD OPERATING PROCEDURE #708
USE OF STREPTOZOTOCIN IN RODENTS

1. PURPOSE

This Standard Operating Procedure (SOP) describes the guidelines for the use of streptozotocin in rodents.

2. CONSIDERATIONS

All chemical hazards must be listed in an approved Animal Use Protocol (AUP).

Streptozotocin (STZ) is a highly hazardous substance, suspected carcinogen, mutagen and teratogen that is harmful to the following organs: blood, kidneys, nervous system, liver, digestive system, skin, eyes, bone marrow, muscle tissue and pancreas. STZ is used to produce an animal model of Type I Diabetes. No occupational exposure limit has been established for STZ. Therefore, the following guidelines must be adhered to at all times when handling STZ.

STZ is non-volatile and thus only represents a risk in its crystalline and solubilized forms. STZ and its metabolites are primarily excreted in the urine and to a much lesser extent in feces. The drug undergoes rapid renal clearance within 48 hours after acute administration.

This SOP aims to ensure that the potential of exposure is reduced as much as possible and that these agents pose no risk to research staff, animal care personnel, and other personnel working in the animal facility.

To minimize the risk of exposure, the Principal Investigator and/or delegate(s) must identify all points of hazard and put in place safe work practices for all steps involving contact with streptozotocin, as per procedures presented in this SOP and in consultation with the McGill Environmental Health and Safety (EHS) Officer.

3. RESPONSIBILITY

Principal investigator (PI) and their research staff, animal care staff, veterinarian, veterinary care staff.

4. MATERIALS

4.1. Personal protective equipment (PPE):

- 4.1.1. Two pairs of nitrile gloves
- 4.1.2. Gown or lab coat
- 4.1.3. Sleeve covers
- 4.1.4. Procedure mask
- 4.1.5. Fit-tested N95 respirator (for cage processing)

4.2. Chemical fume hood, Class II Type B1 or Class II Type B2 Biological Safety Cabinet (BSC)

4.3. 0.5% sodium hypochlorite (bleach) solution £ Enrichment Bedding)approved Animal Use Protocol (AUP).

5.2.

- 5.3. Women who are pregnant, expecting to become pregnant, or nursing should not handle or be exposed to streptozotocin or feces/urine of animals treated with streptozotocin. Refer to the University Laboratory Safety Committee's (ULSC) Policy on Reproductive Health in the Laboratory.
- 5.4. STZ is rapidly metabolized in the liver and quickly eliminated by renal excretion. The procedures in this SOP must be followed when handling animals and bedding for 3 days after the final streptozotocin administration.
- 5.5. Storage precautions and transportation:
 - 5.5.1. All containers of streptozotocin must be clearly labeled and adequately stored when not in use.
 - 5.5.2. Keep containers in a cool, well-ventilated area away from sources of ignition.
 - 5.5.3. Storage and transport containers should be unbreakable, rigid, shock-resistant, leak-proof, and made of a non-reactive material which can be easily cleaned and decontaminated in the event of a leak.
 - 5.5.4. Empty STZ containers pose a fire risk. Evaporate residues under the fume hood and dispose through the Waste Management department.
 - 5.5.5. Dispose of empty containers by incineration through the Waste Management department.
- 5.6. Personal protective equipment (PPE) must be worn at all times when handling streptozotocin, in addition to any PPE requirements of the animal room. Wash hands after removing PPE.

- 6.5.3. Mix 1 part 5% chlorine bleach with 9 parts water (1:10 dilution).
- 6.5.4. Label all storage containers.
- 6.6. Waste disposal:
 - 6.6.1. All items contaminated or potentially contaminated with streptozotocin (e.g., gloves, bedding, paper towels) are discarded as hazardous waste by incineration.

7. SAFETY

- 7.1. In case of accidental exposure:
 - 7.1.1. Potential routes of exposures include inhalation, skin absorption, ingestion, and unintentional injection.
 - 7.1.2. Report the incident immediately to your supervisor. A McGill University [Accident, Incident & Occupational Disease Report form](#) must be completed.
 - 7.1.3. Splash in eyes:
 - 7.1.3.1. Flush eyes with water or normal saline solution for 15 minutes. Remove contact lenses.
 - 7.1.3.2. Seek medical attention after flushing eyes.
 - 7.1.4. Skin exposure:
 - 7.1.4.1. Immediately flush affected skin with water while removing and isolating all contaminated clothing.
 - 7.1.4.2. Gently wash all affected skin areas thoroughly with soap and water. Rinse for 15 minutes
 - 7.1.4.3. If symptoms such as redness or irritation develop, seek medical attention.
 - 7.1.5. Inhalation:
 - 7.1.5.1. Immediately leave the contaminated area; take deep breaths of fresh air.
 - 7.1.5.2. Immediately call a physician or poison control center.
 - 7.1.6. Ingestion:
 - 7.1.6.1. Do not induce vomiting.
 - 7.1.6.2. Give 1 or 2 glasses of water and immediately call a hospital or poison control center.

8. REFERENCES

- 8.1. Karunanayake, E. H., Hearse, D. J., & Mellows, G. (1974). The synthesis of [14C] streptozotocin and its distribution and excretion in the rat. *The Biochemical journal*, 142(3), 673–683. <https://doi.org/10.1042/bj1420673>
- 8.2. Wu, J., & Yan, L. J. (2015). Streptozotocin-induced type 1 diabetes in rodents as a model for studying mitochondrial mechanisms of diabetic cell glucotoxicity. *Diabetes, metabolic syndrome and obesity : targets and therapy*, 8, 181–188. <https://doi.org/10.2147/DMSO.S82272>

STREPTOZOTOCIN

Open only Type II B1 or B2 BSC

DATES OF ADMINISTRATION