



ENVIRONMENTAL AND OCCUPATIONAL HEALTH AND SAFETY SERVICES

STANDARD OPERATING PROCEDURES

Safe Work Practices for the use of MPTP in the Laboratory and Vivarium

Effective Date: January 11, 2007

Revision Date: January 11, 2007

INSTRUCTIONS: Please have each staff member who will be working with this material review this Standard Operation Procedure (SOP). In Section 7 – Signatures, list each of the personnel assigned to the project, and have them initial in the box provided to indicate that he/she has read and understands this SOP. Send a completed copy to your [campus EOHSS office](#).

1 PURPOSE

1.1 This procedure establishes procedures for safe handling, transport and storage of 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine, commonly known as MPTP (CAS # 28289-54-5). MPTP is known to produce severe irreversible brain damage similar to advanced Parkinson's disease. The inappropriate handling of MPTP may result in neurological damage to researchers; therefore its handling, storage and use must follow a strict safety protocol.

2 SCOPE:

2.1 This SOP addresses the use of MPTP in the laboratory and in the Vivarium. It assumes that all of the UMDNJ minimum safety requirements, as detailed in the latest version of the UMDNJ Laboratory Safety Plan have been implemented. This SOP covers:

2.1.1 Pure MPTP or any solution of MPTP, regardless of concentration.

2.1.2 Any excretions from test animals that would reasonably be expected to contain traces of MPTP and/or its metabolites.

3 RESPONSIBILITY

3.1 All staff engaged in the use or handling of MPTP, or working within a laboratory using MPTP, is responsible for understanding all hazards

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associated with its use, and for using appropriate personal protective equipment (PPE).

- 3.2 The Principal Investigator is responsible for ensuring that his/her staff has been trained in the use, storage and handling of MPTP.
- 3.3 MPTP use is restricted to the specific staff member who have had prior training in proper use, handling and storage. Each staff member's name must appear on the listing in Section 7 of this document, and each staff member must initial by his/her name.
- 3.4 The Principal Investigator is responsible for ensuring that all personnel receive a physical exam, as part of the pre-placement process, in order to ensure that they can be safely administered the antidote Selegiline HCL.

4 PROCEDURES

4.1 Training

- 4.1.1 Prior to conducting any work with MPTP, the Principal Investigator must provide training to his/her laboratory personnel specific to the hazards involved in working with this substance, work area decontamination, and emergency procedures.
- 4.1.2 The Principal Investigator must provide his/her laboratory personnel with a copy of this SOP and a copy of the MPTP MSDS (see attachment to this SOP).
- 4.1.3 The Principal Investigator must ensure that his/her laboratory personnel have attended initial laboratory safety training or refresher laboratory safety training within the last two years.

Note: EOHSS is available to assist in the education and/or training of personnel concerning safe work practices.

4.2 Antidote

- 4.2.1 The Principal Investigator must ensure that his/her laboratory personnel have been medically evaluated to insure that they can be safely administered the antidote Selegiline hydrochloride (CAS # 14611-52-0). For more information the function of Selegiline, see the following websites:

<http://www.drugstore.com/pharmacy/prices/drugprice.asp?ndc=59911325401&trx=1Z5006>)

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http://www.medical-library.net/sites/framer.html?/sites/_selegiline.html

4.3 Signage

4.3.1 When MPTP is in use, warning signs must be posted on the laboratory door, and the chemical hood until the MPTP has been returned to storage and the work area has been decontaminated.

4.3.2 A sign must be posted on animal room door/s and on animal cages that contain animals dosed with MPTP.

4.3.3 Signs will include the information shown in the following samples:

Sample Cage, Biosafety Cabinet and Chemical Hood Sign

<p style="text-align: center;">Designated Area</p> <p style="text-align: center;">Caution</p> <p style="text-align: center;">MPTP (1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine)</p> <p style="text-align: center;">In Use</p> <p style="text-align: center;">Neurotoxin</p>

Sample Door Sign

<p style="text-align: center;">Caution</p> <p style="text-align: center;">MPTP (1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine)</p> <p style="text-align: center;">In Use - - Neurotoxin</p> <p style="text-align: center;">Authorized Personnel Only</p> <p style="text-align: center;">Material Safety Data Sheets are available in Room _____</p> <p style="text-align: center;">For more information, please contact: _____</p> <p style="text-align: center;">In the event of a chemical spill, contact Public Safety at 5-4000 and ask for EOHSS to respond.</p>

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4.4 Storage

- 4.4.1 Pure MPTP and concentrated solutions must be stored in a location that is secure to unauthorized access. Examples are a locked drawer or cabinet or a laboratory door that is locked when authorized personnel are not present.
- 4.4.2 Store solutions in appropriate, sealed containers with unbreakable secondary containment (i.e., a bottle or vial within a sealed plastic jar). Label all containers, including secondary containment, with the chemical name and hazard warning.
- 4.4.3 An inventory of pure MPTP will be kept, noting amounts ordered stock on hand and amounts discarded or used.

4.5 Handling and Solution Preparation

- 4.5.1 The MPTP antidote Selegiline hydrochloride (CAS # 14611-52-0) must be immediately accessible to the MPTP work area.
- 4.5.2 Prepare the smallest amount of solution necessary for the procedure.
- 4.5.3 Opening of pure MPTP, preparation and administration of solutions will take place in a chemical hood that has been certified within the last 12 months. Just before use, the operation of the chemical hood must be verified by the use of an installed chemical hood monitoring device, a smoke test using a smoke generating tube, or a mechanical or electronic device that indicates air flow. During use, the sash must be lowered to operating height.
- 4.5.4 Use disposable labware whenever possible. Reusable labware must be decontaminated before reuse. Disposable labware should be decontaminated with a bleach solution (see section 4.4.10 for preparation) before discarding in a medical waste container.
- 4.5.5 When expelling air from syringes used for administering MPTP solutions, wrap the tip of the needle with a sterile dampened gauze. After injection, do not clip, remove, or recap the needle. Instead, place used syringes directly into a sharps container that has been previously placed in the chemical hood. Check the injection site for leaking material and absorb with dampened gauze. Contaminated gauze must be placed in a container for disposal as hazardous waste.

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- 4.5.6 The following minimum personal protective equipment must be worn during operations with pure MPTP and its solutions:
- 4.5.6.1 Safety glasses with sideshields or safety goggles,
 - 4.5.6.2 Disposable nitrile gloves (NOT latex). Double-gloving is recommended. Change gloves frequently and when contaminated, punctured or torn. Wash hands immediately after removing gloves.
 - 4.5.6.3 A disposable laboratory coat, jumpsuit or other appropriate protective clothing that is removed after working with MPTP and discarded.
 - 4.5.6.4 The use of a NIOSH-approved N-95 disposable respirator is recommended when working with pure MPTP or concentrated solutions. Contact EOHSS for guidance on respirator use, selection, fit-testing and training.
- 4.5.7 The chemical hood work surface must be lined with a disposable plastic-backed paper liner. The liner must be changed after work is completed for the day, at shift change, and/or after a spill.
- 4.5.8 Weighing should take place in the chemical hood. If the chemical hood produces vibration that prevents accurate weighing, an alternate method is to tare a closed vessel on a balance outside the hood, add the MPTP in the hood, and reweigh the closed vessel outside the hood. Adding of solvent and any additional dilutions must take place in the chemical hood.
- 4.5.9 Immediately after work with MPTP, decontaminate all work surfaces and equipment with a 5% dilution of household bleach (e.g., 5 mL of Clorox® or equivalent containing 6% sodium hypochlorite, added to 95 mL water). The chemical hood MUST be decontaminated before any other work is performed in it.
- 4.5.10 Remaining solutions of MPTP and any dry waste (paper towels, gloves) must be disposed of as hazardous chemical waste through EOHSS.
- 4.5.11 Wash hands thoroughly immediately after working with any concentration of MPTP.

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5 Animal Handling and Housing

5.1 General Procedures

5.1.1 Animal cages containing treated animals must be labeled in accordance with the sample label shown in 4.3.3.

5.1.1.1 Treated mice must be kept in the laboratory chemical hood or ventilated cages for three days after dosing (while they are expected to excrete MPTP and its metabolites).

Disposable cages are recommended to avoid contamination during cleaning. Contact EOHSS if non-disposable cages are to be used.

5.1.1.2 Use a low-dust bedding such as corncob or paper-type.

5.1.1.3 All potentially contaminated non-metal surfaces must be decontaminated with a 5% bleach solution (see 4.5.9). Metal surfaces must be washed with a strong detergent solution. Paper towels or rags used for cleaning must be placed in a Regulated Medical Waste container.

5.2 Cage Changing

5.2.1 Do not change animal bedding for at least 72 hours after administration of MPTP.

5.2.2 Cage changing will be performed only by appropriately trained staff.

5.2.3 Wear the personal protective equipment specified in 4.5.6, including a NIOSH-approved N-95 respirator.

5.2.4 Wet the bedding with a 5% bleach solution.

5.2.5 Place the entire disposable cage into a red medical waste bag, tie it and place it into a grey medical waste container.

6 EMERGENCIES

6.1 Spill of MPTP outside of chemical hood or biosafety cabinet, including bedding from the first 72 hour after dosing:

6.1.1 Phone the Public Safety Emergency number (Newark: 2-4490; Piscataway/New Brunswick: 5-4000; Camden and Stratford: 7-7777) immediately. Ask them to have EOHSS respond. **DO NOT** attempt to clean up a spill.

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- 6.1.2 Isolate the area to prevent the spread of contamination (e.g., close doors to affected area and post a warning sign).
 - 6.1.3 Alert personnel in the immediate area to evacuate.
 - 6.1.4 Attend to any injured personnel.
 - 6.1.5 NOTE: Personnel must not attempt to clean up a spill of MPTP or a solution of MPTP which occurs outside of a chemical hood or ducted biosafety cabinet.
- 6.2 Spill of MPTP inside of chemical hood or biosafety cabinet:
- 6.2.1 Small spills may be decontaminated with an excess of 5% to 10% bleach solution (see 3.5.9 for preparation instructions). Notify EOHSS of the spill and the cleanup procedure.
 - 6.2.2 If the spill is large or you are unsure of your ability to thoroughly decontaminate it, call the Public Safety Emergency number (above) and ask EOHSS to respond.
- 6.3 Accidental Exposure to MPTP
- 6.3.1 In the event of a recognized percutaneous or mucous membrane exposure to MPTP:
 - 6.3.1.1 Immediately ingest the prescribed dosage of the antidote Selegiline HCl.
 - 6.3.1.2 Remove contaminated clothing.
 - 6.3.1.3 Rinse the affected area with water, using a safety shower or eyewash, as appropriate, for a minimum of 15-minutes. A disposable laboratory coat or jumpsuit should be available for the victim to wear after using a safety shower.
 - 6.3.1.4 Notify the victim's supervisor, if immediately available. The supervisor, a co-worker, or the victim must contact the campus Employee/Occupational Health Program to determine what additional steps should be taken.

Newark: Occupational Medicine Services (973) 972-2900

Piscataway/New Brunswick: EOHSI Employee Health Services (732) 445-0123

Stratford: Kennedy Hospital (856) 346-7816

Camden: Cooper Occupational Health Services (856) 342-2990

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6.3.1.5 If the incident occurs off-hours, or an ambulance is needed because of injury, contact Public Safety to advise them of the medical emergency

Newark: 2-4490
Piscataway/New Brunswick: 5-4000;
Camden and Stratford: 7-7777

6.3.2 In the event of a suspected or incidental exposure to MPTP:

6.3.2.1 Immediately rinse the affected area using a safety shower or eyewash for a minimum of 15 minutes.

6.3.2.2 Notify the supervisor if immediately available. The supervisor, a co-worker, or the victim must contact Employee/Occupational Health (see phone listing in Section 6.3.1.4) to determine what additional steps should be taken.

6.3.2.3 If the incident occurs off-hours, or an ambulance is needed because of injury, contact Public Safety at (see phone listing in Section 6.3.1.4) to advise them of the medical emergency.

7 SIGNATURES

Principal Investigators: Use the following table to list all personnel who will handle MPTP. The staff member's initials indicate that the staff member has read this SOP and understands the I hazards and safe work practices as detailed in this therein.

Name	Job Title	Lab Staff Initials*

Principal /Responsible Investigator: (Print): _____

Principal /Responsible Investigator (Signature): _____

Date: _____

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STANDING ORDERS FOR USE OF SELEGILINE IN MPTP EXPOSURE

Selegiline is used as an antidote in the event of recognized percutaneous or mucous membrane exposure to MPTP (1-methyl-4 phenyl-1, 2,3,6-tetrahydropyridine). MPTP is known to produce severe irreversible brain damage similar to advanced Parkinson disease (tremor, rigidity, slowness of movement and postural instability).

PROTOCOL

Should an employee have a **recognized** percutaneous or mucous membrane exposure to MPTP they should:

1. Immediately ingest four (4) 5mg Selegiline tablets which are available in the lab
2. Call Public Safety at 732-235-4000 for ambulance transport to nearest Emergency Room.
3. Remove contaminated clothing
4. Rinse the affected area with copious amounts of water using a safety shower or eyewash for a minimum of 15 minutes
5. Notify the supervisor immediately
6. Contact Employee Health Services at 732-445-0123 x600 to determine what additional steps should be taken
7. Notify EOHSS at 732-235-4058 to investigate or decontaminate the immediate area

Dr. Iris G. Udasin, Medical Director of Employee Health Services can be reached in the clinic located EOHSI building, 1st floor at 732-445-0123-x600.

_____/_____/_____

Iris G. Udasin, MD
Medical Director, EHS

Susan Anastario, RN
Nurse Manager, EHS

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IF ADDITIONAL ASSISTANCE IS REQUIRED:

The current version of this form and additional information is posted at:
<http://www2.umdnj.edu/eohssweb/forms.htm>

EOHSS Campus Contact Information:

Newark

65 Bergen Street
Bergen Building Room 443
Newark, NJ 07107
(973) 972-4812
Fax (973) 972-3694

Piscataway

675 Hoes Lane - Trailer #1
Piscataway, NJ 08854
(732) 235-4058
Fax (732) 235-5270

New Brunswick

Liberty Plaza Building Suite 2119
335 George Street
New Brunswick, NJ 08903
(732) 235-8376
Fax (732) 235-8370

Camden/Stratford

Primary Care Center
40 E. Laurel Road Suite 101
Stratford, NJ 08084
(856) 566-6189
Fax (856) 566-6352

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REFERENCES

- Langston, J. W., et al., Chronic Parkinsonism in Humans Due to a Product of Meperidine-analog Synthesis. *Science* 219, 979-980 (1983). Posted at: <http://opioids.com/mptp/mepanalog.html>
- Sigma-Aldrich MSDS database, Product M1021, 1-Methyl-4-phenyl-1,2,3,6-tetrahydropyridine MSDS
- "Working With MPTO or MPTP-Treated Animals," NIH Division of Safety, Office of Research Services. Posted at: <http://www2.umdj.edu/eohssweb/aiha/technical/animal.htm> Dec. 1, 2003, 35407 bytes
- Recommended safe practices for using the neurotoxin MPTP in animal experiments. Yang S. C., Markey S. P., Bankiewicz K. S., London W. T. and Lunn G. (1988) *Lab. Anim. Sci.* 38, 563–567. Posted at: http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=retrieve&db=pubmed&list_uids=3264039&dopt=Abstract
- The parkinsonian toxin 1-methyl-4-phenyl-1,2,3,6-tetrahydropyridine (MPTP): a technical review of its utility and safety , *Journal of Neurochemistry*, Vol. 76, No. 5, 2001 1265-1274