**INSTRUCTIONS: This is an SOP template; it is complete when**

**1) All form fields have been completed to reflect chemical/lab-specific information,** including adding relevant procedure information, or deleted inapplicable information; and

**2) SOP has been signed and dated by the PI and relevant lab personnel.**

Use safety data sheets (SDSs) as a resource for chemical-specific information. Text highlighted in gray indicates where information should be added or edited. Delete all instructions in red text and “Draft” watermark after the SOP is approved by PI.

Standard Operating Procedure

Ammonium Chloride

Print a copy and insert into your *Lab-Specific Chemical Hygiene Plan*.

**Section 1 – Lab-Specific Information**

**Building/Room(s) covered by this SOP:**

**Unit or department:**

**Principal Investigator Name:**

**Principal Investigator Signature/Date:**

**This SOP was created by (if not PI):**

**Name/Title/Date/Signature:**

# **Section 2 – Hazards**

Ammonium chloride is a reagent that is used in a variety of research applications. In biological research, it is used for the lysis of human red blood cells, the study of basic calcium phosphate crystals in fibroblasts, and in the isolation of proteins.

Acute potential health effects include skin irritation, which is usually mild, and moderate eye irritation. It may cause Salt Cataract, increased ocular pressure, and degeneration of the retina. Inhalation can lead to respiratory tract and mucous membrane irritation which is usually mild. May be harmful if swallowed. May cause digestive tract irritation with nausea and vomiting, and thirst. May affect behavior/central nervous system (headache, somnolence, confusion, drowsiness, tremor, convulsions, coma), eyes (Mydriasis), cardiovascular system (bradycardia), respiration (respiratory stimulation, apnea, hyperventilation, pulmonary edema). May cause serious metabolic acidosis with hypokalemia, transient hyperglycemia and glycosuria may also occur. Chronic potential health effects from prolonged or repeated skin contact may include dermatitis, an allergic reaction. Prolonged or repeated inhalation may affect the kidneys and cause bronchospasm (asthma). Prolonged or repeated ingestion may affect metabolism (anorexia, metabolic acidosis) and urinary system (enlargement of kidneys).



**Section 3 – Engineering and Personal Protective Equipment (PPE)**

**Engineering Controls:** The use of ammonium chloride should be conducted in a properly functioning chemical fume hood whenever possible. The chemical fume hood must be approved and certified by EH&S.

**Hygiene Measures:** Avoid contact with skin, eyes, and clothing. Wash hands before breaks and immediately after handling the chemical.

**Hand Protection:** Chemical-resistant gloves must be worn, nitrile gloves are recommended. Wearing two pairs of nitrile gloves is recommended. **NOTE:** Consult with your preferred glove manufacturer to ensure that the gloves you plan on using are compatible with the specific chemical being used.

**Eye Protection:** ANSI-approved properly fitting safety glasses or chemical splash goggles are required.

**Skin and Body Protection:** Laboratory coats must be worn and be appropriately sized for the individual and buttoned to their full length. Personnel must also wear full length pants, or equivalent, and close-toed shoes. Full length pants and close-toed shoes must be worn at all times by all individuals that are occupying the laboratory area. The area of skin between the shoe and ankle must not be exposed.

**Respiratory Protection:** Respirators should be used as a last line of defense (i.e., after engineering and administrative controls have been exhausted), and when Permissible Exposure Limit (PEL) has been exceeded or when there is a possibility that PEL will be exceeded. If this activity is necessary, contact EH&S at 206.543.7388 so a respiratory protection analysis can be performed.

**Section 4 – Special Handling and Storage Requirements**

* Avoid contact with skin, eyes, and inhalation.
* Avoid dust formation.
* Avoid exposure to moisture, which can cause instability of ammonium chloride.
* At fire temperature, ammonium chloride may dissociate into ammonia and hydrogen chloride.
* Hygroscopic: keep containers tightly closed. Store in a cool, dry, and well-ventilated area.
* Keep away from incompatible substances such as oxidizing agents, acids, ammonium nitrate, potassium chlorate, silver salts, alkali metals, copper, stainless steel, lead, aluminum.
* It can react violently with ammonium nitrate and potassium chlorate.
* Also incompatible with bromine trifluoride, ammonium halides, bromine pentafluoride, alkalis and their carbonates.
* Severe corrosive effect on brass and bronze.
* Extremely corrosive in presence of copper. Corrosive in presence of steel, of stainless steel. Slightly corrosive in presence of aluminum, of stainless steel.
* Use in the smallest practical quantities for the experiment being performed.
* Conduct work in a properly functioning chemical fume hood.
* Keep containers closed when not in use.
* Label containers appropriately. Label should indicate the name of the chemical(s) in the container. Avoid using chemical abbreviations and formulae.
* Containers must be in good condition and compatible with the material.

# **Section 5 – Spill and Accident Procedures**

If skin is exposed to ammonium chloride, remove contaminated clothing and shoes, rinse for 15 minutes in the safety shower. Send someone to call 911 as soon as possible. Wash irritated skin with soap and water, and then cover with an emollient. If eye is exposed, call 911 as soon as possible and flush eyes for 15 minutes in the eye wash. If ammonium chloride is inhaled, remove to fresh air and call 911. Bring Safety Data Sheet (SDS) with you to show medical personnel.

Immediately evacuate area if fumes present a serious health risk or a spill occurs; ensure others are aware of the spill. Avoid breathing vapors. During normal business hours (Monday – Friday, 8 AM – 5 PM), call EH&S at 206.543.0467 for further assistance. If it is after hours, call 911 for further assistance. If possible, confine the spill to a small area using a spill kit or absorbent material. Keep others from entering contaminated area (e.g., use caution tape, barriers, etc.).

For spills < 1 Liter, use appropriate personal protective equipment listed above and clean-up material for chemical spilled. Double bag and securely fasten spill materials. Label as hazardous waste.

For spills > 1 Liter, call EH&S at 206.543.0467 for further assistance during normal business hours (Monday – Friday, 8 AM – 5 PM). If it is after hours, call 911 for further assistance.

Report the spill via the EH&S Online Accident Reporting System (OARS).

**Section 6 – Waste Disposal Procedures**

Store hazardous waste in closed containers that are properly labeled, and in a designated area. Decontaminate equipment and bench tops using soap and water. Sweep up spills to avoid dust formation. Request chemical waste collection via the EH&S website.

# **Section 7 – Protocol**

Click here to enter text.

**NOTE:** Any deviation from this SOP requires approval from Principal Investigator.

# **Section 8 – Documentation of Training (signature of all users is required)**

Prior to conducting any work with cyclosporin A, the Principal Investigator must ensure that all laboratory personnel receive training on the content of this SOP.

**I have read and understand the content of this SOP:**

| **Name** | **Signature** | **Date** |
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