Cayman Chemical Company  
1180 E. Ellsworth Rd.  
Ann Arbor, MI 48108

### Section 1. Identification of the Substance/Mixture and of the Supplier of the Safety Data Sheet

1.1 **Product Code:** 10500  
**Product Name:** PAD4 (human recombinant)  
**Synonyms:** Peptidylarginine Deiminase 4; Protein Arginine Deiminase 4;

1.2 **Relevant identified uses of the substance or mixture and uses advised against**  
Relevant identified uses: For research use only, not for human or veterinary use.

1.3 **Details of the Supplier of the Safety Data Sheet**  
**Company Name:** Cayman Chemical Company  
**Emergency Contact:** CHEMTREC Within USA and Canada: +1 (800)424-9300  
**Alternate Emergency Contact:** CHEMTREC Outside USA and Canada: +1 (703)527-3887  
**Information:** Cayman Chemical Company +1 (734)971-3335  
**Web site address:** www.caymanchem.com

### Section 2. Hazards Identification

<table>
<thead>
<tr>
<th>GHS Classification</th>
<th>Placard</th>
<th>Key word</th>
<th>GHS Hazard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skin Corrosion/Irritation, Category 3</td>
<td>none</td>
<td>Warning</td>
<td>Causes mild skin irritation</td>
</tr>
<tr>
<td>Serious Eye Damage/Eye Irritation, Category 2B</td>
<td>none</td>
<td>Warning</td>
<td>Causes eye irritation</td>
</tr>
</tbody>
</table>

**GHS Hazard Phrases:**  
H316: Causes mild skin irritation.  
H320: Causes eye irritation.

**GHS Precaution Phrases:**  
P264: Wash hands thoroughly after handling.

**GHS Response Phrases:**  
P332+313: If skin irritation occurs, get medical advice/attention.  
P305+351+338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.  
P337+313: If eye irritation persists, get medical advice/attention.

**GHS Storage and Disposal Phrases:**  
Please refer to Section 7 for Storage and Section 13 for Disposal information.

2.3 **Adverse Human Health Effects and Symptoms:**  
- Causes eye irritation.  
- Causes mild skin irritation.  
- Material may be irritating to the mucous membranes and upper respiratory tract.  
- May be harmful by inhalation, ingestion, or skin absorption.  
- May cause respiratory system irritation.  
- To the best of our knowledge, the toxicological properties have not been thoroughly investigated.

**Target Organs:** Eyes, Kidneys, Respiratory system, Skin.

**LD 50 / LC 50:** Please refer to Section 11.

**Medical Conditions Generally Aggravated By Exposure:** No data available.

### Section 3. Composition/Information on Ingredients

<table>
<thead>
<tr>
<th>Hazardous Components (Chemical Name)</th>
<th>CAS #</th>
<th>Concentration</th>
<th>EC#</th>
<th>Risk Phrases</th>
<th>RTECS #</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PAD4 (human recombinant)</td>
<td>NA</td>
<td>&lt; 0.1 %</td>
<td>NA</td>
<td>No phrases apply</td>
<td>NA</td>
</tr>
<tr>
<td>2. Glycerol</td>
<td>56-81-5</td>
<td>20.0 %</td>
<td>200-289-5</td>
<td>R36</td>
<td>MA8050000</td>
</tr>
<tr>
<td>3. DL-Dithiothreitol</td>
<td>3483-12-3</td>
<td>0.015 %</td>
<td>222-468-7</td>
<td>R22-36/37/38</td>
<td>EK1610000</td>
</tr>
</tbody>
</table>
Section 4. First Aid Measures

4.1 Description of First Aid Measures:

4.1.1 In Case of Inhalation:
Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.

4.1.2 In Case of Skin Contact:
Immediately wash skin with soap and plenty of water for at least 20 minutes. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

4.1.3 In Case of Eye Contact:
Hold eyelids apart and flush eyes with plenty of water for at least 20 minutes. Have eyes examined and tested by medical personnel.

4.1.4 In Case of Ingestion:
Exposure may cause: damage to kidneys. Prolonged exposure may cause nausea, headache, and vomiting.

4.2 Important Symptoms and Effects, Both Acute and Delayed:
No data available.

4.3 Indication of any immediate medical attention and special treatment needed:
No data available.

Section 5. Fire Fighting Measures

5.1 Suitable Extinguishing Media:
Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray. Use water spray to cool fire-exposed containers.

5.2 Flammable Properties and Hazards:
Emits toxic fumes under fire conditions.

Flash Pt:
No data.

Autoignition Pt:
No data available.

Explosive Limits:
LEL: No data. UEL: No data.

Hazardous Combustion Products:
No data available.

5.3 Fire Fighting Instructions:
As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes.

Section 6. Accidental Release Measures

6.1 Protective Precautions, Protective Equipment and Emergency Procedures:
Avoid breathing vapors and provide adequate ventilation. As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator, and appropriate personal protection (rubber boots, safety goggles, and heavy rubber gloves).

6.2 Environmental Precautions:
Take steps to avoid release into the environment, if safe to do so.

6.3 Methods and Material For Containment and Cleaning Up:
Contain spill and collect, as appropriate. Transfer to a chemical waste container for disposal in accordance with local regulations.

Section 7. Handling and Storage

7.1 Precautions To Be Taken in Handling:
Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid prolonged or repeated exposure.

7.2 Precautions To Be Taken in Storing:
Keep container tightly closed. Store in accordance with information listed on the product insert.

Hazard Label Information:
Avoid contact with skin and eyes. Do not reuse this container. Use with adequate ventilation. Wash thoroughly after handling.
Section 8. Exposure Controls/Personal Protection

<table>
<thead>
<tr>
<th>Hazardous Components (Chemical Name)</th>
<th>CAS #</th>
<th>OSHA PEL</th>
<th>ACGIH TLV</th>
<th>Other Limits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PAD4 (human recombinant)</td>
<td>NA</td>
<td>No data.</td>
<td>No data.</td>
<td>No data.</td>
</tr>
<tr>
<td>2. Glycerol</td>
<td>56-81-5</td>
<td>15 (dust); 5 (resp.) mg/m3</td>
<td>10 mg/m3</td>
<td>No data.</td>
</tr>
<tr>
<td>3. DL-Dithiothreitol</td>
<td>3483-12-3</td>
<td>No data.</td>
<td>No data.</td>
<td>No data.</td>
</tr>
<tr>
<td>4. Sodium chloride</td>
<td>7647-14-5</td>
<td>No data.</td>
<td>No data.</td>
<td>No data.</td>
</tr>
<tr>
<td>5. Trizma base</td>
<td>77-86-1</td>
<td>No data.</td>
<td>No data.</td>
<td>No data.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hazardous Components (Chemical Name)</th>
<th>CAS #</th>
<th>Europe</th>
<th>France VL</th>
<th>Britain EH40</th>
<th>Other Limits</th>
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</thead>
<tbody>
<tr>
<td>1. PAD4 (human recombinant)</td>
<td>NA</td>
<td>No data.</td>
<td>No data.</td>
<td>No data.</td>
<td></td>
</tr>
<tr>
<td>2. Glycerol</td>
<td>56-81-5</td>
<td>TWA: 10 mg/m3</td>
<td>TWA: 10 mg/m3</td>
<td>No data.</td>
<td></td>
</tr>
<tr>
<td>3. DL-Dithiothreitol</td>
<td>3483-12-3</td>
<td>No data.</td>
<td>No data.</td>
<td>No data.</td>
<td></td>
</tr>
<tr>
<td>4. Sodium chloride</td>
<td>7647-14-5</td>
<td>No data.</td>
<td>No data.</td>
<td>No data.</td>
<td></td>
</tr>
<tr>
<td>5. Trizma base</td>
<td>77-86-1</td>
<td>No data.</td>
<td>No data.</td>
<td>No data.</td>
<td></td>
</tr>
</tbody>
</table>

Protective Equipment Summary - Hazard Label Information:

8.2.1 Engineering Controls (Ventilation etc.): Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.

8.2.2.1 Eye Protection: Safety glasses

8.2.2.2 Protective Gloves: Compatible chemical-resistant gloves

Other Protective Clothing: Lab coat

8.2.2.3 Respiratory Equipment (Specify Type): NIOSH approved respirator, as conditions warrant.

Work/Hygienic/Maintenance Practices:

Do not take internally. Facilities storing or utilizing this material should be equipped with an eyewash and a safety shower. Wash thoroughly after handling.

Section 9. Physical and Chemical Properties

9.1 Information on Basic Physical and Chemical Properties

Physical States: [ ] Gas [ X ] Liquid [ ] Solid

Appearance and Odor: No data available.

pH: 7.6

Melting Point: No data.

Boiling Point: No data.

Flash Point: No data.

Evaporation Rate: No data.

Vapor Pressure (vs. Air or mm Hg): No data.

Vapor Density (vs. Air = 1): No data.

Specific Gravity (Water = 1): No data.

Solubility in Water: No data.

Autoignition Pt: No data.

Explosive Properties: No data available.
Section 10. Stability and Reactivity

10.1 Reactivity: No data available.

10.2 Stability: Unstable [ ] Stable [ X ]

10.3 Stability Note(s): Stable if stored in accordance with information listed on the product insert.

10.4 Conditions To Avoid: No data available.

10.5 Polymerization: Will occur [ ] Will not occur [ X ]

10.6 Incompatibility - Materials To Avoid: strong bases

10.7 Incompatibility - Materials To Avoid: strong oxidizing agents

10.8 Hazardous Decomposition Or Byproducts: carbon dioxide

10.9 Hazardous Decomposition Or Byproducts: carbon monoxide

Section 11. Toxicological Information

11.1 Information on Toxicological Effects: The toxicological effects of this product have not been thoroughly studied.

Glycerol - Irritation Data: Eyes (rabbit): 500 mg (24h) mild; Skin (rabbit): 500 mg (24h) mild;

Chronic Toxicological Effects: Glycerol - Investigated as a mutagen, reproductive effector, and tumorigen.

Only select Registry of Toxic Effects of Chemical Substances (RTECS) data is presented here. See actual entry in RTECS for complete information.

Glycerol RTECS Number: MA8050000

<table>
<thead>
<tr>
<th>Hazardous Components (Chemical Name)</th>
<th>CAS #</th>
<th>NTP</th>
<th>IARC</th>
<th>ACGIH</th>
<th>OSHA</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PAD4 (human recombinant)</td>
<td>NA</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>2. Glycerol</td>
<td>56-81-5</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>3. DL-Dithiothreitol</td>
<td>3483-12-3</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>4. Sodium chloride</td>
<td>7647-14-5</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
<tr>
<td>5. Trizma base</td>
<td>77-86-1</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

Carcinogenicity: NTP? No IARC Monographs? No OSHA Regulated? No

Section 12. Ecological Information

12.1 Toxicity: Avoid release into the environment.

Runoff from fire control or dilution water may cause pollution.

Section 13. Disposal Considerations

13.1 Waste Disposal Method: Dispose in accordance with local, state, and federal regulations.

Section 14. Transport Information

14.1 LAND TRANSPORT (US DOT)

DOT Proper Shipping Name: Not dangerous goods.

14.1 LAND TRANSPORT (European ADR/RID)

ADR/RID Shipping Name: Not dangerous goods.

14.3 AIR TRANSPORT (ICAO/IATA)

ICAO/IATA Shipping Name: Not dangerous goods.

Additional Transport Information: Transport in accordance with local, state, and federal regulations.
Section 15. Regulatory Information

European Community Hazard Symbol codes  Xi: Irritant

European Community Risk and Safety Phrases

- R36 - Irritating to eyes.
- S24/25 - Avoid contact with skin and eyes.
- S26 - In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
- S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection.

US EPA SARA Title III

<table>
<thead>
<tr>
<th>Hazardous Components (Chemical Name)</th>
<th>CAS #</th>
<th>Sec.302 (EHS)</th>
<th>Sec.304 RQ</th>
<th>Sec.313 (TRI)</th>
<th>Sec.110</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PAD4 (human recombinant)</td>
<td>NA</td>
<td>No</td>
<td>No</td>
<td>No</td>
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<tr>
<td>2. Glycerol</td>
<td>56-81-5</td>
<td>No</td>
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<td>No</td>
<td>No</td>
</tr>
<tr>
<td>3. DL-Dithiothreitol</td>
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<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>4. Sodium chloride</td>
<td>7647-14-5</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>5. Trizma base</td>
<td>77-86-1</td>
<td>No</td>
<td>No</td>
<td>Yes-Cat. N106</td>
<td>No</td>
</tr>
<tr>
<td>6. Water</td>
<td>7732-18-5</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
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</table>

Other US EPA or State Lists

<table>
<thead>
<tr>
<th>Hazardous Components (Chemical Name)</th>
<th>CAS #</th>
<th>CAA HAP,ODC</th>
<th>CWA NPDES</th>
<th>TSCA</th>
<th>CA PROP.65</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. PAD4 (human recombinant)</td>
<td>NA</td>
<td>No</td>
<td>No</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>2. Glycerol</td>
<td>56-81-5</td>
<td>No</td>
<td>No</td>
<td>Inventory</td>
<td>No</td>
</tr>
<tr>
<td>3. DL-Dithiothreitol</td>
<td>3483-12-3</td>
<td>No</td>
<td>No</td>
<td>Inventory</td>
<td>No</td>
</tr>
<tr>
<td>4. Sodium chloride</td>
<td>7647-14-5</td>
<td>No</td>
<td>No</td>
<td>Inventory</td>
<td>No</td>
</tr>
<tr>
<td>5. Trizma base</td>
<td>77-86-1</td>
<td>HAP</td>
<td>No</td>
<td>Inventory</td>
<td>No</td>
</tr>
<tr>
<td>6. Water</td>
<td>7732-18-5</td>
<td>No</td>
<td>No</td>
<td>Inventory</td>
<td>No</td>
</tr>
</tbody>
</table>


Section 16. Other Information

Revision Date: 04/18/2013

Company Policy or Disclaimer

For research use only, not for human or veterinary use.

DISCLAIMER: This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.

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