SAFETY DATA SHEET

03813 - Hygromycin B

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND OF THE COMPANY/UNDERTAKING

Product identifier

Product Name
Hygromycin B

Other means of identification

Catalog Number
03813

UN/ID no.
UN3462

Document Number
DX22495

Synonyms

Recommended use of the chemical and restrictions on use

Recommended Use
Laboratory chemicals

STEMCELL TECHNOLOGIES INC.’S QUALITY MANAGEMENT SYSTEM IS CERTIFIED TO ISO 13485. PRODUCTS ARE FOR RESEARCH USE ONLY AND NOT INTENDED FOR HUMAN OR ANIMAL DIAGNOSTIC OR THERAPEUTIC USES UNLESS OTHERWISE STATED.

Details of the supplier of the safety data sheet

Manufacturer/Supplier
STEMCELL Technologies Canada Inc.
Suite 500 - 1618 Station Street
Vancouver, British Columbia V6A 1B6 Canada

Emergency telephone number

Emergency Telephone
1-800-667-0322

2. HAZARDS IDENTIFICATION

Classification

This chemical is considered hazardous by the 2012 OSHA Hazard Communication Standard (29 CFR 1910.1200)

<table>
<thead>
<tr>
<th>Acute toxicity - Oral</th>
<th>Category 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity - Dermal</td>
<td>Category 2</td>
</tr>
<tr>
<td>Acute toxicity - Inhalation (Dusts/Mists)</td>
<td>Category 2</td>
</tr>
</tbody>
</table>
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 Serious eye damage/eye irritation Category 1
 Respiratory sensitization Category 1

Hazards not otherwise classified (HNOC)
Not applicable

Label elements

Danger

Hazard statements
Fatal if swallowed
Fatal in contact with skin
Fatal if inhaled
Causes serious eye damage
May cause allergy or asthma symptoms or breathing difficulties if inhaled

Appearance Crystalline Powder
Physical state Solid
Odor No information available

Precautionary Statements - Prevention
Wash face, hands and any exposed skin thoroughly after handling
Do not eat, drink or smoke when using this product
Do not get in eyes, on skin, or on clothing
Do not breathe dust/fume/gas/mist/vapors/spray
Use only outdoors or in a well-ventilated area
Wear respiratory protection
Wear protective gloves/protective clothing/eye protection/face protection

IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
Immediately call a POISON CENTER or doctor
IF ON SKIN: Wash with plenty of water and soap
Immediately call a POISON CENTER or doctor
Take off immediately all contaminated clothing and wash it before reuse
IF INHALED: Remove person to fresh air and keep comfortable for breathing
Immediately call a POISON CENTER or doctor
IF SWALLOWED: Immediately call a POISON CENTER or doctor
Rinse mouth

Precautionary Statements - Storage
Store locked up
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Store in a well-ventilated place. Keep container tightly closed

Precautionary Statements - Disposal
Dispose of contents/container to an approved waste disposal plant

Other Information
Not applicable

Unknown acute toxicity
100 % of the mixture consists of ingredient(s) of unknown toxicity
0 % of the mixture consists of ingredient(s) of unknown acute oral toxicity
0 % of the mixture consists of ingredient(s) of unknown acute dermal toxicity
100 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (gas)
100 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (vapor)
0 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (dust/mist)

3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance
E.C. 250-545-5: Hygromix: (3’ R,3aS,4S,4’ R,5’ R,6R,6’ R,7S,7aS)-4-{
[(1R,2S,3R,5S,6R)-3-amino-2,6-dihydroxy-5-(methylamino)cyclohexyl]oxy}
-6’-[(1S)-1-amino-2-hydroxyethyl]-6-(hydroxymethyl)-tetrahydro-3aHspiro[1,3]dioxolo[4,5-c]
pyran-2,2’-oxane]-3’,4’,5’,7-tetrol;

<table>
<thead>
<tr>
<th>Substance</th>
<th>Chemical name</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hygromycin B</td>
<td>31282-04-9</td>
</tr>
</tbody>
</table>

*The exact percentage (concentration) of composition has been withheld as a trade secret.

4. FIRST AID MEASURES

Description of first aid measures

General advice
Immediate medical attention is required. Show this safety data sheet to the doctor in attendance.

Inhalation
If breathing has stopped, give artificial respiration. Get medical attention immediately. Remove to fresh air. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. If breathing is difficult, (trained personnel should) give oxygen. May cause allergic respiratory reaction. Avoid direct contact with skin. Use barrier to give mouth-to-mouth resuscitation. Get immediate medical advice/attention.

Eye contact
Get immediate medical advice/attention. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Keep eye wide open while rinsing. Remove contact
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lenses, if present and easy to do. Continue rinsing. Do not rub affected area.

Skin contact
Get immediate medical advice/attention. Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. May cause an allergic skin reaction.

Ingestion
Get immediate medical advice/attention. Do NOT induce vomiting. Clean mouth with water and drink afterwards plenty of water. Never give anything by mouth to an unconscious person. May produce an allergic reaction.

Self-protection of the first aider
Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination. Do not breathe vapor or mist. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device. Use personal protective equipment as required. See section 8 for more information. Avoid contact with skin, eyes or clothing.

Most important symptoms and effects, both acute and delayed

Symptoms
Coughing and/ or wheezing. Difficulty in breathing. Burning sensation. May cause allergy or asthma symptoms or breathing difficulties if inhaled. Itching. Rashes. Hives.

Indication of any immediate medical attention and special treatment needed

Note to physicians
May cause sensitization in susceptible persons. Treat symptomatically.

5. FIRE-FIGHTING MEASURES

Suitable Extinguishing Media
Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Unsuitable extinguishing media
CAUTION: Use of water spray when fighting fire may be inefficient.

Specific hazards arising from the chemical
Product is or contains a sensitizer. May cause sensitization by inhalation and skin contact.

Explosion data
Sensitivity to Mechanical Impact
None.

Sensitivity to Static Discharge
None.

Special protective equipment for fire-fighters
Firefighters should wear self-contained breathing apparatus and full firefighting turnout gear. Use personal protection equipment.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures
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Personal precautions
Avoid contact with skin, eyes or clothing. Ensure adequate ventilation. Use personal protective equipment as required. Evacuate personnel to safe areas. Do not breathe vapor or mist. Keep people away from and upwind of spill/leak.

Other Information
Refer to protective measures listed in Sections 7 and 8.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Should not be released into the environment. Do not allow to enter into soil/subsoil. Prevent product from entering drains.

Methods and material for containment and cleaning up
Methods for containment
Prevent further leakage or spillage if safe to do so.

Methods for cleaning up
Pick up and transfer to properly labeled containers.

Prevention of secondary hazards
Clean contaminated objects and areas thoroughly observing environmental regulations.

7. HANDLING AND STORAGE

Precautions for safe handling
Advice on safe handling
Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes or clothing. Take off contaminated clothing and wash before reuse. Do not breathe vapor or mist. In case of insufficient ventilation, wear suitable respiratory equipment. Handle product only in closed system or provide appropriate exhaust ventilation. Do not eat, drink or smoke when using this product. Provide extract ventilation to points where emissions occur. Remove contaminated clothing and shoes.

Conditions for safe storage, including any incompatibilities
Storage Conditions
Store locked up. Keep containers tightly closed in a dry, cool and well-ventilated place. Keep out of the reach of children.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Control parameters
Exposure Limits
The following ingredients are the only ingredients of the product above the cut-off level (or level that contributes to the hazard classification of the mixture) which have an exposure limit applicable in the region for which this safety data sheet is intended or other recommended limit. At this time, the other relevant constituents have no known exposure limits from the sources listed here.
Appropriate engineering controls

Engineering controls
- Showers
- Eyewash stations
- Ventilation systems.

Individual protection measures, such as personal protective equipment

Eye/face protection
- Tight sealing safety goggles.

Hand protection
- Wear suitable gloves. Impervious gloves.

Skin and body protection
- Impervious clothing. Wear suitable protective clothing. Long sleeved clothing. Chemical resistant apron.

Respiratory protection
- When workers are facing concentrations above the exposure limit they must use appropriate certified respirators.

General hygiene considerations
- Do not eat, drink or smoke when using this product. Wash hands before breaks and immediately after handling the product. Avoid contact with skin, eyes or clothing. Wear suitable gloves and eye/face protection. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Regular cleaning of equipment, work area and clothing is recommended. Do not breathe vapor or mist. Contaminated work clothing should not be allowed out of the workplace.

9. PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Values</th>
<th>Remarks • Method</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Solid</td>
<td>None known</td>
</tr>
<tr>
<td>Appearance</td>
<td>Crystalline Powder</td>
<td>None known</td>
</tr>
<tr>
<td>Color</td>
<td>white</td>
<td>None known</td>
</tr>
<tr>
<td>Odor</td>
<td>No information available</td>
<td>None known</td>
</tr>
<tr>
<td>Odor threshold</td>
<td>No information available</td>
<td>None known</td>
</tr>
<tr>
<td>pH</td>
<td>No data available</td>
<td>None known</td>
</tr>
<tr>
<td>Melting point / freezing point</td>
<td>No data available</td>
<td>None known</td>
</tr>
<tr>
<td>Boiling point / boiling range</td>
<td>No data available</td>
<td>None known</td>
</tr>
<tr>
<td>Flash point</td>
<td>No data available</td>
<td>None known</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No data available</td>
<td>None known</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No data available</td>
<td>None known</td>
</tr>
<tr>
<td>Flammability Limit in Air</td>
<td>No data available</td>
<td>None known</td>
</tr>
<tr>
<td>Upper flammability limit</td>
<td>No data available</td>
<td>None known</td>
</tr>
</tbody>
</table>
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10. STABILITY AND REACTIVITY

Reactivity
No information available.

Chemical stability
Stable under normal conditions.

Possibility of hazardous reactions
None under normal processing.

Conditions to avoid
Excessive heat.

Incompatible materials

Hazardous decomposition products
None known based on information supplied.

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Product Information

Inhalation
Specific test data for the substance or mixture is not available. Fatal if inhaled. (based on components). May cause sensitization in susceptible persons.

Eye contact
Specific test data for the substance or mixture is not available. Severely irritating to eyes. Causes serious eye damage. May cause burns. May cause irreversible damage to eyes.
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Skin contact
Specific test data for the substance or mixture is not available. Fatal in contact with skin. (based on components). May cause irritation. Repeated or prolonged skin contact may cause allergic reactions with susceptible persons.

Ingestion
Specific test data for the substance or mixture is not available. Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea. May cause additional affects as listed under "Inhalation". Fatal if swallowed. (based on components).

Symptoms related to the physical, chemical and toxicological characteristics

Symptoms
Coughing and/or wheezing. Difficulty in breathing. Redness. Burning. May cause blindness. Symptoms of allergic reaction may include rash, itching, swelling, trouble breathing, tingling of the hands and feet, dizziness, lightheadedness, chest pain, muscle pain, or flushing.

Numerical measures of toxicity

Acute toxicity
The following values are calculated based on chapter 3.1 of the GHS document.

<table>
<thead>
<tr>
<th></th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>ATEmix (oral)</td>
<td>13.00 mg/kg</td>
<td>-</td>
<td>2220 µg/m³ (Rat) 4 h</td>
</tr>
<tr>
<td>ATEmix (dermal)</td>
<td>50.01 mg/kg</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>ATEmix (inhalation-dust/mist)</td>
<td>0.05 mg/l</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Unknown acute toxicity
100 % of the mixture consists of ingredient(s) of unknown toxicity
0 % of the mixture consists of ingredient(s) of unknown acute oral toxicity
0 % of the mixture consists of ingredient(s) of unknown acute dermal toxicity
100 % of the mixture consists of ingredient(s) of unknown acute inhalation toxicity (gas)
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Component Information

<table>
<thead>
<tr>
<th>Chemical name</th>
<th>Oral LD50</th>
<th>Dermal LD50</th>
<th>Inhalation LC50</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hygromycin B</td>
<td>= 13 mg/kg (Rat)</td>
<td>-</td>
<td>2220 µg/m³ (Rat) 4 h</td>
</tr>
<tr>
<td>31282-04-9</td>
<td></td>
<td>-</td>
<td></td>
</tr>
</tbody>
</table>

Delayed and immediate effects as well as chronic effects from short and long-term exposure

Skin corrosion/irritation
May cause skin irritation.

Serious eye damage/eye irritation
Classification based on data available for ingredients. Causes burns. Risk of serious damage to eyes.

Respiratory or skin sensitization
May cause sensitization by inhalation.

Germ cell mutagenicity
No information available.

Carcinogenicity
No information available.
**Reproductive toxicity**
No information available.

**STOT - single exposure**
No information available.

**STOT - repeated exposure**
No information available.

**Aspiration hazard**
No information available.

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### 12. ECOLOGICAL INFORMATION

**Ecotoxicity**
The environmental impact of this product has not been fully investigated.

**Persistence and degradability**
No information available.

**Bioaccumulation**
There is no data for this product.

**Other adverse effects**
No information available.

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### 13. DISPOSAL CONSIDERATIONS

**Waste treatment methods**

**Waste from residues/unused products**
Dispose of in accordance with local regulations. Dispose of waste in accordance with environmental legislation.

**Contaminated packaging**
Do not reuse empty containers.

---

### 14. TRANSPORT INFORMATION

**DOT**

<table>
<thead>
<tr>
<th>UN/ID no.</th>
<th>Proper shipping name</th>
<th>Hazard class</th>
<th>Packing Group</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN3462</td>
<td>Toxins, extracted from living sources, solid, n.o.s. (Hygromycin B)</td>
<td>6.1 Toxic substances</td>
<td>I</td>
</tr>
</tbody>
</table>

**TDG**

<table>
<thead>
<tr>
<th>UN/ID no.</th>
<th>Proper shipping name</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN3462</td>
<td>3462 Toxins, extracted from living sources, solid, n.o.s. (Hygromycin B)</td>
</tr>
</tbody>
</table>
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Hazard class 6.1 Toxic substances
Packing Group I

MEX Not regulated

ICAO (air) Not regulated

IATA
UN Number UN3462
Transport hazard class(es) 6.1 Toxic substances
Packing Group I

IMDG
UN Number UN3462
UN proper shipping name TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID,N.O.S. (Hygromycin B)
Transport hazard class(es) 6.1 Toxic substances
Packing Group I

RID Not regulated

ADR UN Number UN3462
UN proper shipping name 3462 Toxins, extracted from living sources, solid, n.o.s. (Hygromycin B)
Transport hazard class(es) 6.1 Toxic substances
Packing Group I

ADN Not regulated

15. REGULATORY INFORMATION

International Inventories
TSCA Does not comply
DSL/NDSL Does not comply
EINECS/ELINCS Complies
ENCS Does not comply
IECSC Complies
KECL Does not comply
PICCS Does not comply
AICS Does not comply

Legend:
TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances
ENCS - Japan Existing and New Chemical Substances
IECSC - China Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
AICS - Australian Inventory of Chemical Substances
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US Federal Regulations

SARA 313
Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372.

SARA 311/312 Hazard Categories

<table>
<thead>
<tr>
<th>Hazard Category</th>
<th>Yes/No</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute health hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Chronic Health Hazard</td>
<td>Yes</td>
</tr>
<tr>
<td>Fire hazard</td>
<td>No</td>
</tr>
<tr>
<td>Sudden release of pressure hazard</td>
<td>No</td>
</tr>
<tr>
<td>Reactive Hazard</td>
<td>No</td>
</tr>
</tbody>
</table>

CWA (Clean Water Act)
This product does not contain any substances regulated as pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42).

CERCLA
This material, as supplied, does not contain any substances regulated as hazardous substances under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302) or the Superfund Amendments and Reauthorization Act (SARA) (40 CFR 355). There may be specific reporting requirements at the local, regional, or state level pertaining to releases of this material.

US State Regulations

California Proposition 65
This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

US State Regulations
This product does not contain any substances regulated by state right-to-know regulations

U.S. EPA Label Information

EPA Pesticide Registration Number
Not applicable

16. OTHER INFORMATION, INCLUDING DATE OF PREPARATION OF THE LAST REVISION

Prepared By, Quality Control. STEMCELL Technologies Canada Inc.
Revision Date 28-May-2018