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

1.1 Product Identifier
Chemical Name  Novobiocin Sodium Salt

Catalogue #  N888500

1.2 Relevant Identified Uses of the Substance or Mixture and Uses Advised Against
Product Uses  To be used only for scientific research and development. Not for use in humans or animals.

1.3 Details of the Supplier of the Safety Data Sheet
Company  Toronto Research Chemicals
2 Brisbane Road
Toronto, ON  M3J 2J8
CANADA

Telephone  +14166659696
FAX  +14166654439
Email  orders@trc-canada.com

1.4 Emergency Telephone Number
Emergency#  +14166659696 between 0800-1700 (GMT-5)

2. HAZARDS IDENTIFICATION

WHMIS Classification (Canada)
D2B  Toxic Material Causing Other Toxic Effects
    Skin Sensitizer
    Moderate Eye Irritant

2.1/2.2 Classification of the Substance or Mixture and Label Elements
GHS Hazards Classification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)
    Acute Toxicity, Oral (Category 5)
    Sensitisation, Skin (Category 1)
    Serious Eye Irritation (Category 2)

EU Classification (According to EU Regulation 67/548/EEC)
May cause sensitization by skin contact. Irritating to the eyes.

EU Risk and Safety Statements (According to EU Regulation 67/548/EEC)

<table>
<thead>
<tr>
<th>Hazard Statements</th>
<th>Hazard Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Irritant</td>
<td>Xi</td>
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</tbody>
</table>

Risk Codes and Phrases
R43  May cause sensitization by skin contact.
R36  Irritating to the eyes.

Safety Precaution Codes and Phrases
S24  Avoid contact with skin.
S37/39  Wear suitable gloves and eye/face protection.
GHS Hazards Identification (According to EU Regulation 1272/2008 and US OSHA 1910.1200)

Signal Word  Warning

GHS Hazard Statements
H303  May be harmful if swallowed.
H317  May cause an allergic skin reaction.
H319  Causes serious eye irritation.

GHS Precautionary Statements
P264  Wash hands thoroughly after handling.
P270  Do not eat, drink or smoke when using this product.
P261  Avoid breathing dust/fume/gas/mist/vapours/spray.
P280  Wear protective gloves/protective clothing/eye protection/face protection.
P302/P352  IF ON SKIN: Wash with plenty of soap and water.
P333/P313  IF ON SKIN: Wash with plenty of soap and water. If skin irritation or rash occurs: Get medical advice/attention.
P305/P351/P338  IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

2.3 Unclassified Hazards/Hazards Not Otherwise Classified
No data available

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1 Substances
Molecular Formula:  C$_{31}$H$_{35}$N$_{2}$NaO$_{11}$  Molecular Weight:  634.61
CAS Registry #:  1476-53-5  EC#:  216-023-6
Synonyms:
N-[7-[[3-O-(Aminocarbonyl)-6-deoxy-5-C-methyl-4-O-methyl-α-L-lyxo-hexopyranosyl]oxy]-4-hydroxy-8-methyl-2-oxo-2H-1-benzopyran-3-yl]-4-hydroxy-3-(3-methyl-2-butenyl)benzamide monosodium salt; Albamycin Sodium; Cathomycin Sodium; Cathomycin Sodium Lyovac; NSC 2382; Vulcamycin;

3.2 Mixtures
Not a mixture

4. FIRST AID MEASURES

4.1 Description of First Aid Measures

General Advice
If medical attention is required, show this safety data sheet to the doctor.

If Inhaled
If inhaled, move casualty to fresh air. If not breathing, give artificial respiration and consult a physician.

In Case of Skin Contact
Wash affected area with soap and water. Consult a physician if any exposure symptoms are observed.

In Case of Eye Contact
Immediately rinse eyes with plenty of water for at least 15 minutes. Consult a physician.

If Swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Do NOT induce vomiting unless advised to do so by a physician or Poison Control Center. Seek medical attention.

4.2 Most Important Symptoms and Effects, Both Acute and Delayed
Sleepiness, weight gain, mild temporary increase in serum prolactin, dizziness, weakness, restlessness, increased appetite, swelling of hands and feet, decreased blood pressure when standing, dry mouth and constipation. Mild temporary increases in glucose and liver enzyme levels and blood effects have been seen occasionally. Symptoms reported in olanzapine overdose include changes in heart rate and rhythm, slurred speech, reduced level of consciousness ranging from sedation to coma, convulsion, and muscle rigidity.

This Safety Data Sheet contains 16 sections. All 16 sections must be present for this document to be valid.
6.1 Personal Precautions, Protective Equipment and Emergency Procedures
Use recommended personal protective equipment (see Section 8). Prevent the formation of dusts and mists. Adequate ventilation must be provided to ensure dusts or mists are not inhaled.

6.2 Environmental Precautions
Material should not be allowed to enter the environment. Prevent further spillage or discharge into drains, if safe to do so.

6.3 Methods and Materials for Containment and Cleaning Up
Contain the spill and then collect using non-combustible absorbent material (such as clay, diatomaceous earth, vermiculite or other appropriate material). Place material in a suitable, sealable container and then dispose according to local/national regulations and guidance (see Section 13).

For protective equipment, refer to Section 8. For disposal, see Section 13.

6. ACCIDENTAL RELEASE MEASURES
6.1 Personal Precautions, Protective Equipment and Emergency Procedures
Use recommended personal protective equipment (see Section 8). Prevent the formation of dusts and mists. Adequate ventilation must be provided to ensure dusts or mists are not inhaled.

6.2 Environmental Precautions
Material should not be allowed to enter the environment. Prevent further spillage or discharge into drains, if safe to do so.

6.3 Methods and Materials for Containment and Cleaning Up
Contain the spill and then collect using non-combustible absorbent material (such as clay, diatomaceous earth, vermiculite or other appropriate material). Place material in a suitable, sealable container and then dispose according to local/national regulations and guidance (see Section 13).

For protective equipment, refer to Section 8. For disposal, see Section 13.

7. HANDLING AND STORAGE
7.1 Precautions for Safe Handling
Avoid contact with skin and eyes. Ventilation and proper handling are to be used to prevent the formation of dusts and mists. Normal measures for preventative fire protection. No smoking, eating or drinking around this material. Wash hands after use.

7.2 Conditions for Safe Storage, Including any Incompatibilities
Ensure container is kept securely closed before and after use. Keep in a well ventilated area and do not store with strong oxidizers or other incompatible materials (see Section 10).

Store at -20°C.

7.3 Specific End Uses
For scientific research and development only. Not for use in humans or animals.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION
8.1 Control Parameters
Contains no components with established occupational exposure limits.

8.2 Exposure Controls
Personal Protective Equipment
All recommendations below are advisory in nature and a risk assessment should be performed by the employer/end user prior to use of this product. The type of protective equipment must be selected based on the amount and concentration of the dangerous material being used in the workplace.

Eye/Face Protection
Safety glasses or safety goggles. All equipment should have been tested and approved under appropriate standards, such as NIOSH (US), CSA (Canada), or EN 166 (EU).
Skin Protection
Gloves should be used when handling this material. Gloves are to be inspected prior to use. Contaminated gloves are to be removed using proper glove removal technique so that the outer surface of the glove does not contact bare skin. Dispose of contaminated gloves after use in compliance with good laboratory practices and local requirements.

Gloves used for incidental exposures (splash protection) should be designated as “low chemical resistant” or “waterproof” by EU standard EN 374. Unrated gloves are not recommended.
Suggested gloves: AnsellPro nitrile gloves style 92-500 or 92-600, 5 mil thickness.
Penetration time has not been determined.

Gloves used for prolonged direct exposure (immersion) should be designated “chemical resistant” as per EN 734 with the resistance codes corresponding to the anticipated use of the material.
Penetration time has not been determined.

These recommendations may not apply if the material is mixed with any other chemical, or dissolved into a solution. A risk assessment must be performed to ensure the gloves will still offer acceptable protection.

Body Protection
Fire resistant (Nomex) lab coat or coveralls.

Respiratory Protection
Recommended respirators are NIOSH-approved N95 or CEN-approved FFP2 particulate respirators. These are to be only used as a backup to local exhaust ventilation or other engineering controls. If the respirator is the only means of protection, a full-face supplied air respirator must be used.

9. PHYSICAL AND CHEMICAL PROPERTIES

9.1 Information on Basic Physical and Chemical Properties

<table>
<thead>
<tr>
<th>A) Appearance</th>
<th>B) Odour</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>C) Odour Threshold</th>
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<tr>
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<table>
<thead>
<tr>
<th>E) Melting Point/Freezing Point</th>
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</thead>
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<table>
<thead>
<tr>
<th>G) Flash point</th>
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<table>
<thead>
<tr>
<th>I) Flammability (Solid/Gas)</th>
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<table>
<thead>
<tr>
<th>K) Vapour Pressure</th>
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<table>
<thead>
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<th>M) Relative Density</th>
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<table>
<thead>
<tr>
<th>O) Partition Coefficient: n-octanol/water</th>
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<tr>
<th>Q) Decomposition Temperature</th>
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<table>
<thead>
<tr>
<th>S) Explosive Properties</th>
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<tbody>
<tr>
<td>No data available</td>
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</tbody>
</table>

9.1 Other Information
no data available

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical Stability
Stable under recommended storage conditions.

10.3 Possibility of Hazardous Reactions
No data available
10.4 Conditions to Avoid
No data available

10.5 Incompatible Materials
Strong oxidizing materials.

10.6 Hazardous Decomposition Products
No data available

11. TOXICOLOGICAL INFORMATION

11.1 Information on Toxicological Effects

A) Acute Toxicity
LD50 (oral - rat) 3500 mg/kg

B) Skin Corrosion/Irritation
No data available

C) Serious Eye Damage/Irritation
Moderate skin/eye irritant.

D) Respiratory or Skin Sensitization
May cause an allergic skin reaction.

E) Germ Cell Mutagenicity
No data available

F) Carcinogenicity
No data available

G) Reproductive Toxicity/Teratogenicity
No data available

H) Single Target Organ Toxicity - Single Exposure
No data available

I) Single Target Organ Toxicity - Repeated Exposure
No data available

J) Aspiration Hazard
No data available

K) Potential Health Effects and Routes of Exposure

Inhalation
May be harmful if inhaled. May cause respiratory tract irritation.

Ingestion
May be harmful if swallowed.

Skin
May be harmful if absorbed through skin. Causes skin irritation.

Eyes
Causes eye irritation.

L) Signs and Symptoms of Exposure
Sleepiness, weight gain, mild temporary increase in serum prolactin, dizziness, weakness, restlessness, increased appetite, swelling of hands and feet, decreased blood pressure when standing, dry mouth and constipation. Mild temporary increases in glucose and liver enzyme levels and blood effects have been seen occasionally. Symptoms reported in olanzapine overdose include changes in heart rate and rhythm, slurred speech, reduced level of consciousness ranging from sedation to coma, convulsion, and muscle rigidity.

To the best of our knowledge, the chemical, physical, and toxicological properties of this material have not been thoroughly investigated.

M) Additional Information
RTECS: RD5425000

12. ECOLOGICAL INFORMATION

12.1 Toxicity
No data available

12.2 Persistence and Degradability

This Safety Data Sheet contains 16 sections. All 16 sections must be present for this document to be valid.
12.3 Bioaccumulative Potential
No data available

12.4 Mobility in Soil
No data available

12.5 Results of PBT and vPvB Assessment
No data available

12.6 Other Adverse Effects
No data available

13. DISPOSAL CONSIDERATIONS

13.1 Waste Treatment Methods
A) Product
Product may be burned in an incinerator equipped with afterburner and scrubber. Excess and expired materials are to be offered to a licensed hazardous material disposal company. Ensure that all Federal and Local regulations regarding the disposal and destruction of this material are followed.

B) Contaminated Packaging
Dispose of as above.

C) Other Considerations
Product is not to be disposed of in sanitary sewers, storm sewers, or landfills.

14. TRANSPORT INFORMATION

14.1 UN Number
DOT (US): N/A
IATA: N/A
IMDG: N/A
ADR/RID: N/A

14.2 UN Proper Shipping Name
DOT (US)/IATA:
Not dangerous goods
IMDG/ARD/RID:
Not dangerous goods

14.3 Transport Hazard Class(es)
DOT (US): N/A
IATA: N/A
IMDG: N/A
ADR/RID: N/A

14.4 Packing Group
DOT (US): N/A
IATA: N/A
IMDG: N/A
ADR/RID: N/A

14.5 Environmental Hazards
DOT (US): None
IATA: None
IMDG: None
ADR/RID: None

14.6 Special Precautions for User
None

15. REGULATORY INFORMATION

This safety data sheet complies with the requirements of WHMIS (Canada), OSHA 1910.1200 (US), and EU Regulation EC No. 1907/2006 (European Union).

15.1 Safety, Health and Environmental Regulations/Legislation Specific for the Substance or Mixture

A) Canada
DSL/NDSL Status: This product is not listed on the Canadian DSL/NDSL.

B) United States
TSCA Status: This product is not listed on the US EPA TSCA.

C) European Union
ECHA Status: This product is not registered with the EU ECHA.

15.2 Chemical Safety Assessment
No data available

16. OTHER INFORMATION

16.1 Revision History
Original Publication Date: 2/22/2013

16.2 List of Abbreviations
LD50: Median lethal dose of a substance required to kill 50% of a test population.
LC50: Median lethal concentration of a substance required to kill 50% of a test population.
LDLo: Lowest known lethal dose
TDLo: Lowest known toxic dose
16.2 Further Information

Copyright 2012. Toronto Research Chemicals Inc. Copies may be made for internal use only. The above information is believed to be correct to the best of our knowledge, but is to be only used as a guide. To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated. Please take all due care when handling this product.