SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product No 5927
Product name Doxorubicin
Reach registration number This substance/mixture contains only ingredients which have been registered, or are exempt from registration, according to Regulation (EC) No. 1907/2006.

Contains

Chemical Name (8S-cis)-10-((3-Amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxy)-7,8,9,10-tetrahydro-6,8,11-trihydroxy-8-(hydroxyacetyl)-1-methoxynaphthalene-5,12-dione hydrochloride (90 - 100%)
Index No. Not Listed
CAS No 25316-40-9
Formula C_{27}H_{30}CINO_{11}
Molecular Weight 579.98 g/mol

1.2. Relevant identified uses of the substance or mixture and uses advised against

Identified uses For research use only

1.3. Details of the supplier of the safety data sheet

Importer (Applicable in EU only) Cell Signaling Technology Europe B.V.
Schuttersveld 2
2316 ZA Leiden
The Netherlands
TEL: +31 (0)71 7200 200
FAX: +31 (0)71 891 0098
Website www.cellsignal.com
E-mail Address info@cellsignal.eu

Manufacturer Cell Signaling Technology, Inc.
3 Trask Lane
Danvers, MA 01923
United States
TEL: +1 978 867 2300
FAX: +1 978 867 2400

CHEMTREC 24 hours a day, 7 days a week, 365 days a year
+1 703 527 3887 (INTERNATIONAL) +1 800 424 9300 (NORTH AMERICA)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Regulation (EC) No. 1272/2008

Acute oral toxicity Category 4 - (H302)
2.2. Label elements

Signal word
Danger

Hazard statement(s)
H302 - Harmful if swallowed
H340 - May cause genetic defects
H350 - May cause cancer
H360FD - May damage fertility. May damage the unborn child

Precautionary statement(s)
P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P264 - Wash face, hands and any exposed skin thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301 + P312 - IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell
P308 + P313 - IF exposed or concerned: Get medical advice/attention
P330 - Rinse mouth
P405 - Store locked up
P501 - Dispose of contents/container to an approved waste disposal plant

2.3. Other hazards

For the full text of the H-phrases & EUH-phrases mentioned in this Section, see Section 16

SECTION 3: Composition/information on ingredients

3.1 Substances

Synonyms
Doxorubicin Hydrochloride;
Adriamycin;
Antineoplastic antibiotic obtained from Streptomyces peucetius;
Lipodox

Formula
C_{27}H_{30}CINO_{11}

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No</th>
<th>Weight %</th>
<th>EC No</th>
<th>Classification (1272/2008)</th>
<th>REACH Registration Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>(8S-cis)-10-((3-Amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxy)-7,8,9,10-tetrahydro-6,8,11-trihydroxy-8-(hydroxyacetyl)-1-methoxynaphthacene-5,12-dione hydrochloride</td>
<td>25316-40-9</td>
<td>100</td>
<td>246-818-3</td>
<td>Acute Tox. 4 (H302) Muta. 1B (H340) Carc. 1B (H350) Repr. 1B (H360FD) STOT RE 2 (H373)</td>
<td>no data available</td>
</tr>
</tbody>
</table>
SECTION 4: First aid measures

4.1. Description of first aid measures

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

Inhalation
Immediate medical attention is required. Move to fresh air. If not breathing, give artificial respiration.

Skin contact
Immediate medical attention is required. Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes.

Eye contact
Rinse thoroughly with plenty of water, also under the eyelids. Keep eye wide open while rinsing.

Ingestion
Do NOT induce vomiting. Immediate medical attention is required. Never give anything by mouth to an unconscious person. Drink plenty of water.

Protection of first-aiders
Use personal protective equipment. Avoid contact with skin, eyes and clothing.

4.2. Most important symptoms and effects, both acute and delayed

Flushing. Shortness of breath or cough. Headache. hypotension. chills. back pain. tightness in chest or throat.

4.3. Indication of any immediate medical attention and special treatment needed

Notes to physician
Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

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

Unsuitable Extinguishing Media
No information available.

5.2. Special hazards arising from the substance or mixture

Thermal decomposition can lead to release of irritating gases and vapors.

5.3. Advice for firefighters

Wear self-contained breathing apparatus and protective suit. Use personal protective equipment.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

For non-emergency personnel
Evacuate personnel to safe areas. Ensure adequate ventilation.

For emergency responders
Use personal protection recommended in Section 8.

6.2. Environmental precautions

Do not flush into surface water or sanitary sewer system.

6.3. Methods and material for containment and cleaning up

Methods for containment
Prevent further leakage or spillage if safe to do so. Use personal protective equipment. Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry. Take up mechanically, placing in appropriate containers for disposal. Avoid dust formation. Clean contaminated surface thoroughly.
6.4. Reference to other sections
See Sections 8 & 13 for additional information.

SECTION 7: Handling and storage

7.1. Precautions for safe handling
When using, do not eat, drink or smoke. Provide regular cleaning of equipment, work area and clothing. Avoid contact with skin, eyes and clothing. Wash hands before breaks and immediately after handling the product. Keep away from food, drink and animal feeding stuffs.

7.2. Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place.

7.3. Specific end use(s)
Use as a laboratory reagent.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.2. Exposure controls
Appropriate engineering controls
Showers, eyewash stations, and ventilation systems.

Individual protection measures, such as personal protective equipment
Eye/face protection	Tightly fitting safety goggles
Skin protection
  Hand protection	Impervious gloves.
  Other	Impervious gloves. Impervious clothing.
Respiratory protection
  In case of inadequate ventilation wear respiratory protection.

Environmental Exposure Controls
No information available.

SECTION 9: Physical and chemical properties

9.1. Information on basic 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>No information available</td>
</tr>
<tr>
<td>Appearance</td>
<td>Crystalline Powder</td>
<td></td>
</tr>
<tr>
<td>Color</td>
<td>Orange</td>
<td></td>
</tr>
<tr>
<td>Odor</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>pH</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Melting point/freezing</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Initial boiling point</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>and boiling range</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Flash point</td>
<td>No information available.</td>
<td></td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Upper flammability limit</td>
<td>No information available</td>
<td></td>
</tr>
<tr>
<td>Lower flammability limit</td>
<td>No information available</td>
<td></td>
</tr>
</tbody>
</table>
SECTION 10: Stability and reactivity

10.1. Reactivity

No information available.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous polymerization: Hazardous polymerization does not occur.

10.4. Conditions to avoid

None known based on information supplied.

10.5. Incompatible materials

No information available.

10.6. Hazardous decomposition products

None under normal use conditions.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

This material should only be handled by, or under the close supervision of, those properly qualified in the handling and use of potentially hazardous chemicals. It should be borne in mind that the toxicological and physiological properties of this compound is not well defined.

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>LD50 Oral</th>
<th>LD50 Dermal</th>
<th>LC50 Inhalation</th>
</tr>
</thead>
<tbody>
<tr>
<td>(8S-cis)-10-((3-Amino-2,3,6-trideoxy-alpha-L-lyxo-hexopyranosyl)oxy)-7,8,9,10-tetrahydro-6,8,11-trihydroxy-8-(hydroxyacetyl)-1-methoxynaphthacene-5,12-dione hydrochloride</td>
<td>698 mg/kg (Mouse)</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Information on likely routes of exposure
5927 Doxorubicin

<table>
<thead>
<tr>
<th>Inhalation</th>
<th>There is no data available for this product.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye contact</td>
<td>There is no data available for this product.</td>
</tr>
<tr>
<td>Skin contact</td>
<td>There is no data available for this product.</td>
</tr>
<tr>
<td>Ingestion</td>
<td>May be harmful if swallowed. May cause adverse cardiac effects. Reproductive Toxicity. Target Organ Effects.</td>
</tr>
</tbody>
</table>

### Symptoms

Flushing. Shortness of breath or cough. Headache. hypotension. chills. back pain. tightness in chest or throat.

### Target Organ Effects

- **Heart**: May be harmful if swallowed. May cause adverse cardiac effects. Reproductive Toxicity. Target Organ Effects.

### Skin corrosion/irritation

No information available.

### Serious eye damage/eye irritation

No information available.

### Sensitization

No information available.

### Mutagenic effects

Possible risks of irreversible effects. Doxorubicin was shown to be mutagenic in the in vitro Ames assay, and clastogenic in multiple in vitro assays (CHO cell, V79 hamster cell, human lymphoblast, and SCE assays) and the in vivo mouse micronucleus assay.

### Carcinogenic effects

Secondary oral cancers, primarily squamous cell carcinoma, have been reported from post-marketing experience in patients with long-term (more than one year) exposure.

### Reproductive toxicity

This material is classified as a Pregnancy Category D: Positive evidence of risk. Embryotoxic at doses of 1 mg/kg/day in rats and was embryotoxic and abortifacient at 0.5 mg/kg/day in rabbits. Embryotoxicity was characterized by increased embryo-fetal deaths and reduced live litter sizes. In males, may result in oligospermia, azoospermia, damage to spermatozoa and testicular tissue, resulting in possible genetic fetal abnormalities and/or permanent loss of fertility. In females of reproductive potential, may cause infertility and result in amenorrhea.

### STOT - single exposure

No information available.

### STOT - repeated exposure

Doxorubicin HCl can result in myocardial damage, including acute left ventricular failure.

### Target Organ Effects

Heart, Liver, Reproductive system.

### Aspiration Hazard

No information available.

### Other information

No information available.

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### SECTION 12: Ecological information

#### 12.1. Toxicity

No information available.

#### 12.2. Persistence and degradability

No information available.

#### 12.3. Bioaccumulative potential

- **Bioaccumulation**: No information available.
- **Bioconcentration factor (BCF)**: No information available.

#### 12.4. Mobility in soil

No information available.

#### 12.5. Results of PBT and vPvB assessment

No information available.

#### 12.6. Other adverse effects

No information available.

---

### SECTION 13: Disposal considerations

#### 13.1. Waste treatment methods

No information available.
5927 Doxorubicin

Waste from residues / unused products
Dispose of in accordance with local regulations.

Contaminated packaging
Empty containers should be taken to an approved waste handling site for recycling or disposal.

Other information
According to the European Waste Catalogue, Waste Codes are not product specific, but application specific. Waste codes should be assigned by the user based on the application for which the product was used.

SECTION 14: Transport information

IMDG/IMO
14.1 UN number
Not regulated
14.2 UN proper shipping name
Not regulated
14.3 Transport hazard class(es)
Not regulated
14.4 Packing group
Not regulated
14.5 Environmental hazards
None
14.6 Special precautions for user
None
14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not regulated

ADR/RID
14.1 UN number
Not regulated
14.2 UN proper shipping name
Not regulated
14.3 Transport hazard class(es)
Not regulated
14.4 Packing group
Not regulated
14.5 Environmental hazards
None
14.6 Special precautions for user
None

IATA
14.1 UN number
Not regulated
14.2 UN proper shipping name
Not regulated
14.3 Transport hazard class(es)
Not regulated
14.4 Packing group
Not regulated
14.5 Environmental hazards
None
14.6 Special precautions for user
None

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture

Candidate List of Substances of Very High Concern for Authorization Information
This product does not contain Substances of Very High Concern (SVHC).

SEVESO Directive Information
This product does not contain substances identified in the SEVESO Directive.

International inventories
TSCA 8(b) -
DSL/NDSL -
EINECS/ELINCS Complies
ENCS -
IECSC -
KECL Complies
PICCS -
AICS -

International inventories 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 Commercial Chemical Substances/EU List of Notified Chemical Substances
5927 Doxorubicin

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

SECTION 16: Other information

Full text of H-Statements referred to under Sections 2 and 3

- H302 - Harmful if swallowed
- H340 - May cause genetic defects if inhaled
- H350 - May cause cancer if swallowed
- H360FD - May damage fertility. May damage the unborn child

Classification procedure: Expert judgment and weight of evidence determination.
Issuing Date: 2018-03-23

Disclaimer

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.