SAFETY DATA SHEET (SDS):

Issuing Date: 2014-03-14  Revision Date: 2014-03-14  Version: 1

SECTION 1. Identification

Product identifier

Product No. 12520
Product name Vorinostat (SAHA)
UN number UN3077
Other means of identification 12520S

Recommended use of the chemical and restrictions on use

Identified uses
This product is intended for research purposes only.

Uses advised against
This product is not intended for use in diagnostic procedures or therapeutics.
This product is not intended for use in humans or animals.

Manufacturer, importer, supplier

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

Website www.cellsignal.com
Email address support@cellsignal.com
Company phone number 978-867-2300
Emergency telephone number In case of emergency call CHEMTREC 1-800-424-9300

SECTION 2. Hazard(s) identification

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

<table>
<thead>
<tr>
<th>Germ cell mutagenicity</th>
<th>Category 2</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reproductive toxicity</td>
<td>Category 1B</td>
</tr>
</tbody>
</table>

GHS Label elements, including precautionary statements

Signal Word
Danger
Hazard statement(s)
Suspected of causing genetic defects
May damage fertility or the unborn child

Precautionary Statement(s)
Obtain special instructions before use
Use personal protective equipment as required
IF exposed or concerned: Get medical advice/attention.
Dispose of contents/container to an approved waste disposal plant

Supplementary Hazard Information
Hazards not otherwise classified (HNOC) Very toxic to aquatic life.
Unknown Acute Toxicity 100% of the mixture consists of ingredient(s) of unknown acute toxicity.

SECTION 3. Composition/information on ingredients

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS No.</th>
<th>Weight %</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-hydroxy-N'-phenyloctanediamide</td>
<td>149647-78-9</td>
<td>60-100</td>
</tr>
</tbody>
</table>

SECTION 4. First-aid measures

Eye contact
Rinse thoroughly with plenty of water for at least 15 minutes, lifting lower and upper eyelids.
Consult a physician.

Skin contact
Wash skin with soap and water.

Inhalation
Move to fresh air.

Ingestion
Clean mouth with water and afterwards drink plenty of water.

Most important symptoms and effects, both acute and delayed
Diarrhea, nausea, anorexia, weight decrease, vomiting, constipation, fatigue, chills, thrombocytopenia, anemia, dysgeusia and dry mouth.

Indication of any immediate medical attention and special treatment needed
Notes to physician
Treat symptomatically. Remove unabsorbed material from the gastrointestinal tract, employ clinical monitoring, and institute supportive therapy, if required. It is not known if vorinostat is dialyzable.

Advice for emergency responders
General advice
For further assistance, contact your local Poison Control Center.

Protection of First-aiders
Ensure that medical personnel are aware of the material(s) involved, and take precautions to protect themselves.

SECTION 5. Fire-fighting measures

Extinguishing media
**SECTION 6. Accidental release measures**

**Personal precautions, protective equipment and emergency procedures**

**For non-emergency personnel**  
Ensure adequate ventilation.

**Other information**  
No information available.

**Environmental precautions**

Do not flush into surface water or sanitary sewer system.

**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**  
Use personal protective equipment. Cover powder spill with plastic sheet or tarp to minimize spreading and keep powder dry. Take up mechanically and collect in suitable container for disposal. Avoid dust formation. Clean contaminated surface thoroughly.

**SECTION 7. Handling and storage**

**Precautions for safe handling**

Handle in accordance with good industrial hygiene and safety practice.

**Conditions for safe storage, including any incompatibilities**

**Technical measures/Storage conditions**  
Keep containers tightly closed in a dry, cool and well-ventilated place.

**Packaging material**  
No information available.

**Incompatible products**  
None known based on information supplied.

**SECTION 8. Exposure controls/personal protection**

**Control parameters**

This product, as supplied, does not contain any hazardous materials with occupational exposure limits established by the region specific regulatory bodies.
Appropriate engineering controls

Showers, eyewash stations, and ventilation systems.

Individual protection measures, such as personal protective equipment

Personal protective equipment (PPE) needs to be selected depending on the implemented engineering controls, frequency/duration of work activities and the concentrations of the hazardous substance.

- **Eye/face protection**: Safety glasses with side-shields.
- **Skin and body protection**: Wear protective gloves/clothing.
- **Respiratory protection**: If exposure limits are exceeded or irritation is experienced, NIOSH/MSHA approved respiratory protection should be worn. Positive-pressure supplied air respirators may be required for high airborne contaminant concentrations. Respiratory protection must be provided in accordance with current local regulations.

Hygiene measures: Handle in accordance with good industrial hygiene and safety practice.

### SECTION 9. Physical and chemical properties

Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Physical state</th>
<th>Solid</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>Crystalline powder</td>
</tr>
<tr>
<td>Odor</td>
<td>No information available</td>
</tr>
<tr>
<td>Color</td>
<td>White to off-white</td>
</tr>
<tr>
<td>Odor Threshold</td>
<td>No information available</td>
</tr>
<tr>
<td>pH</td>
<td>6.6 saturated water solution (9.2 pKa)</td>
</tr>
<tr>
<td>Melting point/freezing point</td>
<td>151-163 °C</td>
</tr>
<tr>
<td>Initial boiling point and boiling range</td>
<td>No information available</td>
</tr>
<tr>
<td>Flash point</td>
<td>No information available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>No information available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>No information available</td>
</tr>
<tr>
<td>Upper flammability limit</td>
<td>No information available</td>
</tr>
<tr>
<td>Lower flammability limit</td>
<td>No information available</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>No information available</td>
</tr>
<tr>
<td>Vapor density</td>
<td>No information available</td>
</tr>
<tr>
<td>Relative density</td>
<td>No information available</td>
</tr>
<tr>
<td>Solubility</td>
<td>Practically insoluble</td>
</tr>
<tr>
<td>Solubility in other solvents</td>
<td>66 mg/mL in Dimethyl sulfoxide (DMSO); soluble in Ethanol (EtOH) @ 2 mg/mL with slight warming.</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>No information available</td>
</tr>
<tr>
<td>Autoignition temperature</td>
<td>No information available</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>No information available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No information available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
<td>No information available</td>
</tr>
<tr>
<td>Molecular Weight</td>
<td>264.32</td>
</tr>
<tr>
<td>VOC content</td>
<td>No information available</td>
</tr>
<tr>
<td>Viscosity</td>
<td>No information available</td>
</tr>
<tr>
<td>Density</td>
<td>No information available</td>
</tr>
</tbody>
</table>

### SECTION 10. Stability and reactivity

Reactivity

No information available.

Chemical stability

Stable under recommended storage conditions.
### Possibility of hazardous reactions

<table>
<thead>
<tr>
<th>Hazardous reactions</th>
<th>None under normal processing.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hazardous polymerization</td>
<td>None under normal processing.</td>
</tr>
</tbody>
</table>

### Conditions to Avoid

No information available.

### Incompatible Materials

None known based on information supplied.

### Hazardous Decomposition Products

None known based on information supplied.

### SECTION 11. Toxicological information

#### Information on likely routes of exposure

<table>
<thead>
<tr>
<th>Route</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalation</td>
<td>There is no data available for this product.</td>
</tr>
<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>There is no data available for this product.</td>
</tr>
</tbody>
</table>

#### 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.

**Unknown Acute Toxicity**

100% of the mixture consists of ingredient(s) of unknown acute toxicity.

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

<table>
<thead>
<tr>
<th>Effect type</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Symptoms</td>
<td>Diarrhea, nausea, anorexia, weight decrease, vomiting, constipation, fatigue, chills, thrombocytopenia, anemia, dysgeusia and dry mouth.</td>
</tr>
<tr>
<td>Corrosivity</td>
<td>No information available.</td>
</tr>
<tr>
<td>Sensitization</td>
<td>No information available.</td>
</tr>
<tr>
<td>Mutagenic effects</td>
<td>Mutagenic in vitro in the bacterial reverse mutation assays (AMES test). Caused chromosomal aberrations in vitro in Chinese hamster ovary (CHO) cells. Increased the incidence of micro-nucleated erythrocytes when administered to mice (Mouse Micronucleus Assay).</td>
</tr>
<tr>
<td>Carcinogenicity</td>
<td>No component of this product present at levels greater than or equal to 0.1% is identifiable as probable, possible or confirmed carcinogen by IARC, ACGIH, NTP, or OSHA.</td>
</tr>
<tr>
<td>Reproductive toxicity</td>
<td>This material is classified as a Pregnancy Category D: Positive evidence of risk.</td>
</tr>
<tr>
<td>STOT - single exposure</td>
<td>No information available.</td>
</tr>
<tr>
<td>STOT - repeated exposure</td>
<td>No information available.</td>
</tr>
<tr>
<td>Neurological effects</td>
<td>No information available.</td>
</tr>
<tr>
<td>Aspiration Hazard</td>
<td>No information available.</td>
</tr>
</tbody>
</table>

### SECTION 12. Ecological information

#### Ecotoxicity

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SECTION 13. Disposal considerations

Waste Disposal Methods

Dispose of in accordance with all applicable national environmental laws and regulations.

Disposal considerations

Do not empty into drains; dispose of this material and its container in a safe way.

SECTION 14. Transport information

DOT

UN number UN3077
UN proper shipping name Environmentally hazardous substance, solid, n.o.s. (N-hydroxy-N’-phenyloctanediamide)
Transport hazard class(es) 9
Packing Group III
Special precautions for user 146, 335, A112, B54, B120, IB8, IP3, N20, T1, TP33
Emergency Response Guide Number 171

IATA

UN number UN3077
UN proper shipping name Environmentally hazardous substance, solid, n.o.s. (N-hydroxy-N’-phenyloctanediamide)
Transport hazard class(es) 9
Packing Group III
Special precautions for user A158, A179, A97

IMDG/IMO

UN number UN3077
UN proper shipping name Environmentally hazardous substance, solid, n.o.s. (N-hydroxy-N’-phenyloctanediamide)
Transport hazard class(es) 9
Packing group III
EmS No. F-A, S-F
Special precautions for user 274, 335, 966, 967
SECTION 15. Regulatory information

North American Inventory Listing

<table>
<thead>
<tr>
<th>Component</th>
<th>TSCA</th>
<th>DSL</th>
<th>NDSL</th>
</tr>
</thead>
<tbody>
<tr>
<td>N-hydroxy-N'-phenyloctanediamide 149647-78-9 (60-100)</td>
<td>Not Listed</td>
<td>Not Listed</td>
<td>Not Listed</td>
</tr>
</tbody>
</table>

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

- **Acute Health Hazard**: No
- **Chronic Health Hazard**: Yes
- **Fire Hazard**: No
- **Sudden Release of Pressure Hazard**: No
- **Reactive Hazard**: No

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.

California Proposition 65

This product does not contain any Proposition 65 chemicals.

U.S. State Right-to-Know Regulations

This product does not contain any substances regulated under applicable state right-to-know regulations

U.S. EPA Label Information

This product does not contain any substances regulated as pesticides.

SECTION 16. Other information

**Issuing Date:** 2014-03-14
**Revision Date:** 2014-03-14
**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.

End of Safety Data Sheet