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MATERIAL SAFETY DATA SHEET

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M0338

SECTION 1—CHEMICAL INFORMATION

Product Name: XRN-1

SECTION 2—COMPOSITION/INFORMATION ON INGREDIENT

1. Glycerol	50%	Cas.	#56-81-6
2. NaCl	< 1%	Cas.	#7647-14-5
3. Triton X-1-00	< 1%	Cas.	#9002-93-1
4. EDTA	< 1%	Cas.	#60-00-4
5. Dithiothreitol	< 1%	Cas.	#3483-12-3
6. Tris-HCl	< 1%	Cas.	#1185-53-1

SECTION 3—HAZARDOUS IDENTIFICATION

Emergency Overview: The hazards identified with this product are those associated with the following component(s):
Glycerol.

HMIS Rating
Health: 0*
Flammability: 0
Reactivity: 0

NFPA Rating
Health: 0
Flammability: 0
Reactivity: 0

For additional information on toxicity, please refer to Sec. 11.

SECTION 4—FIRST AID MEASURES

Oral Exposure: If swallowed, wash out mouth with water provided person is conscious. Call a physician.

Inhalation Exposure: If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

Dermal Exposure: In case of contact, immediately wash skin with soap and copious amounts of water.

Eye Exposure: In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

SECTION 5—FIRE FIGHTING MEASURES

Extinguishing Media: Suitable: Water spray. Carbon Dioxide, dry chemical powder or appropriate foam.

Special Firefighting Procedures: Wear self contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Specific Hazard(s): Combustible liquid. Emits toxic fumes under fire conditions.

Flash point: 188.6°F, 87°C Method closed cup.

Flammability: N/A

Autoignition Temp: 301°C

Explosin Limits: Lower 3.5%, Upper: 42%

SECTION 6—ACCIDENTAL RELEASE MEASURES

Procedure(s) Of Personal Precaution(s): Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves and Chemical safety goggles.

Methods For Cleaning Up: Cover with dry lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Environmental Precaution(s): Avoid contaminating water supply. Avoid contaminating sewers and waterways with this material.

Procedure To Be Followed in Case Of Leak or Spill: Evacuate area.

SECTION 7—HANDLING AND STORAGE

Handling: Avoid prolonged or repeated exposure.

User Exposure: Avoid Inhalation. Avoid contact with DMSO solutions containing toxic materials or material with unknown toxicological properties. Dimethyl sulfoxide is readily absorbed through skin and may carry such materials into the body. Avoid prolonged or repeated exposure.

Storage: Keep tightly closed, away from sparks and open flames. Store in a cool dry place.

Special Requirements: Store under inert gas. Hygroscopic.

SECTION 8—EXPOSURE CONTROLS/PPE

Engineering Controls: Safety shower and eye bath. Mechanical exhaust required.

Personal Protective Equipment: Government approved respirator.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

Skin Specific: Chemical resistant

General Hygiene Measures: Wash hands thoroughly after handling. Wash contaminated clothing before use.

SECTION 9—PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Physical State: Clear Liquid	Color: Colorless
<u>Property</u>	<u>Value</u>	<u>At temperature or Pressure</u>
Molecular Weight:	78.13 AMU	
pH:	N/A	
BP/BP Range:		89°C
MP/MP Range:		18.4°C
Freezing Point:	N/A	
Vapor Pressure:	0.42 mmHg	20°C
Vapor Density:	2.7 g/l	
Saturated Vapor:	N/A	
SG/Density:	.1 g/cm ³	
Bulk Density:	N/A	
Odor Threshold:	N/A	
Volatile %:	N/A	
Voc Content:	N/A	
Water Content:	N/A	
Solvent Content:	N/A	
Evaporation Rate:	N/A	
Viscosity:	0.002 Pas	20°C
Surface Tension:	N/A	
Partition Coefficient:	Log Kow: -2.03	
Decomposition Temp:	> 190°C	
Flash Point:		88.6°F, 87°C Method: Closed cup.
Explosion Limits:		Lower: 3.5%, Upper: 42%
Flammability:	N/A	
Autoignition Temp:	01°C	
Refraction Index:	1.479	
Optical Rotation:	N/A	
Miscellaneous Data:	N/A	
Sollubility in Water:	Soluble	

N/A = not available

SECTION 10—STABILITY AND REACTIVITY

Stability: Stable

Conditions to Avoid: Moisture.

Materials to Avoid: Acid chlorides, Phosphorus halides, strong oxidizing agents, strong acids, strong reducing agents.

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Sulfur dioxides.

Hazardous Polymerization: Will not occur.

Hazardous Exothermic Reactions: Hazardous Exothermic Reactions: Methyl sulfoxide (DMSO) undergoes a violent exothermic reaction on mixing with copper wool and trichloroacetic acid. On mixing with potassium permanganate it will flash instantaneously. It reacts violently with: acid halides, cyanuric chloride, silicon tetrachloride, phosphorus trichloride and trioxide, thionyl chloride, magnesium perchlorate, silver fluoride, methyl bromide, iodine pentafluoride, nitrogen periodate, diborane, sodium hydride and perchloric and periodic acids. When heated above its boiling point methyl sulfoxide degrades giving off formaldehyde, methyl mercaptan and sulfur dioxide.

SECTION 11—TOXICOLOGICAL INFORMATION

Route of Exposure:

Skin Absorption: May be harmful if absorbed.

Contact: May cause skin irritation.

Eye Contact: May cause eye irritation.

Inhalation: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.

Ingestion: May be harmful if swallowed.

Target Organ (s) or System (s): Eyes and Skin

Toxicity Data

Inhalation

Rat

40,250 ppm

LC50

Oral

Rat

3,300 mg/kg

LD50

Skin

Rabbit

> 5,000 mg/kg

LD50

Oral

Rat

14,500 mg/kg

LD50

Remarks: Sense Organs and Special Senses (Nose, Eye, Ear and Taste): Eye: Hemorrhage. Sense Organs and Special Senses (Nose, Eye, Ear and Taste): Eye: Conjunctive irritation.

Skin

Rat

40,000 mg/kg

LD50

Intraperitoneal

Rat

8,200 mg/kg

LD50

Subcutaneous

Rat

12 gg/kg

LD50

Remarks: Behavioral: Change in motor activity (specific assay), Lungs, Thorax, or Respiration: Dyspnea.

Intravenous

Rat

5,360 mg /kg

LD50

Remarks: Behavioral: Tremor, Muscle weakness. Lungs, Thorax or Respiration: Dyspnea.

Oral

Mouse

7,920 mg /kg

LD50

Skin

Mouse

50,000 mg /kg

LD50

Intraperitoneal

Mouse

2,500 mg /kg

LD50

Subcutaneous

Mouse

14 gm/kg

LD50

Remarks: Behavioral: Change in motor activity (specific assay), Lungs, Thorax, or Respiration: Other changes. Kidney, Ureter, Bladder: Hematuria.

Irritation Data

Skin

Rabbit

4 Hours

Remarks: No irritation effect

Eyes

Rabbit

Remarks: Mild irritation effect

Skin

Rabbit

10 mg

24H

Remarks: Open irritation test

Skin

Rabbit

500 mg

24H

Remarks: Mild irritation effect

Eyes

Rabbit

100 mg

Eyes

Rabbit

500 mg

24H

Remarks: Mild irritation effect

Chronic Exposure - Carcinogen

Species: Rat

Route of Application: Oral

Dose: 59 gm/kg

Exposure Time: 81W

Frequency: I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria, Skin and Appendages: Other: Tumors.

Species: Rat

Route of Application: Subcutaneous

Dose: 220 gm/kg

Exposure Time: 82W

Frequency I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria, Skin and Appendages: Other: Tumors.

Species: Mouse

Route of Application: Oral

Dose: 65,340 mg/kg

Exposure Time: 66W

Frequency I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria. Blood: Leukemia Skin and Appendages: Other: Tumors.

Species: Mouse

Route of Application: Subcutaneous

Dose: 66 gm/kg

Exposure Time: 66W

Frequency I

Result: Tumorigenic: Equivocal tumorigenic agent by RTECS criteria, Lungs Thorax or Appendages: Other: Tumors. Skin and Appendages: Other: Tumors.

Chronic Exposure - Teratogen

Species: Mouse

Route of Application: Intraperitoneal

Dose: 210 mg/kg

Exposure Time: (6–12D PREG)

Result: Specific development Abnormalities: Central nervous system. Specific development Abnormalities: Musculoskeletal system.

Species: Mouse

Route of Application: Intraperitoneal

Dose: 5,500 mg/kg

Exposure Time: (10D PREG)

Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Hamster

Route of Application: Oral

Dose: 11 gm/kg

Exposure Time: (7D PREG)

Result: Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.

Species: Hamster

Route of Application: Intraperitoneal

Dose: 5,500 mg/kg

Exposure Time: (8D PREG)

Result: Specific development Abnormalities: Central nervous system. Specific development Abnormalities: Musculoskeletal system. Specific development Abnormalities: Craniofacial (including nose and tongue).

Species: Mouse

Route of Application: Intraperitoneal

Dose: 4,400 mg/kg

Exposure Time: (8D PREG)

Result: Effects on Embryo or Fetus: Fetus: death. Specific Developmental Abnormalities: Central nervous system.

Species: Hamster

Route of Application: Intervenous

Dose: 2,500 mg/kg

Exposure Time: (8D PREG)

Result: Specific development Abnormalities: Central nervous system. Specific development Abnormalities: Musculoskeletal system. Specific development Abnormalities: Craniofacial (including nose and tongue).

Species: Hamster

Route of Application: Intervenous

Dose: 2,500 mg/kg

Exposure Time: (8D PREG)

Result: Specific development Abnormalities: Other developmental abnormalities.

Chronic Exposure - Mutagen

Species: Human
Dose: 140 MMOL/L
Cell Type: lymphocyte
Mutation Test: Other mutation test system.

Species: Rat
Route: Intraperitoneal
Dose: 25 gm/kg
Exposure Time: 5D
Mutation Test: Cytogenetic analysis.

Species: Mouse
Route: Intraperitoneal
Dose: 75 mmol/kg
Mutation Test: DNA damage.

Species: Mouse
Route: Intraperitoneal
Dose: 93 gm/l
Cell Type: lymphocyte
Mutation Test: Cytogenetic analysis.

Species: Mouse
Dose: 1 mol/l
Cell Type: lymphocyte
Mutation Test: Mutation in mammalian somatic cells.

Species: Hamster
Dose: 19 pph
Cell Type: ovary
Mutation Test: Cytogenetic analysis.

Species: Hamster
Dose: 1 pph
Cell Type: lung
Mutation Test: Cytogenetic analysis.

Chronic Exposure - Reproductive Hazard

Species: Rat
Dose: 56 gm/kg
Route of Application: Intraperitoneal
Exposure Time: (6–12D PREG)
Result: Effects on Fertility: Abortion

Species: Rat
Dose: 6,600 mg/kg
Route of Application: Intraperitoneal
Exposure Time: (7–15D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species : Rat
Dose: 30,750 mg/kg
Route of Application: Subcutaneous
Exposure Time: (8–10D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
Effects on Fertility:Litter size (e.g., # fetuses per litter; measured before birth).

Species: Mouse
Dose: 16 mg/kg
Route of Application: Oral
Exposure Time: (5–9D PREG)
Result: Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.

Species : Mouse
Dose: 82,50 mg/kg
Route of Application: Intraperitoneal
Exposure Time: (10D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species : Mouse
Dose: 240 gm/kg
Route of Application: Intravenous
Exposure Time: (1–20D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).

Species: Hamster
Route of Application: Intervenous
Dose: 2,500 mg/kg
Exposure Time: (8D PREG)
Result: Specific development Annormalities: Central nervous system, Musculoskeletal system and Craniofacial (including nose and tongue).

Species: Hamster
Route of Application: Intervenous
Dose: 2,500 mg/kg
Exposure Time: (8D PREG)
Result: Specific development Annormalities:Other developmental abnormalities.

SECTION 12–ECOLOGICAL INFORMATION

Acute Ecotoxicity Tests

Test Type: LC50 Fish
Species : Onchorhynchus mykiss (Rainbow trout)
Time: 96h
Value: 35,000 mg/1

Test Type: EC50 Daphnia
Species : Daphnia pulex
Value: 27,500 mg/1

Test Type: EC50 Alge
Species: Lepomis macrochirus (Bluegill)
Time: 96 h
Value: > 400,000 mg/1

Test Type: LC50 Fish
Species: Pimephales promelas (Fathead minnow)
Time: 96 h
Value: 34,000 mg/1

SECTION 13–DISPOSAL CONSIDERATIONS

Appropriate Method of Disposal of Substance or Preparation

Contact a licensed professional waste disposal service to dispose of this material. This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state and local environmental regulations.

SECTION 14–TRANSPORT INFORMATION

DOT

Proper Shipping Name: Combustible Liquid n.o.s.
UN # NA1993
Class: Combustible Liquid
Packing Group: Packing Group III
Hazard Label: None
PIH: Not PIH

IATA

Non-Hazardous for Air Transport: non-hazardous for air transport.

SECTION 15–REGULATORY INFORMATION

US Classification and Label Text

US Statments: Combustible. Readily absorbed through skin. Target Organ (s): Eyes, Skin.

United States Regulatory Information:

Sara Listed: No
TSCA Inventory Item: Yes

Canada Regulatory Information WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

SECTION 16–OTHER INFORMATION

DISCLAIMER

For R&D use only. Not for drug, household or other uses.

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide.

New England Biolabs shall not be held liable for any damage resulting from handling or from contact with the above product.