SAFETY DATA SHEET

SECTION 1: IDENTIFICATION OF THE PRODUCT & THE COMPANY

a) **Product Name** : Clofarabine injection

b) **Common/ trade Name** : Clofarabine injection

c) **Chemical Name** : 2-Chloro-9-(-deoxy-2-fluoro-beta-D-arabinofuranosyl)-9H-purin-6-amine.

d) **Chemical Family** : Purine nucleoside metabolic inhibitor.

e) **Product Use** : Pharmaceutical, injectable

Product type : Regulated prescription drug

Container Information : Vial

f) **Manufacture Name** : **Gland pharma Limited**

Address : UNIT II, Block C, phase I
Vishakapatnam SEZ,
Duvvada, Visakhapatnam-530046
Andhra Pradesh , India

g) **Telephone Number for Info** : +0891 2548313

Section 2 - Hazards Identification

Classification:	Germ cell mutagenicity, Category 2 Reproductive toxicity, Category 1B Effects on or via lactation
Signal Word,	Danger
Hazard statement(s)	Suspected of causing genetic defects. May damage fertility. May damage the unborn child. May cause harm to breast-fed children. Causes damage to organs through prolonged or repeated exposure.
Precautionary statement(s):	Prevention: Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Wear protective gloves, protective clothing and eye protection. Avoid contact during pregnancy and while nursing. Wash hands thoroughly after handling. Do not eat, drink or smoke while using this product.
Description of Hazards:	Ingestion. N/A

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Section 3 – Composition / Information on Ingredients:

Chemical Name	CommonName	Percentage	CAS No.
2-chloro-9-(2-deoxy-2-fluoro- beta-D-arabinofuranosyl)-9H	Clofarabine	0.1 %	123318-82-1
Water for injection	Water	99%	7732-18-5
Sodium chloride	Sodium chloride	0.9 %	7647-14-5

Section 4 - First Aid Measures:

Eye Exposure:	In case of contact with product, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lenses if worn. Get medical attention.
Skin Exposure:	In case of contact with product, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Get medical attention if irritation develops and persists.
Ingestion:	If swallowed, call a poison center or physician immediately. Do NOT induce vomiting unless directed to do so by a physician. Never give anything by mouth to an unconscious person. Rinse mouth thoroughly with water..
Injection:	Not available
Inhalation:	If product is inhaled, remove to fresh air. If breathing is difficult, trained personnel should give oxygen. Get medical attention immediately.

Section 5 –Fire-fighting Measures

(a) **Extinguishing Media** All means: water, carbon dioxide, foam or dry chemical..

(b) Unsuitable

Extinguishing media: Strong water jet

(c) Special Protective Equipment / clothing and a self-contained breathing apparatus is Suggested.

Precautions: Use water spray to cool the fire exposed containers as well as For protection of people. Avoid Jet of water as extinguishing media

Section 6 - Accidental Release Measures:

Small Spills

If a small spill occurs within a ventilated cabinet, wear protective equipment to prevent inhalation or eye/skin contact (see Section 8). Wipe up spill with absorbent material and place in an impervious container.

Large Spills

During a large spill, evacuate non-essential personnel from the area. Wear protective equipment to prevent inhalation or eye/skin contact (see Section 8). Absorb the liquid with an inert absorbent material (e.g.

absorbent pad, clay, vermiculite, etc.). Avoid excessive physical disturbance of spill during cleanup to minimize aerosol generation.

Release to Air: Not available.
Release to Water: Not available.

SECTION 7: HANDLING AND STORAGE

General Handling: Use local exhaust ventilation. Use personal protective equipment (Protective clothes, goggles and latex gloves).

Storage Conditions : Store at 20°C to 25°C (68° to 77° F) (USP controlled room temperature

Precautions for safe Handling : Product should be used in a controlled work area. Use with adequate ventilation (see Section 8). Avoid contact with eyes, skin and clothing. To minimize hazards from accidental breakage or Spills of containers and to simplify clean -up, store and transport within secondary containers, pans or trays. Use disposable protective coatings and/or barrier sheeting in use areas where possibility of spillage exists to simplify cleanup. Do not eat, smoke or drink while handling product. Wash thoroughly after handling.

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

(a) Exposure Limits

Compound	Issuer	Type	Exposure Limit
Clofarabine	Sanofi-aventis	TWA	0.2 micrograms/m^3

(b) Engineering Controls

Ventilation:	Preparation of this product should be done in an area that is devoted solely to the preparation of hazardous drugs and is restricted to authorized personnel. This product should be prepared within a ventilated cabinet designed to protect workers and adjacent personnel from exposure. Transfers from primary packaging such as vials to dosing equipment should also be performed within a ventilated cabinet. Use closed-system, drug-transfer devices, glove bags and needleless systems within the ventilated cabinet. The final prepared product should be sealed in a plastic bag or other sealable container prior to removal from the cabinet. All waste containers in the cabinet should be sealed and wiped prior to removal for disposal.

(c) Individual Protection Measures

Respiratory Protection:	Respiratory protective equipment can only be used in place of engineering controls as a temporary measure in emergency situations or when control by other means is not feasible. Respiratory protection must be selected according to the risk from the work task or situation. In general, positive pressure, supplied air respiratory protective equipment (hood, half suit or full suit), which provides high factors of protection, is used when there is risk of airborne exposure above recommended exposure levels. All respiratory protection should be in compliance with the OSHA Respiratory Protection Standard, 29 CFR 1910.134, or other regulations applicable to the country of use
Eye/face Protection:	At a minimum, safety glasses with side shields should be worn. Wear a face shield to avoid splash incidents involving the eyes, nose and mouth when adequate engineering controls are not available
Skin Protection:	Use two pairs of impervious chemical resistant gloves with the outer one covering the gown cuff at all times, including when unpacking product shipments. Gloves should be changed every 30 minutes or when torn, punctured or contaminated and discarded immediately in the appropriate container. When working in a ventilated cabinet, the outer gloves should be removed and bagged for disposal inside the ventilated cabinet. Avoid skin contact by using a disposable gown made of non -linting and non-absorbent fabric. The gown should have a closed front, long sleeves and elastic or knit closed cuffs and should not be reused.
Other Protective Equipment:	N/A
General hygiene considerations	Health care workers who prepare or administer hazardous drugs or who work in areas where these drugs are used should follow specific workplace handling guidelines in order to prevent exposure to these agents in the air or on work surfaces, clothing, medical equipment, or in patient urine or feces. Wash hands with soap and water immediately before using personal protective clothing (such as disposable gloves and gowns) and after removing personal protective clothing, including gloves. Outer gloves and gowns should be removed and bagged for disposal in the appropriate container at the site of administration. The waste container should be double -bagged before removal of the inner gloves. Clean and decontaminate work areas before and after each activity and at the end of each shift. See Section 13 for guidance on waste handling

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Property	**Clofarabine injection**
Description	Clear, colorless liquid
Odor	Not available
Odor threshold	Not available
pH:	4.5 – 7.5

Water Solubility:	Miscible with water
Specific Gravity (g/ml):	1.006
Boiling Point (°C):	Approx. 100 °C.
Melting Point (°C):	No data available
Flash Point (°C):	No data available
Ignition Temperature (°C):	No data available
Evaporation rate	No data available
Partition coefficient (n-octanol/water)	No data available

SECTION 10: STABILITY AND REACTIVITY

Property	**Clofarabine Injection**
Reactivity	Not a reactive material under normal handling conditions.
Chemical stability	Stable under normal handling conditions.
Conditions to avoid:	Keep away from heat, sparks and flames.
Hazardous decomposition products:	Carbon monoxide, carbon dioxide, oxides of nitrogen.
Possibility of Hazardous Reactions	None known.

SECTION 11: TOXICOLOGICAL INFORMATION

The following information is for the active ingredient clofarabine unless otherwise noted:

Information on likely routes of exposure: Not expected under normal handling conditions. Unintended spills or releases could result in exposure to eyes, skin and respiratory tract.

Symptoms related to the physical, chemical and toxicological characteristics: The most common adverse effects of intravenous treatment in humans with clofarabine are gastrointestinal tract symptoms such as vomiting, nausea and diarrhea, hematologic effects including anemia (decreased red blood cells), leukopenia and neutropenia (decreased white blood cells), and thrombocytopenia (low blood platelet levels), presenting as fever, fatigue and infection.

Effects of short-term (acute) exposure: No data available.

Effects of long-term (chronic) exposure: Clofarabine is orally bioavailable and can cause adverse effects in rapidly proliferating tissues, including bone marrow, lymphoid tissue, gastrointestinal tract, liver and testes.

Acute toxicity (LD50): No data available.

Skin corrosion/irritation: Non-irritating to the skin.

Serious eye damage/irritation: Non-irritating to the eyes.

Sensitization: No data available.

Specific target organ toxicity – single exposure (STOT-SE): No data available.

Specific target organ toxicity – repeated exposure (STOT-RE): In dogs given repeat intravenous doses of clofarabine, the maximum tolerated dose (MTD) was 0.75 mg/kg/day. Clofarabine is orally bioavailable and can cause adverse effects in rapidly proliferating tissues, including bone marrow, lymphoid tissue, gastrointestinal tract, liver and testes.

Carcinogenicity: Clofarabine has not been tested for carcinogenic potential.

Not listed by NTP, not found to be a potential carcinogen by IARC or OSHA.

Reproductive toxicity and teratogenicity: Clofarabine was teratogenic in rats and rabbits. Developmental toxicity (reduced fetal body weight and increased post-implantation loss) and increased incidences of malformations and variations (gross external, soft tissue, skeletal and retarded ossification) were observed in rats receiving 54 mg/m2 /day (approximately equivalent to the recommended clinical dose on a mg/m2 basis), and in rabbits receiving 12 mg/m2 /day (approximately 23% of the recommended clinical dose on a mg/m2 basis).

Studies in mice, rats, and dogs have demonstrated dose-related adverse effects on male reproductive organs. It is not known whether clofarabine or its metabolites are excreted in human milk. Because of the potential for tumorigenicity shown for clofarabine in animal studies and the potential for serious adverse reactions, women treated with clofarabine should not nurse.

Mutagenicity: Clofarabine showed clastogenic activity in the in vitro mammalian cell chromosome aberration assay (CHO cells) and in the in vivo rat micronucleus assay. It did not show evidence of mutagenic activity in the bacterial mutation assay (Ames test).

Aspiration hazard: No data available.

SECTION 12: ECOLOGICAL CONSIDERATIONS

(a)	**Ecotoxicity**	Not Available
(b)	**Persistence and degradability**	Not Available
(c)	**Bioaccumulative potential**	Not Available
(d)	**Mobility in soil**	Not Available
(e)	**Other Adverse Effects**	Not Available

SECTION 13: DISPOSAL CONSIDERATIONS

Disposal of product waste:

Dispose of in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements. Wastes should be double

contained (e.g. double sealed bags) and labeled indicating contents to ensure safe handling and disposal. Incineration of waste product is recommended.

Disposal of Packaging waste:

Dispose of in a safe manner in accordance with federal, state and local environmental regulations.

Empty packages, containers or liners may contain product residue.

SECTION 14: TRANSPORT INFORMATION

U.S. DOT	Not a regulated material.
ICAO/IATA	Not a regulated material.
IMDG	Not a regulated material.

SECTION 15: REGULATORY INFORMATION

U.S. Regulations:

CERCLA Hazardous Substance List (40 CFR 302.4): Not listed.

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3): Not listed.

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130): Not listed.

SARA Title III:

Section 302 Extremely Hazardous Substance (40 CFR 355, Appendix A): Not listed.

Section 313 Toxic Release Inventory (40 CFR 372): Not listed.

State regulations:

California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): Not listed.

Massachusetts Right-To-Know List: Not listed.

New Jersey Right-To-Know List: Not listed.

Pennsylvania Right-To-Know List: Not listed.

SECTION 16: OTHER INFORMATION

As of the date of issuance, we are providing available information relevant to the handling of this material in the workplace. All information contained herein is offered with the good faith belief that it is accurate. THIS SAFETY DATA SHEET SHALL NOT BE DEEMED TO CREATE ANY WARRANTY OF ANY KIND (INCLUDING WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE). In the event of an adverse incident associated with this material, this safety data sheet is not intended to be a substitute for consultation with appropriately trained personnel. Nor is this safety data sheet intended to be a substitute for product literature which may accompany the finished product.

Glossary: This glossary contains definitions of general terms used in SDSs. Not all of these Glossary terms will apply to this SDS.

AIHA	American Industrial Hygiene Association
CAS Number	Chemical Abstract Service Registry Number
CERCLA	Comprehensive Environmental Response Compensation and Liability Act (of 1980)
CHAN	Chemical Hazard Alert Notice
CHEMTREC	Chemical Transportation Emergency Center
DOT	Department of Transportation
EPA	Environmental Protection Agency
HEPA	High Efficiency Particulate Air (Filter)
IARC	International Agency for Research on Cancer
ICAO/IATA	International Civil Aviation Organization/International Air Transport Association
IMO	International Maritime Organization
KOW	Octanol/Water Partition Coefficient
LEL	Lower Explosive Limit
MSDS	Material Safety Data Sheet
MSHA	Mine Safety and Health Administration
NA	Not Applicable,
NE	Not Established
NADA	New Animal Drug Application
NAIF	No Applicable Information Found
NCI	National Cancer Institute
NIOSH	National Institute for Occupational Safety and Health
NOS	Not Otherwise Specified
NTP	National Toxicology Program
OSHA	Occupational Safety and Health Administration
OEL	Occupational Exposure Limit
PEL	Permissible Exposure Limit (OSHA)
IOEL	International Occupational Exposure Limit
RCRA	Resource Conservation and Recovery Act
RQ	Reportable Quantity
RTECS	Registry of Toxic Effects of Chemical Substances

SARA	Superfund Amendments and Reauthorization Act
SDS	Safety Data Sheet
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value (ACGIH)
TPQ	Threshold Planning Quantity
TSCA	Toxic Substances Control Act
TWA	Time Weighted Average/8 Hours Unless Otherwise Noted
UEL	Upper Explosive Limit
UN	United Nations