# Safety Data Sheet

## SECTION 1: Identification

**Contact information**

**General**

Vizgen, Inc.
61 Moulton St.
Cambridge, MA 02138
Main: +1 (833) 222-8206
E-mail: info@vizgen.com

**Emergency telephone number**

Chemtrec (24-hour availability):
+1 (800) 424-9300 (USA and Canada);
+1 (703) 527-3887 (International; collect calls accepted)

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|---|---|
| **Product identifier** | MERSCOPE™ 140 Gene Panel Mix; MERSCOPE™ 300 Gene Panel Mix; MERSCOPE™ 500 Gene Panel Mix; MERSCOPE™ PanNeuro Cell Type 500 Gene Panel (Mouse); MERSCOPE™ PanCancer Pathways 500 Gene Panel (Human) |
| **Product number** | 20300006; 20300007; 20300008; 20300122; 20300123 |
| **Trade name** | Not applicable |
| **Chemical family** | Mixture |
| **Recommended uses and restrictions** | Reagent for research and development purposes only. |
| **Note** | This SDS is written to address potential worker health and safety issues associated with the handling of the formulated product/mixture. Workers manufacturing this product/mixture should consult the SDS of each hazardous ingredient for hazard information and handling recommendations. This SDS will be revisited if more data become available. |

## SECTION 2: Hazard(s) identification

**Classification of the substance or mixture**

**Reproductive toxicity Category 1B**
May damage fertility or the unborn child

**Label elements**

**GHS Hazard pictograms**

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| **GHS Signal word** | Danger |
| **GHS Hazard statements** | H360D - May damage fertility or the unborn child |
| **GHS Precautionary statements** | P201 - Obtain special instructions before use. P280 - Wear protective gloves/protective clothing/eye protection/face protection. P308+P313 - If exposed or concerned: Get medical advice/attention. P405 - Store locked up. P501 - Dispose of contents/container to hazardous or special waste collection point, in accordance with local, regional, national and/or international regulation. |
| **Other hazards** | No data were available for the mixture. The following data describe the hazards associated with the active ingredient and/or the individual ingredients where applicable.<br><br>Oligonucleotides present a low hazard following accidental ingestion or inhalation in a workplace, due to rapid breakdown in the digestive tract and low inhalation bioavailability. |

**Note** This mixture is classified as hazardous under GHS as implemented by Regulation EC No 1272/2008 (EU CLP), WHMIS 2015 (Health Canada), and Hazard Communication Standard No. 1910.1200 (US OSHA).

## SECTION 3: Composition/Information on ingredients

| Ingredient | CAS number | EINECS/ELINCS# | Amount | GHS classification |
|---|---|---|---|---|
| Formamide | 75-12-7 | 200-842-0 | < 50 % | Repr. 1B, H360D |
| Oligodeoxyribonucleic acid (unmodified, modified) | N/A | N/A | < 5 % | Not classified |

**Note** The ingredients listed above are considered hazardous. GHS classifications of formamide are based on the classification in EU - CLP Annex VI - Table 3.1. Oligodeoxyribonucleic acid (DNA) is not classified but is listed as it is considered pharmacologically active. The remaining components are non-hazardous and/or present at amounts below reportable limits. See Section 16 for full text of GHS classifications.

## SECTION 4: First-aid measures

**Description of first aid measures**

**Immediate medical attention and special treatment, if necessary** Yes.

**Inhalation** If experiencing respiratory symptoms: Call a poison center or a doctor. Immediately move exposed subject to fresh air. If not breathing, give artificial respiration. If breathing is labored, administer oxygen. Immediately notify medical personnel and supervisor.

**Skin contact** Wash exposed area with soap and water and remove contaminated clothing/shoes. If irritation occurs or persists, notify medical personnel and supervisor.

**Eye contact** If easy to do, remove contact lenses, if worn. Immediately flush eyes with copious quantities of water for at least 15 minutes. If irritation occurs or persists, notify medical personnel and supervisor.

**Ingestion** If swallowed, call a physician immediately. Do not induce vomiting unless directed by medical personnel. Do not give anything to drink unless directed by medical personnel. Never give anything by mouth to an unconscious person. Notify medical personnel and supervisor.

**Most Important Symptoms/Effects** Medical conditions aggravated by exposure: None known or reported. Treat symptomatically and supportively.

**Expected Symptoms/Effects, Acute and Delayed** See Sections 2 and 11

## SECTION 5: Fire-fighting measures

**Suitable (and unsuitable) extinguishing media**

**Suitable extinguishing media** Use water spray (fog), foam, dry powder, or carbon dioxide, as appropriate for surrounding fire and materials.

**Specific hazards arising from the chemical** No information identified. May emit carbon monoxide, carbon dioxide, oxides of nitrogen and other nitrogen-containing compounds.

**Fire hazard** No information identified. As product is an aqueous solution, it is not expected to be flammable.

**Explosion hazard** No information identified. As product is an aqueous solution, it is not expected to be explosive.

**Special protective equipment and precautions for fire-fighters**

**Firefighting instructions** In case of fire in the surroundings: use the appropriate extinguishing agent. Wear full protective clothing and an approved, positive pressure, self-contained breathing apparatus. Decontaminate all equipment after use.

## SECTION 6: Accidental release measures

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

**Protective equipment** If product is released or spilled, take proper precautions to minimize exposure by using appropriate personal protective equipment (see Section 8). Area should be adequately ventilated.

**Emergency procedures** Do not breathe vapors/mist/spray.

**Environmental precautions** Do not empty into drains. Avoid release to the environment.

**Methods and material for containment and cleaning up**

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| **Methods for cleaning up** | DO NOT CAUSE MATERIAL TO BECOME AIRBORNE. For small spills, soak up material with absorbent, e.g, paper towels. For large spills, cordon off spill area and minimize the spreading of spilled material. Soak up material with absorbent. Collect spilled material, absorbent, and rinse water into suitable containers for proper disposal in accordance with applicable waste disposal regulations (see Section 13). Decontaminate the area twice with an appropriate solvent. . |
| **Other information** | Dispose of materials or solid residues at an authorized site. |
| **Reference to other sections** | See Sections 8 and 13 for more information. |

## SECTION 7: Handling and storage

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| **Precautions for safe handling** | Follow recommendations for handling bulk formulated biochemical reagents (i.e, use of engineering controls and/or other personal protective equipment if needed). Avoid contact with eyes, skin and other mucous membranes. Wash thoroughly after handling. Do not breathe vapor/mist/spray. |

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

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| **Storage conditions** | Store at NMT -20° C, away from incompatible materials. Store protected from light. |
| **Storage temperature** | ≤ -20 °C |
| **Specific end use(s)** | Research and development. |

## SECTION 8: Exposure controls/personal protection

**Control parameters/Occupational Exposure Limits**

| Name | Issuer | Value |
|---|---|---|
| **Formamide** | ACGIH | TLV - 10 ppm (18 mg/m³) skin |
| | Alberta, Belgium, British Columbia, Bulgaria, Denmark, Finland, Ireland, Ontario, Sweden | TWA - 10 ppm (18 mg/m³) |
| | Austria | MAK-TWA - 9 ppm (16 mg/m³); skin |
| | France | VME - TWA - 20 ppm (37 mg/m³) |
| | Netherlands | MAC-TGG - 9 ppm (16 mg/m³) |
| | NIOSH | REL - 10 ppm (18 mg/m³) skin |
| | Poland | MAC-TWA - 12 ppm (23 mg/m³) skin |
| | United Kingdom | TWA - 20 ppm (37 mg/m³) |
| | United Kingdom | TWA - 30 ppm (56 mg/m³) |
| **Oligodeoxyribonucleic acid (unmodified, modified)** | No data available | No data available |

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| **Appropriate engineering controls** | Control exposures to below the OEL (for the active ingredient(s) if available). Selection and use of containment devices and personal protective equipment should be based on a risk assessment of exposure potential. Use local exhaust and/ or enclosure at aerosol/mist-generating points. Use engineered local exhaust ventilation (LEV) and/or enclosure for procedures where aerosolization may occur such as opened transfers, pumping, and spraying. Solutions can be handled outside a containment system or without LEV during procedures with no potential for aerosolization. All containers for solutions and slurries must be covered while being transferred. |
| **Respiratory protection** | Choice of respiratory protection should be appropriate to the task and the level of existing engineering controls. At a minimum, a tight-fitting full-face respirator with HEPA filters is required when performing aerosol generating operations. A powered air-purifying respirator (PAPR) with HEPA filters and head cover is required for spill cleanup. |
| **Hand protection** | Wear nitrile or other impervious gloves if skin contact is possible. When the material is diluted in an organic solvent, wear gloves that provide protection against the solvent. |
| **Eye protection** | Wear safety glasses with side shields, chemical splash goggles, or full face shield, if necessary. Base the choice of protection on the job activity and potential for contact with eyes or face. An emergency eye wash station should be available. |
| **Skin and body protection** | Wear disposable coveralls appropriate to the task, booties, and safety glasses with side shields. Ensure gloves are protective against solvents in use. Protective garments (coveralls, disposable coveralls, lab coats) are not to be worn in common areas (e.g., cafeterias) or out-of-doors. Employees must be trained in proper gowning and degowning practices |
| **Other protective measures** | Wash hands in the event of contact with this product/mixture, especially before eating, drinking or smoking. Protective equipment is not to be worn outside the work area (e.g., in common areas or out-of-doors). Decontaminate all protective equipment following use. |
| **Environmental exposure controls** | Avoid release to the environment and operate within closed systems wherever practicable. Air and liquid emissions should be directed to appropriate pollution control devices. In case of spill, do not release to drains. Implement appropriate and effective emergency response procedures to prevent release or spread of contamination and to prevent inadvertent contact by personnel. |

## SECTION 9: Physical and chemical properties

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| **Physical state** | Liquid |
| **Appearance** | Clear |
| **Formula** | Not applicable (Mixture) |
| **Molecular mass** | Not applicable (Mixture) |
| **Color** | Colorless |
| **Odor** | Ammonia-like. |
| **Odor threshold** | No data available |
| **pH** | No data available |
| **Melting point** | No data available |
| **Freezing point** | No data available |
| **Boiling point** | No data available |
| **Flash point** | No data available |
| **Relative evaporation rate (butyl acetate=1)** | No data available |
| **Flammability (solid, gas)** | No data available |
| **Vapor pressure** | No data available |
| **Relative vapor density at 20 °C** | No data available |
| **Relative density** | No data available |
| **Solubility** | Soluble in water (aqueous solution) |
| **Log Pow** | No data available |
| **Auto-ignition temperature** | No data available |
| **Decomposition temperature** | No data available |
| **Viscosity, kinematic** | No data available |
| **Viscosity, dynamic** | No data available |
| **Explosion limits** | No data available |
| **Explosive properties** | No data available |
| **Oxidizing properties** | No data available |

## SECTION 10: Stability and reactivity

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| **Reactivity** | The product is non-reactive under normal conditions of use, storage and transport. |
| **Chemical stability** | Stable under normal conditions. |
| **Possibility of hazardous reactions** | No dangerous reactions known under normal conditions of use. |
| **Conditions to avoid** | None under recommended storage and handling conditions (see section 7). |
| **Incompatible materials** | Protect from light. |
| **Hazardous decomposition products** | Under normal conditions of storage and use, hazardous decomposition products should not be produced. |

## SECTION 11: Toxicological information

**Likely routes of exposure** May be absorbed by inhalation, skin contact and ingestion.

**Toxicological information**

**Acute toxicity**

| Component | Type | Dose |
|---|---|---|
| **Formamide** | LD50 Oral rat | 4000 mg/kg |
| | LD50 Oral mouse | 2450 mg/kg |
| | LD50 Dermal rabbit | 6000 mg/kg |
| | LD50 Inhalation rat | >3900 ppm (6 hrs) |
| **Oligodeoxyribonucleic acid (unmodified, modified)** | No data available | No data available |

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| **Additional information** | No data available |
| **Serious eye damage/irritation** | In rabbits, formamide caused mild, temporary eye irritation. |
| **Skin corrosion/irritation** | Formamide was not irritating to rabbit skin. |
| **Sensitization** | No data available |
| **STOT-single exposure** | No data available |
| **STOT-repeated exposure** | In a three-month oral study in rats with formamide, dose-related increases in hematocrit values, hemoglobin concentrations, and red blood cell counts were reported at 10-160 |

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| | mg/kg, five days/week. The incidence of degeneration of the germinal epithelium of the testes and epididymis was significantly increased in 160 mg/kg males.<br><br>In a three-month study in mice with formamide, no adverse effects were reported at oral doses up to a maximum of 160 mg/kg, five days/week.<br><br>In a two-week rat inhalation study with formamide, histopathological changes in the kidneys, and reduced platelet counts were seen at 1500 ppm, six hours/day, five days per week (highest dose). Rats at 500 ppm showed reduced platelet counts only. The no-observed-adverse-effect concentration (NOAEC) was 100 ppm.<br><br>Repeated parenteral exposure of mice and rats to moderate doses of various oligonucleotides led to pro-inflammatory effects. Such effects were not reported in monkeys in similar studies. |
| **Reproductive toxicity** | In a two-generation study in mice, oral doses of formamide at 750 ppm (~200 mg/kg/day) resulted in decreased fertility rate in female parental and offspring generations. The reported NOAELs in female and males were ~100 and ~200 mg/kg/day, respectively.<br><br>Oligonucleotides are not likely to adversely affect reproduction |
| **Developmental toxicity** | Formamide was administered to pregnant rats in two studies during gestation days (GD) 6-19. In the first study, reduced fetal body weights were reported at ≥ 125 mg/kg/day, with maternal toxicity at ≥ 250 mg/kg/day. The developmental and maternal NOAELs were 62 and 125 mg/kg/day, respectively. In the second study, embryofetal malformations and/or variations, increased resorptions and fetal loss, and reduced litter sizes were reported at oral doses ≥ 100 mg/kg/day. Maternal toxicity was reported at 200 mg/kg/day. The developmental and maternal NOAELs were 50 and 100 mg/kg/day, respectively.<br><br>Oligonucleotides are not likely to adversely affect embryo/fetal development |
| **Genotoxicity** | Formamide was negative for mutagenicity in an Ames assay with and without metabolic activation. *In vivo*, an increased incidence of micronuclei was reported in mice at high doses (≥ 900 mg/kg). Overall, the weight of evidence suggests a low potential for genotoxicity.<br><br>Oligonucleotides tested in a battery of *in vitro* and *in vivo* genotoxicity studies were negative |
| **Carcinogenicity** | No carcinogenic effects were observed in a two-year rat study at oral doses of formamide of up to 80 mg/kg/day. None of the components of the mixture present at levels greater than or equal to 0.1% are listed by NTP, IARC, ACGIH or OSHA as a carcinogen |
| **Aspiration hazard** | No data available |
| **Experience with humans** | See "Section 2 - Other Hazards". |

## SECTION 12: Ecological information

**Toxicity**

| Component | Type | Concentration |
|---|---|---|
| **Formamide** | No data available | No data available |
| **Oligodeoxyribonucleic acid (unmodified, modified)** | No data available | No data available |

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| **Persistence and degradability** | No data available. |
| **Bioaccumulative potential** | No data available. |
| **Mobility in soil** | No data available |
| **Results of PBT assessment** | No data available |
| **Other adverse effects** | No data available |
| **Note** | The environmental characteristics of this product/mixture have not been fully investigated. Releases to the environment should be avoided. |

## SECTION 13: Disposal considerations

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| **Waste treatment methods** | Used product should be disposed of according to local, state, and federal regulations. All wastes containing the material should be properly labeled. Dispose of wastes in accordance to prescribed federal, state, and local guidelines, e.g, appropriately permitted chemical waste incinerator. Rinse waters resulting from spill cleanups should be discharged in an environmentally safe manner, e.g, appropriately permitted municipal or on-site wastewater treatment facility. |

## SECTION 14: Transport information

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| **Transport** | Based on the available data, this product/mixture is not regulated as a hazardous material/dangerous good under EU ADR/RID, US DOT, Canada TDG, IATA, or IMDG. |
| **UN number** | None assigned. |
| **UN proper shipping name** | None assigned. |
| **Transport hazard class(es) (DOT)** | None assigned. |
| **Packing group** | None assigned. |
| **Marine pollutant** | Based on the available data, this product/mixture is not regulated as an environmental hazard or a marine pollutant. |
| **Special transport precautions** | Avoid release to the environment. |
| **Transport in bulk according to Annex II of Marpol and the IBC Code** | Not applicable |

## SECTION 15: Regulatory information

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| **Safety, health and environmental regulations/legislation specific for the substance or mixture** | This SDS generally complies with the requirements listed under current guidelines in the US, EU and Canada. Consult your local or regional authorities for more information. |
| **Chemical safety assessment** | No chemical safety assessment has been carried out. |
| **TSCA** | All components of this product are listed as active, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory. |
| **SARA Section 313 - Emission Reporting** | This substance or mixture is not known to contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372. |
| **California Proposition 65** | California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm. |
| **Additional information** | This SDS generally complies with the requirements listed under current guidelines in the US, EU and Canada. Consult your local or regional authorities for more information. |

## SECTION 16: Other information

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| **Full text of H phrases and GHS classification** | Repr. 1B - Reproductive toxicity Category 1B. .<br>H360D - May damage the unborn child.. |
| **Data sources** | Information from published literature and internal company data. |
| **Abbreviations and acronyms** | ACGIH - American Conference of Governmental Industrial Hygienists; ADR/RID - European Agreement Concerning the International Carriage of Dangerous Goods by Road/Rail; AIHA - American Industrial Hygiene Association; CAS# - Chemical Abstract Services Number; CLP - Classification, Labelling, and Packaging of Substances and Mixtures; DNEL - Derived No Effect Level; DOT - Department of Transportation; EINECS - European Inventory of New and Existing Chemical Substances; ELINCS - European List of Notified Chemical Substances; EU - European Union; GHS - Globally Harmonized System of Classification and Labeling of Chemicals; IARC - International Agency for Research on Cancer; IDLH - Immediately Dangerous to Life or Health; IATA - International Air Transport Association; IMDG - International Maritime Dangerous Goods; LOEL - Lowest Observed Effect Level; LOAEL - Lowest Observed Adverse Effect Level; NIOSH - The National Institute for Occupational Safety and Health; NMT - Not More Than; NOEL - No Observed Effect Level; NOAEL - No Observed Adverse Effect Level; NTP - National Toxicology Program; OEL - Occupational Exposure Limit; OSHA - Occupational Safety and Health Administration; PBT - Persistent, Bioaccumulative, and Toxic; PNEC - Predicted No Effect Concentration; SARA - Superfund Amendments and Reauthorization Act; STOT - Specific Target Organ Toxicity; STEL - Short Term Exposure Limit; TDG - Transportation of Dangerous Goods; TSCA - Toxic Substances Control Act; TWA - Time Weighted Average; vPvB - Very Persistent and Very Bioaccumulative; WHMIS - Workplace Hazardous Materials Information System |
| **Issue date** | March 2023 |
| **Current revision** | B |
| **Indication of changes** | This is the second version of this SDS |

**Disclaimer**

The above information is based on data available to us and is believed to be correct. Since the information may be applied under conditions beyond our control and with which we may be unfamiliar, we do not assume any responsibility for the results of its use and all persons receiving it must make their own determination of the effects, properties and protections which pertain to their particular conditions. No representation, warranty, or guarantee, express or implied (including a warranty of fitness or merchantability for a particular purpose), is made with respect to the materials, the accuracy of this information, the results to be obtained from the use thereof, or the hazards connected with the use of the material. Caution should be used in the handling and use of the material because it is a biochemical reagent. The above information is offered in good faith and with the belief that it is accurate. As of the date of issuance, we are providing all information relevant to the foreseeable handling of the material. However, in the event of an adverse incident associated with this product, this Safety Data Sheet is not, and is not intended to be, a substitute for consultation with appropriately trained personnel.