

**THE UNIVERSITY OF WESTERN ONTARIO
BIOLOGICAL AGENTS REGISTRY FORM**
Approved Biohazards Subcommittee: October 14, 2010
Biosafety Website: www.uwo.ca/humanresources/biosafety/

This form must be completed by each Principal Investigator holding a grant administered by the University of Western Ontario (UWO) or in charge of a laboratory/facility where the use of Level 1, 2 or 3 biological agents is described in the laboratory or animal work proposed. The form must also be completed if any work is proposed involving animals carrying zoonotic agents infectious to humans or involving plants, fungi, or insects that require Public Health Agency of Canada (PHAC) or Canadian Food Inspection Agency (CFIA) permits.

This form must be updated at least every 3 years or when there are changes to the biological agents being used.

Containment Levels will be established in accordance with Laboratory Biosafety Guidelines, 3rd edition, 2004, Public Health Agency of Canada (PHAC) or Containment Standards for Veterinary Facilities, 1st edition 1996, Canadian Food Inspection Agency (CFIA).

Completed forms are to be returned to Occupational Health and Safety, (OHS), (Support Services Building, Room 4190) for distribution to the Biohazards Subcommittee. For questions regarding this form, please contact the Biosafety Officer at extension 81135 or biosafety@uwo.ca. If there are changes to the information on this form (excluding grant title and funding agencies), contact Occupational Health and Safety for a modification form. See website: www.uwo.ca/humanresources/biosafety/

PRINCIPAL INVESTIGATOR	<u>Harvey Goldberg</u>
DEPARTMENT	<u>Dentistry</u>
ADDRESS	<u>DSB 0019</u>
PHONE NUMBER	<u>#82182</u>
EMERGENCY PHONE NUMBER(S)	<u>519 661-2182</u>
EMAIL	<u>hagoldbe@uwo.ca</u>

Location of experimental work to be carried out: Building(s) DSB Room(s) 0019,0021, 0032, 0024A

*For work being performed at Institutions affiliated with the University of Western Ontario, the Safety Officer for the Institution where experiments will take place must sign the form prior to its being sent to the University of Western Ontario Biosafety Officer (See Section 15.0, Approvals).

FUNDING AGENCY/AGENCIES: CIHR and AO Foundation

GRANT TITLE(S): 1) Functional Characterization of Bone Sialoprotein. 2) Peptidmonetics and Proteomic Modulators of Pro-inflammatory Functions of Osteopontin. 3) Delivery of Bone Sialoprotein Within Scaffolds for Enhanced Bone Repair.

List all personnel working under Principal Investigators supervision in this location:

<u>Name</u>	<u>UWO E-mail Address</u>	<u>Date of Biosafety Training</u>
<u>Hong Hong Chen</u>	<u>Hchen38@uwo.ca</u>	<u>Sept.26, 2002</u>
<u>Michelle Siqueira</u>	<u>michellefsiqueira@gmail.com</u>	<u>Oct.19, 2009</u>
<u>Yohannes Soenjaya</u>	<u>ysoenjaya@uwo.ca</u>	<u>Sept.14,2009</u>
<u>Erik Holm</u>	<u>eholm@uwo.ca</u>	<u>Sept. 2008</u>

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Please explain the biological agents and/or biohazardous substances used and how they will be stored, used and disposed of. Projects without this description will not be reviewed.

Biological materials waste generated during culture are bleached immediately after use.

All the containers used for the materials mentioned above (including culture flasks, plates, tips, pipettes) are autoclaved before disposal. Thus after use, they are stored in appropriate bags, bags sealed and material autoclaved (autoclave generally once a week).

After animal related experiments, animal bodies are temporarily stored at -20 C, and transferred to the cold room in animal facility (MSB 6th floor) on a routine basis for incineration.

Stock adenoviruses are stored at -80^oC. Stock mammalian cells are stored in liquid nitrogen or -80^oC freezer and bacteria stocks are stored at -80^oC.

Please include a one page research summary or teaching protocol.

FUNCTIONAL CHARACTERIZATION OF MINERAL ASSOCIATED PROTEINS

Background: Studies by us and others have shown that bone sialoprotein (BSP) and osteopontin (OPN) plays central roles in the development and turnover of bone. Furthermore, expression of OPN in soft tissues and biological fluids is believed related to its role as an inhibitor of mineralization, in addition to its demonstrated roles in inflammatory processes and wound repair. To date, our ongoing structure-function analyses of BSP have identified the collagen-binding site and two hydroxyapatite (HA)-nucleating poly-glutamic acid [poly(E)] sequences as well as providing some insight into the mechanisms of these activities. We have also shown that integrin engagement by the arginine-glycine-aspartic acid (RGD) sequence of BSP, and in part OPN, promotes differentiation of osteoblasts, NFATc1 translocation and bone resorption by osteoclasts, and upregulation of specific signaling pathways in chondrocytes. However, understanding of the mechanisms by which BSP interacts with HA and collagen remains elusive. In addition to studies of OPN in mineralized tissues, we are indirectly involved in studies on inflammatory processes and wound repair mediated by this protein. We have developed the reagents, techniques and concepts necessary to identify the key details of the structure-function relationships of BSP and OPN. The studies are focused on determining the mechanism of biomineralization mediated by BSP and its interaction with collagen, in addition to understanding the multiple roles of OPN.

A number of related studies utilize various in vitro and in vivo techniques. Primarily we develop and test protein reagents isolated from rat and bovine bone, or prokaryotically-expressed wild type and mutated BSP and OPN both as full-length proteins and peptides. We have transgenic mice that are used for isolation of cells and for certain in vivo studies, procedures which are also performed on wild type mice and rats. We have a variety of adenoviral expression constructs for OPN and BSP that we use to transduce cells to express the proteins of interest. Furthermore we have several different eukaryotic and prokaryotic cell lines which are used to create the reagents or to perform functional analysis including intracellular signaling and differentiation. In addition, my lab is involved in other studies that utilize only biophysical techniques to study protein-mineral interactions, though some of the experiments are performed elsewhere or in collaboration with others.

Current Projects:

To identify the BSP-binding domain in type I collagen and determine the physiological relevance of this interaction.

To define the motifs which contribute to the HA-nucleating activity of BSP.

To determine the mechanism by which BSP nucleates HA.

To delineate the signaling pathways mediated by BSP and OPN interaction in bone cells.

To develop therapeutic reagents to promote bone repair utilizing active domains of our proteins in combination of growth factors and/or osteoprogenitor cells or possibly mesenchymal stem cells in scaffolds composed of poly(ester)-urethane or collagen.

Significance: Our studies of BSP and OPN will lead to new insights into the mechanisms underlying biomineralization in bone. Precise identification of the domains and mechanisms of action of BSP and OPN will allow us to design novel therapeutics for bone repair and replacement and to improve the osseous integration of orthopaedic implants, in addition to addressing pathological calcifications including kidney stone and atherosclerosis.

1.0 Microorganisms

1.1 Does your work involve the use of biological agents? **X YES** NO
(non-pathogenic and pathogenic biological agents including but not limited to bacteria and other microorganisms, viruses, prions, parasites or pathogens of plant or animal origin)? If no, please proceed to Section 2.0

Do you use microorganisms that require a permit from the CFIA?

YES

NO

If YES, please give the name of the species. _____

What is the origin of the microorganism(s)? _____

Please describe the risk (if any) of escape and how this will be mitigated:

Please attach the CFIA permit.

Please describe any CFIA permit conditions:

1.2 Please complete the table below:

Name of Biological Agent(s)* (Be specific)	Is it known to be a human pathogen? YES/NO	Is it known to be an animal pathogen? YES/NO	Is it known to be a zoonotic agent? YES/NO	Maximum quantity to be cultured at one time? (in Litres)	Source/Supplier	PHAC or CFIA Containment Level
E.coli XL-1	Yes <input checked="" type="checkbox"/> No	Yes <input checked="" type="checkbox"/> No	Yes <input checked="" type="checkbox"/> No	0.3 litres	Stratagene	X 1 2 2+ 3
E.coli XL-10	Yes <input checked="" type="checkbox"/> No	Yes <input checked="" type="checkbox"/> No	Yes <input checked="" type="checkbox"/> No	0.3 Litres	Stratagene	X 1 2 2+ 3
E.coli BL-21	Yes <input checked="" type="checkbox"/> No	Yes <input checked="" type="checkbox"/> No	Yes <input checked="" type="checkbox"/> No	Less than 10 Litres	Novagene	X 1 2 2+ 3
Adenovirus	<input checked="" type="checkbox"/> Yes No	Yes <input checked="" type="checkbox"/> No	Yes <input checked="" type="checkbox"/> No	0.10 -0.15 Litres	Invitrogen	1 X 2 2+ 3

*Please attach a Material Safety Data Sheet or equivalent from the supplier.

2.0 Cell Culture

2.1 Does your work involve the use of cell cultures?

YES

NO

If no, please proceed to Section 3.0

2.2 Please indicate the type of primary cells (i.e. derived from fresh tissue) that will be grown in culture:

Cell Type	Is this cell type used in your work?	Source of Primary Cell Culture Tissue	AUS Protocol Number
Human	Yes <input checked="" type="checkbox"/> No		Not applicable
Rodent	<input checked="" type="checkbox"/> Yes No	calvaria, long bone	2008-092
Non-human primate	Yes <input checked="" type="checkbox"/> No		
Other (specify)	Yes <input checked="" type="checkbox"/> No		

2.3 Please indicate the type of established cells that will be grown in culture in:

Cell Type	Is this cell type used in your work?	Specific cell line(s)*	Containment Level of each cell line	Supplier / Source of cell line(s)
Human	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	HEK293	2	ATCC
Rodent	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	MC3T3 ROS17.28 C3H/10T1/2 ATDC5	2	ATCC for all; ATDC5 obtained from Dr. Beier
Non-human primate	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			
Other (specify)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No			

*Please attach a Material Safety Data Sheet or equivalent from the supplier. (For more information, see www.atcc.org)

2.4 For above named cell types(s) indicate PHAC or CFIA containment level required 1 2 2+
 3

3.0 Use of Human Source Materials

3.1 Does your work involve the use of human source materials? YES NO
 If no, please proceed to Section 4.0

3.2 Indicate in the table below the Human Source Material to be used.

Human Source Material	Source/Supplier /Company Name	Is Human Source Material Infected With An Infectious Agent? YES/UNKNOWN	Name of Infectious Agent (If applicable)	PHAC or CFIA Containment Level (Select one)
Human Blood (whole) or other Body Fluid		<input type="checkbox"/> Yes <input type="checkbox"/> Unknown		<input type="radio"/> 1 <input type="radio"/> 2 <input type="checkbox"/> 2+ <input type="radio"/> 3
Human Blood (fraction) or other Body Fluid		<input type="checkbox"/> Yes <input type="checkbox"/> Unknown		<input type="radio"/> 1 <input type="radio"/> 2 <input type="checkbox"/> 2+ <input type="radio"/> 3
Human Organs or Tissues (unpreserved)		<input type="checkbox"/> Yes <input type="checkbox"/> Unknown		<input type="radio"/> 1 <input type="radio"/> 2 <input type="checkbox"/> 2+ <input type="radio"/> 3
Human Organs or Tissues (preserved)		Not Applicable		Not Applicable

4.0 Genetically Modified Organisms and Cell lines

4.1 Will genetic modifications be made to the microorganisms, biological agents, or cells described in Sections 1.0 and 2.0? YES NO If no, please proceed to Section 5.0

4.2 Will genetic modification(s) involving plasmids be done? YES, complete table below NO

CELLS Used for Cloning *	Plasmid(s) **	Source of Plasmid	Gene Transfected	Describe the change that results from transformation or transfection
E.coli XL10	pET28a(+)	Stratagene	Bone sialoprotein and osteopontin genes transformed	Amplified the wild type and mutated plasmids. Plasmids used for bacterial (BL21)

				expression of proteins

* Please attach a Material Data Sheet or equivalent if available.
** Please attach a plasmid map.

4.3 Will genetic modification(s) of bacteria and/or cells involving viral vectors be made?

YES, complete table below NO

Virus Used for Vector Construction	Vector(s) *	Source of Vector	Gene(s) Transduced	Describe the change that results from transduction
Adenovirus	pAd/cmv/V5-DEST	Invitrogen	Bone sialoprotein, osteopontin	When transfect into primary cells cause alteration in osteoblast differentiation

* Please attach a Material Safety Data Sheet or equivalent.

4.4 Will genetic sequences from the following be involved?

- ◆ HIV YES, please specify _____ NO
- ◆ HTLV 1 or 2 or genes from any Level 1 or Level 2 pathogens YES, specify _____ NO
- ◆ SV 40 Large T antigen YES NO
- ◆ E1A oncogene YES NO
- ◆ Known oncogenes YES, please specify _____ NO
- ◆ Other human or animal pathogen and or their toxins YES, please specify HEK cells have adenoviral replication genes incorporated into their genome

4.5 Will virus be replication defective? YES NO

4.6 Will virus be infectious to humans or animals? YES NO

4.7 Will this be expected to increase the containment level required? YES NO

5.0 Human Gene Therapy Trials

5.1 Will human clinical trials be conducted involving a biological agent? YES NO
(including but not limited to microorganisms, viruses, prions, parasites or pathogens of plant or animal origin)

If no, please proceed to Section 6.0

5.2 If YES, please specify which biological agent will be used: _____
Please attach a full description of the biological agent.

5.2 Will the biological agent be able to replicate in the host? YES NO

5.3 How will the biological agent be administered? _____

5.4 Please give the Health Care Facility where the clinical trial will be conducted: _____

5.5 Has human ethics approval been obtained? YES, number: _____ NO PENDING

6.0 Animal Experiments

6.1 Will live animals be used? YES NO If no, please proceed to section 7.0

6.2 Name of animal species to be used rat and mouse

6.3 AUS protocol # 2009-008

6.4 Will any of the agents listed in section 4.0 be used in live animals YES, specify: _____ X
NO

6.5 Will the agent(s) be shed by the animal: YES X **NO**, please justify:

9.7 Do you use insects that require a permit from the CFIA permit? YES NO
If YES, Please attach the CFIA permit & describe any CFIA permit conditions:

10.0 Plants

10.1 Do you use plants? YES NO If no, please proceed to Section 11.0

10.2 If YES, please give the name of the species. _____

10.3 What is the origin of the plant? _____

10.4 What is the form of the plant (seed, seedling, plant, tree...)? _____

10.5 What is your intention? Grow and maintain a crop "One-time" use

10.6 Do you do any modifications to the plant? YES NO
If yes, please describe: _____

10.7 Please describe the risk (if any) of loss of the material from the lab and how this will be mitigated:

10.8 Is the CFIA permit attached? YES NO
If YES, Please attach the CFIA permit & describe any CFIA permit conditions:

11.0 Import Requirements

11.1 Will any of the above agents be imported? YES, please give country of origin _____
 NO

If no, please proceed to Section 12.0

11.2 Has an Import Permit been obtained from HC for human pathogens? YES NO

11.3 Has an import permit been obtained from CFIA for animal or plant pathogens? YES NO

11.4 Has the import permit been sent to OHS? YES, please provide permit # _____ NO

12.0 Training Requirements for Personnel Named on Form

All personnel named on the above form who will be using any of the above named agents are required to attend the following training courses given by OHS:

- ◆ Biosafety
- ◆ Laboratory and Environmental/Waste Management Safety
- ◆ WHMIS (Western or equivalent)
- ◆ Employee Health and Safety Orientation

As the Principal Investigator, I have ensured that all of the personnel named on the form who will be using any of the biological agents in Sections 1.0 to 9.0 have been trained.

M. Goldberg

SIGNATURE _____

13.0 Containment Levels

13.1 For the work described in sections 1.0 to 9.0, please indicate the highest HC or CFIA Containment Level required. 1 2 2+ 3

13.2 Has the facility been certified by OHS for this level of containment?
 YES, date of most recent biosafety inspection: ___ Oct 19, 2010
 NO, please certify
 NOT REQUIRED for Level 1 containment

13.3 Please indicate permit number (not applicable for first time applicants): _____

14.0 Procedures to be Followed

14.1 Please describe additional risk reduction measures will be taken beyond containment level 1, 2, 2+ or 3 measures, that are unique to this agent.

____ NA _____

14.2 Please outline what will be done if there is an exposure to the biological agents listed, such as a needlestick injury or an accidental splash:

Thorough washing of related body parts that become exposed (sink, for hands, arms; eye wash station for face/eyes;

14.3 As the Principal Investigator, I will ensure that this project will follow the Western Biosafety Guidelines and Procedures Manual for Containment Level 1 & 2 Laboratories (and the Level 3 Facilities Manual for Level 3 projects). I will ensure that UWO faculty, staff and students working in my laboratory have an up-to-date Hazard Communication Form, found at <http://www.wph.uwo.ca/>

M. Goldberg

SIGNATURE

Date: January 31, 2011

15.0 Approvals

1) UWO Biohazards Subcommittee: SIGNATURE: _____
Date: _____

2) Safety Officer for the University of Western Ontario
SIGNATURE: _____
Date: _____

3) Safety Officer for Institution where experiments will take place (if not UWO):

SIGNATURE: _____

Date: _____

Approval Number: _____ Expiry Date (3 years from Approval):

Special Conditions of Approval:



Office of Biohazard Containment and Safety
Science Branch, CFIA
53 Camelot Drive, Ottawa, Ontario K1A 0Y9
Tel: (613) 221-7068 Fax: (613) 228-6129
Email: ImportZooopath@inspection.gc.ca

Bureau du confinement des biohazards et sécurité
Direction générale des sciences, ACIA
53 promenade Camelot, Ottawa, Ontario K1A 0Y9
Tél: (613) 221-7068 Téléc: (613) 228-6129
Courriel: ImportZooopath@inspection.gc.ca

October 20th, 2009

Ms. Shamila Survery / Mr. Michael Decosimo
Cedarlane Laboratories Ltd
4410 Paletta Court
Burlington, Ontario L7L 5R2

By Facsimile: (289) 288-0020

SUBJECT: Importation of *Escherichia coli* strains

Dear Ms. Survery / Mr. Decosimo:

Our office received your query about the importation of *Escherichia coli* from the American Type Culture Collection (ATCC) located in Manassas, Virginia, United States. The following *Escherichia coli* strains are considered to be level 1 animal pathogens:

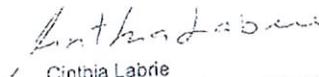
- 5K
- 58
- 58-161
- 679
- 1532
- AB284
- AB311
- AB1157
- AB1206
- AG1
- B
- BB4
- BD792
- BL21
- BL21 (DE3)
- BM25.8
- C
- C-1a
- C-3000
- C25
- C41 (DE3)
- C43 (DE3)
- C600
- Cavalli Hfr
- CIE85
- DH1
- DH10 GOLD
- DH10B
- DH5
- DH5-alpha
- DP50
- DY145
- DY380
- E11
- EJ183
- EL250
- EMG2
- EPI 300
- EZ10
- FDA Seattle 1946
- Fusion-Blue
- H1443
- HF4714
- HB101
- HS(PFAMP)R
- Hfr3000
- Hfr3000 X74
- HMS174
- J52
- J53
- JC3272
- JC7661
- JC9387
- JF1504
- JF1508
- JF1509
- JJ055
- JM83
- JM101
- JM109
- K12
- KC8
- KA802
- KAM32
- KAM33
- KAM43
- LE450
- LE451
- LE452
- MB408
- MBX1928
- MC1061
- MC4100 (MuLac)
- MG1655
- MM294
- MS101
- NC-7
- Nissle 1917
- One Shot STBL3
- OP50
- P678
- PA3C9
- PK-5
- PMC103
- PR13
- Rri
- RV308
- S17-1λ -PIR
- SCS1
- SMR10
- SOLR
- SuperchargeEZ10
- SURE
- TOP10
- TG1
- U5/41
- W208
- W945
- W1485
- W3104
- W3110
- WA704
- WP2
- X1854
- X2160T
- X2541
- X2547T
- XL1-BLUE
- XL1-BLUE-MRF
- XL0LR
- Y10
- Y1090 (1090)
- YN2980
- W311C
- WG1
- WG439
- WG443
- WG445

The Office of Biohazard Containment and Safety (BCS) of the Canadian Food Inspection Agency (CFIA) only issues import permits for microorganisms that are pathogenic to animals, or parts of microorganisms that are pathogenic to animals. As the products listed above are not considered pathogenic to animals, the Office of BCS does not have any regulatory requirements for their importation.

Please note that other legislation may apply. You may wish to contact the Public Health Agency of Canada's (PHAC) Office of Laboratory Security at (613) 957-1779.

Note: Microorganisms pathogenic to animals and veterinary biologics require an import permit from the CFIA.

Sincerely,


Cynthia Labrie
Head, Animal Pathogen Importation Program
Office of Biohazard Containment & Safety

Canada

Material Safety Data Sheet

Stratagene XL1-Blue Competent Cells, Catalog #200249

1. Product and company identification

Product name : Stratagene XL1-Blue Competent Cells, Catalog #200249

Part No. : pUC18 Control Plasmid 200231-42
DNA
1.42 M 2- 210200-43
Mercaptoethanol
XL1-Blue Competent 200236-41
Cells

Manufacturer / Supplier : Agilent Technologies, Inc.
1834 State Highway 71 West
Cedar Creek, TX 78612

Emergency telephone number : 1-800-894-1304

Use of the substance/preparation : Chemical Kit

Validation date : 01/09/2009

2. Hazards identification

Physical state : pUC18 Control Plasmid Liquid.
DNA
1.42 M 2-Mercaptoethanol Liquid.
XL1-Blue Competent Liquid.
Cells

Odor : pUC18 Control Plasmid Not available.
DNA
1.42 M 2-Mercaptoethanol Not available.
XL1-Blue Competent Not available.
Cells

OSHA/HCS status : pUC18 Control Plasmid While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product.
DNA
1.42 M 2-Mercaptoethanol This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
XL1-Blue Competent This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Cells

Emergency overview-Signal Word : WARNING !

Emergency overview-Label Statement : pUC18 Control Plasmid NOT EXPECTED TO PRODUCE SIGNIFICANT ADVERSE HEALTH EFFECTS WHEN THE RECOMMENDED INSTRUCTIONS FOR USE ARE FOLLOWED.
DNA
1.42 M 2-Mercaptoethanol HARMFUL IF SWALLOWED. CAUSES EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION.
XL1-Blue Competent HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
Cells

2. Hazards identification

	pUC18 Control Plasmid DNA	No known significant effects or critical hazards. Avoid prolonged contact with eyes, skin and clothing.
	1.42 M 2-Mercaptoethanol	Toxic if swallowed. Irritating to eyes and skin. May cause sensitization by skin contact. Do not breathe vapor or mist. Do not ingest. Do not get on skin or clothing. Avoid contact with eyes. Wash thoroughly after handling.
	XL1-Blue Competent Cells	Toxic if swallowed. Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Contains material that may cause target organ damage, based on animal data. Wash thoroughly after handling.
	pUC18 Control Plasmid DNA	Not available.
	1.42 M 2-Mercaptoethanol	Not available.
	XL1-Blue Competent Cells	Contains material which may cause damage to the following organs: blood, kidneys, gastrointestinal tract, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.
Routes of entry	: pUC18 Control Plasmid DNA	Eye contact. Ingestion.
	1.42 M 2-Mercaptoethanol	Dermal contact. Eye contact. Inhalation. Ingestion.
	XL1-Blue Competent Cells	Eye contact. Inhalation. Ingestion.
Potential acute health effects		
Eyes	: pUC18 Control Plasmid DNA	No known significant effects or critical hazards.
	1.42 M 2-Mercaptoethanol	Irritating to eyes.
	XL1-Blue Competent Cells	No known significant effects or critical hazards.
Skin	: pUC18 Control Plasmid DNA	No known significant effects or critical hazards.
	1.42 M 2-Mercaptoethanol	Irritating to skin. May cause sensitization by skin contact.
	XL1-Blue Competent Cells	No known significant effects or critical hazards.
Inhalation	: pUC18 Control Plasmid DNA	No known significant effects or critical hazards.
	1.42 M 2-Mercaptoethanol	No known significant effects or critical hazards.
	XL1-Blue Competent Cells	No known significant effects or critical hazards.
Ingestion	: pUC18 Control Plasmid DNA	No known significant effects or critical hazards.
	1.42 M 2-Mercaptoethanol	Toxic if swallowed.
	XL1-Blue Competent Cells	Toxic if swallowed.
Medical conditions aggravated by over-exposure	: pUC18 Control Plasmid DNA	Not applicable.
	1.42 M 2-Mercaptoethanol	Repeated skin exposure can produce local skin destruction or dermatitis. Repeated or prolonged contact with spray or mist may produce chronic eye irritation and severe skin irritation.
	XL1-Blue Competent Cells	Repeated or prolonged exposure to the substance can produce target organs damage.
Over-exposure signs/symptoms	: pUC18 Control Plasmid DNA	Not applicable.
	1.42 M 2-Mercaptoethanol	Not applicable.
	XL1-Blue Competent Cells	Not applicable.

See toxicological information (section 11)

3. Composition/information on ingredients

Name	CAS number	%
1.42 M 2-Mercaptoethanol 2-Mercaptoethanol	60-24-2	10
XL1-Blue Competent Cells	56-81-5	5 - 10
Glycerol	7773-01-5	5 - 10
Manganese dichloride	57-50-1	5 - 10
Sucrose	67-68-5	5 - 10
Dimethyl sulfoxide	7447-40-7	1 - 5
Potassium chloride		

There are no ingredients or additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

Eye contact	: pUC18 Control Plasmid DNA	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if adverse health effects persist or are severe.
	1.42 M 2-Mercaptoethanol	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if adverse health effects persist or are severe.
	XL1-Blue Competent Cells	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if adverse health effects persist or are severe.
Skin contact	: pUC18 Control Plasmid DNA	In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if adverse health effects persist or are severe.
	1.42 M 2-Mercaptoethanol	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if adverse health effects persist or are severe.
	XL1-Blue Competent Cells	In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if adverse health effects persist or are severe.
Inhalation	: pUC18 Control Plasmid DNA	If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention if adverse health effects persist or are severe.
	1.42 M 2-Mercaptoethanol	If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention if adverse health effects persist or are severe.
	XL1-Blue Competent Cells	If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention if adverse health effects persist or are severe.

4. First aid measures

Ingestion	: pUC18 Control Plasmid DNA	Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if adverse health effects persist or are severe.
	1.42 M 2-Mercaptoethanol	Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if adverse health effects persist or are severe.
	XL1-Blue Competent Cells	Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if adverse health effects persist or are severe.
Protection of first-aiders	: pUC18 Control Plasmid DNA	Not applicable.
	1.42 M 2-Mercaptoethanol	Not applicable.
	XL1-Blue Competent Cells	Not applicable.
Notes to physician	: No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.	

5. Fire-fighting measures

Flammability of the product	: pUC18 Control Plasmid DNA	Non-flammable.
	1.42 M 2-Mercaptoethanol	Non-flammable.
	XL1-Blue Competent Cells	Non-flammable.
Products of combustion	: pUC18 Control Plasmid DNA	No specific data.
	1.42 M 2-Mercaptoethanol	Decomposition products may include the following materials: carbon oxides sulfur oxides
	XL1-Blue Competent Cells	Decomposition products may include the following materials: carbon oxides sulfur oxides halogenated compounds metal oxide/oxides

Extinguishing media

Suitable	: pUC18 Control Plasmid DNA	Use an extinguishing agent suitable for the surrounding fire.
	1.42 M 2-Mercaptoethanol	Use an extinguishing agent suitable for the surrounding fire.
	XL1-Blue Competent Cells	Use an extinguishing agent suitable for the surrounding fire.
Not suitable	: pUC18 Control Plasmid DNA	Not applicable.
	1.42 M 2-Mercaptoethanol	Not applicable.
	XL1-Blue Competent Cells	Not applicable.
Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.	
	: pUC18 Control Plasmid DNA	Not available.
Special remarks on fire hazards	1.42 M 2-Mercaptoethanol	Not available.
	XL1-Blue Competent Cells	Not available.
	: Not available.	
Special remarks on explosion hazards	: Not available.	

6. Accidental release measures

Personal precautions	: pUC18 Control Plasmid DNA	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
	1.42 M 2-Mercaptoethanol	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
	XL1-Blue Competent Cells	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
Environmental precautions	: pUC18 Control Plasmid DNA	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
	1.42 M 2-Mercaptoethanol	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
	XL1-Blue Competent Cells	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
Methods for cleaning up Small spill	: pUC18 Control Plasmid DNA	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
	1.42 M 2-Mercaptoethanol	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
	XL1-Blue Competent Cells	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7. Handling and storage

Handling	: pUC18 Control Plasmid DNA	Wash thoroughly after handling.
	1.42 M 2-Mercaptoethanol	Do not ingest. Avoid contact with eyes, skin and clothing. Wash thoroughly after handling.
	XL1-Blue Competent Cells	Do not ingest. Wash thoroughly after handling.

7. Handling and storage

Storage : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8. Exposure controls/personal protection

Product name

Exposure limits

United States

1.42 M 2-Mercaptoethanol
2-Mercaptoethanol

AIHA WEEL (United States, 1/2008).
TWA: 0.2 ppm 8 hour(s).

XL1-Blue Competent Cells
Glycerol

ACGIH TLV (United States, 1/2008).
TWA: 10 mg/m³ 8 hour(s). Form: Mist
OSHA PEL (United States, 11/2006).
TWA: 5 mg/m³ 8 hour(s). Form: Respirable fraction
TWA: 15 mg/m³ 8 hour(s). Form: Total dust
OSHA PEL 1989 (United States, 3/1989).
TWA: 5 mg/m³ 8 hour(s). Form: Respirable fraction
TWA: 10 mg/m³ 8 hour(s). Form: Total dust

Manganese dichloride

ACGIH TLV (United States, 1/2008).
TWA: 0.2 mg/m³, (as Mn) 8 hour(s).
OSHA PEL 1989 (United States, 3/1989).
CEIL: 5 mg/m³, (as Mn)
NIOSH REL (United States, 12/2001).
TWA: 1 mg/m³, (as Mn) 10 hour(s).
STEL: 3 mg/m³, (as Mn) 15 minute(s).
OSHA PEL (United States, 11/2006).
CEIL: 5 mg/m³, (as Mn)

Sucrose

ACGIH TLV (United States, 1/2008).
TWA: 10 mg/m³ 8 hour(s).
OSHA PEL 1989 (United States, 3/1989).
TWA: 15 mg/m³ 8 hour(s). Form: Total dust
TWA: 5 mg/m³ 8 hour(s). Form: Respirable fraction
NIOSH REL (United States, 12/2001).
TWA: 10 mg/m³ 10 hour(s). Form: Total
TWA: 5 mg/m³ 10 hour(s). Form: Respirable fraction
OSHA PEL (United States, 11/2006).
TWA: 15 mg/m³ 8 hour(s). Form: Total dust
TWA: 5 mg/m³ 8 hour(s). Form: Respirable fraction

Dimethyl sulfoxide

AIHA WEEL (United States, 1/2008).
TWA: 250 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

Engineering measures : If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Personal protection

Eyes : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.

8. Exposure controls/personal protection

Skin	:	Chemical resistant protective gloves and clothing are recommended. The choice of protective gloves or clothing must be based on chemical resistance and other use requirements. Generally, BUNA-N offers acceptable chemical resistance. Individuals who are acutely and specifically sensitive to this chemical may require additional protective clothing.
Respiratory	:	Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
Hands	:	Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.
Other protection	:	Not available.
Hygiene measures	:	Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

9. Physical and chemical properties

Physical state	:	pUC18 Control Plasmid Liquid. DNA 1.42 M 2-Mercaptoethanol Liquid. XL1-Blue Competent Liquid. Cells
Flash point	:	pUC18 Control Plasmid Not applicable. DNA 1.42 M 2-Mercaptoethanol Not applicable. XL1-Blue Competent Not applicable. Cells
Color	:	pUC18 Control Plasmid Not available. DNA 1.42 M 2-Mercaptoethanol Not available. XL1-Blue Competent Not available. Cells
Odor	:	pUC18 Control Plasmid Not available. DNA 1.42 M 2-Mercaptoethanol Not available. XL1-Blue Competent Not available. Cells
pH	:	pUC18 Control Plasmid Neutral. DNA 1.42 M 2-Mercaptoethanol Neutral. XL1-Blue Competent Neutral. Cells
Boiling/condensation point	:	pUC18 Control Plasmid Lowest known value: 100°C (212°F) (Water). DNA 1.42 M 2-Mercaptoethanol Lowest known value: 100°C (212°F) (Water). Weighted average: 105.7°C (222.3°F) XL1-Blue Competent Lowest known value: 100°C (212°F) (Water). Weighted average: 122.01°C (251.6°F) Cells
Melting/freezing point	:	pUC18 Control Plasmid May start to solidify at the following temperature: 0°C (32°F) DNA This is based on data for the following ingredient: Water. 1.42 M 2-Mercaptoethanol May start to solidify at the following temperature: 0°C (32°F) This is based on data for the following ingredient: Water. XL1-Blue Competent May start to solidify at the following temperature: 19.8°C (67.6°F) This is based on data for the following ingredient: Cells Glycerol. Weighted average: 3.02°C (37.4°F)

9 . Physical and chemical properties

Relative density	: pUC18 Control Plasmid	Not available.
	DNA	
Vapor pressure	1.42 M 2-Mercaptoethanol	Only known value: 1.1 (Water = 1) (2-Mercaptoethanol). Weighted average: 1.29 (Water = 1)
	XL1-Blue Competent Cells	
	pUC18 Control Plasmid	Highest known value: 2.3 kPa (17.5 mm Hg) (at 20°C) (Water).
Vapor density	DNA	
	1.42 M 2-Mercaptoethanol	Highest known value: 2.3 kPa (17.5 mm Hg) (at 20°C) (Water). Weighted average: 2.08 kPa (15.6 mm Hg) (at 20°C)
	XL1-Blue Competent Cells	Highest known value: 2.3 kPa (17.5 mm Hg) (at 20°C) (Water). Weighted average: 2.11 kPa (15.83 mm Hg) (at 20°C)
Evaporation rate	pUC18 Control Plasmid	Highest known value: 0.62 (Air = 1) (Water).
	DNA	
	1.42 M 2-Mercaptoethanol	Highest known value: 2.7 (Air = 1) (2-Mercaptoethanol). Weighted average: 0.83 (Air = 1)
Evaporation rate	XL1-Blue Competent Cells	Highest known value: 3.1 (Air = 1) (Glycerol). Weighted average: 0.98 (Air = 1)
	pUC18 Control Plasmid	Not available.
	DNA	
Evaporation rate	1.42 M 2-Mercaptoethanol	Not available.
	XL1-Blue Competent Cells	0.026 (Dimethyl sulfoxide) compared with Butyl acetate.

10 . Stability and reactivity

Stability and reactivity	: The product is stable.
Incompatibility with various substances	: Highly reactive or incompatible with the following materials: oxidizing materials and organic materials. Reactive or incompatible with the following materials: acids.
Hazardous decomposition products	: pUC18 Control Plasmid Under normal conditions of storage and use, hazardous decomposition products should not be produced. DNA Under normal conditions of storage and use, hazardous decomposition products should not be produced. 1.42 M 2-Mercaptoethanol Under normal conditions of storage and use, hazardous decomposition products should not be produced. XL1-Blue Competent Cells Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Conditions of reactivity - Flammability	: Flammable in the presence of the following materials or conditions: open flames, sparks and static discharge.

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Dimethyl sulfoxide	LD50 Dermal	Rat	40 gm/kg	-
	LD50 Oral	Rat	14500 mg/kg	-
Sucrose	LD50 Oral	Rat	29700 mg/kg	-
	LD50 Oral	Rat	250 mg/kg	-
Manganese dichloride	LD50 Dermal	Rabbit	>10 gm/kg	-
Glycerol	LD50 Dermal	Rat	12600 mg/kg	-
	LD50 Oral	Rat	2600 mg/kg	-

Eyes

: pUC18 Control Plasmid	No known significant effects or critical hazards.
DNA	
1.42 M 2-Mercaptoethanol	Irritating to eyes.
XL1-Blue Competent Cells	No known significant effects or critical hazards.

11 Toxicological information

Skin	pUC18 Control Plasmid	No known significant effects or critical hazards.
	DNA	
	1.42 M 2-Mercaptoethanol	Irritating to skin. May cause sensitization by skin contact.
	XL1-Blue Competent Cells	No known significant effects or critical hazards.
Inhalation	pUC18 Control Plasmid	No known significant effects or critical hazards.
	DNA	
	1.42 M 2-Mercaptoethanol	No known significant effects or critical hazards.
	XL1-Blue Competent Cells	No known significant effects or critical hazards.
Ingestion	pUC18 Control Plasmid	No known significant effects or critical hazards.
	DNA	
	1.42 M 2-Mercaptoethanol	Toxic if swallowed.
	XL1-Blue Competent Cells	Toxic if swallowed.

Classification

Product/ingredient name	ACG	ACGIH	IAR	IARC	EPA	EPA	NIOSH	HITP	NTP	OSHA	OSHA
XL1-Blue Competent Cells											
Sucrose				A4							

Potential chronic health effects

Chronic effects	Contains material that may cause target organ damage, based on animal data.
Carcinogenicity	No known significant effects or critical hazards.
Mutagenicity	No known significant effects or critical hazards.
Teratogenicity	No known significant effects or critical hazards.
Developmental effects	No known significant effects or critical hazards.
Fertility effects	No known significant effects or critical hazards.

Over-exposure signs/symptoms

Inhalation	No specific data.	
Ingestion	No specific data.	
Skin	No specific data.	
Eyes	No specific data.	
Target organs	pUC18 Control Plasmid	Not available.
	DNA	
	1.42 M 2-Mercaptoethanol	Not available.
	XL1-Blue Competent Cells	Contains material which may cause damage to the following organs: blood, kidneys, gastrointestinal tract, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.
Other adverse effects	pUC18 Control Plasmid	Not available.
	DNA	
	1.42 M 2-Mercaptoethanol	Not available.
	XL1-Blue Competent Cells	Not available.

12 Ecological information

Environmental effects	No known significant effects or critical hazards.
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12. Ecological information

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
Dimethyl sulfoxide	-	Acute LC50 35 to 37 ml/L Fresh water	Fish	96 hours
Manganese dichloride	-	Acute LC50 34000000 ug/L Fresh water	Fish	96 hours
Glycerol	-	Acute EC50 4700 ug/L Fresh water	Daphnia	48 hours
Potassium chloride	-	Acute LC50 54 to 57 ml/L Fresh water	Fish	96 hours
	-	Acute EC50 83000 ug/L Fresh water	Daphnia	48 hours
	-	Acute LC50 337 mg/L Fresh water	Daphnia	48 hours
	-	Acute LC50 435000 ug/L Fresh water	Fish	96 hours

Other adverse effects : No known significant effects or critical hazards.

13. Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

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

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14. Transport information

Regulatory information

DOT / IMDG / IATA : Not regulated.

15. Regulatory information

HCS Classification : pUC18 Control Plasmid DNA Not regulated.
 1.42 M 2-Mercaptoethanol Toxic material
 Irritating material
 Sensitizing material
 XL1-Blue Competent Cells Toxic material
 Target organ effects

15 Regulatory information

pUC18 Control Plasmid:DNA Not available/label.
 1.42 M-2-Mercaptoethanol: Not available/label.
 XL1-Blue Competent Cells: Contains material which may cause damage to the following organs: blood, kidneys, gastrointestinal tract, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea/nea.

U.S. Federal regulations:

pUC18 Control Plasmid:DNA **United States inventory (TSCA 85):** All components are listed or exempted.

1.42 M-2-Mercaptoethanol: **United States inventory (TSCA 85):** All components are listed or exempted.

XL1-Blue Competent Cells: **United States inventory (TSCA 85):** All components are listed or exempted.

pUC18 Control Plasmid:DNA **SARA 302/304/311/312 extremely hazardous substances:** No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: No products were found.
SARA 311/312 MSDS distribution, chemical inventory - hazard identification: No products were found.

1.42 M-2-Mercaptoethanol: **SARA 302/304/311/312 extremely hazardous substances:** No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: 2-Mercaptoethanol
SARA 311/312 MSDS distribution, chemical inventory - hazard identification: 2-Mercaptoethanol: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard.

XL1-Blue Competent Cells: **SARA 302/304/311/312 extremely hazardous substances:** No products were found.
SARA 302/304 emergency planning and notification: No products were found.
SARA 302/304/311/312 hazardous chemicals: Potassium chloride; Glycerol; Manganese dichloride; Sucrose; Dimethyl sulfoxide
SARA 311/312 MSDS distribution, chemical inventory - hazard identification: Potassium chloride: Immediate (acute) health hazard, Delayed (chronic) health hazard; Glycerol: Immediate (acute) health hazard, Delayed (chronic) health hazard; Manganese dichloride: Delayed (chronic) health hazard; Sucrose: Delayed (chronic) health hazard; Dimethyl sulfoxide: Immediate (acute) health hazard, Delayed (chronic) health hazard.

pUC18 Control Plasmid:DNA **Clean Water Act (CWA) 307:** No products were found.

1.42 M-2-Mercaptoethanol: **Clean Water Act (CWA) 307:** No products were found.

XL1-Blue Competent Cells: **Clean Water Act (CWA) 307:** No products were found.

pUC18 Control Plasmid:DNA **Clean Water Act (CWA) 311:** Edetic acid
 DNA: **Clean Water Act (CWA) 311:** No products were found.

1.42 M-2-Mercaptoethanol: **Clean Water Act (CWA) 311:** No products were found.

XL1-Blue Competent Cells: **Clean Water Act (CWA) 311:** No products were found.

15 Regulatory information

pUC18 Control Plasmid DNA : Clean Air Act (CAA) 112 accidental release prevention : No products were found.
 1.42 M-2-Mercaptoethanol : Clean Air Act (CAA) 112 accidental release prevention : No products were found.
 XL1-Blue Competent Cells : Clean Air Act (CAA) 112 accidental release prevention : No products were found.

pUC18 Control Plasmid DNA : Clean Air Act (CAA) 112 regulated flammable substances : No products were found.
 1.42 M-2-Mercaptoethanol : Clean Air Act (CAA) 112 regulated flammable substances : No products were found.
 XL1-Blue Competent Cells : Clean Air Act (CAA) 112 regulated flammable substances : No products were found.

pUC18 Control Plasmid DNA : Clean Air Act (CAA) 112 regulated toxic substances : No products were found.
 1.42 M-2-Mercaptoethanol : Clean Air Act (CAA) 112 regulated toxic substances : No products were found.
 XL1-Blue Competent Cells : Clean Air Act (CAA) 112 regulated toxic substances : No products were found.

SARA 313

Form Reporting requirements	Product name	CAS number	Concentration
SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.	XL1-Blue Competent Cells	7773-01-5	5 - 10 - 10
	Manganese dichloride	10534-89-1	0.1 - 1 - 1
	Hexaamminecobalt trichloride	10534-89-1	0.1 - 1 - 1

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State Regulations : pUC18 Control Plasmid DNA : Connecticut Carcinogen Reporting: None of the components are listed.
 Connecticut Hazardous Material Survey: None of the components are listed.
 Florida substances: None of the components are listed.
 Illinois Chemical Safety Act: None of the components are listed.
 Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.
 Louisiana Reporting: None of the components are listed.
 Louisiana Spill: None of the components are listed.
 Massachusetts Spill: None of the components are listed.
 Massachusetts Substances: None of the components are listed.
 Michigan Critical Material: None of the components are listed.
 Minnesota Hazardous Substances: None of the components are listed.
 New Jersey Hazardous Substances: None of the components are listed.
 New Jersey Spill: None of the components are listed.
 New Jersey Toxic Catastrophe Prevention Act: None of the components are listed.
 New York Acutely Hazardous Substances: None of the components are listed.
 New York Toxic Chemical Release Reporting: None of the components are listed.
 Pennsylvania RTK Hazardous Substances: None of the components are listed.

15. Regulatory information

	<p>components are listed. Rhode Island Hazardous Substances: None of the components are listed.</p>
1.42 M 2-Mercaptoethanol	<p>Connecticut Carcinogen Reporting: None of the components are listed. Connecticut Hazardous Material Survey: None of the components are listed. Florida substances: None of the components are listed. Illinois Chemical Safety Act: None of the components are listed. Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed. Louisiana Reporting: None of the components are listed. Louisiana Spill: None of the components are listed. Massachusetts Spill: None of the components are listed. Massachusetts Substances: The following components are listed: 2-Mercaptoethanol Michigan Critical Material: None of the components are listed. Minnesota Hazardous Substances: None of the components are listed. New Jersey Hazardous Substances: None of the components are listed. New Jersey Spill: None of the components are listed. New Jersey Toxic Catastrophe Prevention Act: None of the components are listed. New York Acutely Hazardous Substances: None of the components are listed. New York Toxic Chemical Release Reporting: None of the components are listed. Pennsylvania RTK Hazardous Substances: The following components are listed: 2-Mercaptoethanol Rhode Island Hazardous Substances: None of the components are listed.</p>
XL1-Blue Competent Cells	<p>Connecticut Carcinogen Reporting: None of the components are listed. Connecticut Hazardous Material Survey: None of the components are listed. Florida substances: None of the components are listed. Illinois Chemical Safety Act: None of the components are listed. Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed. Louisiana Reporting: None of the components are listed. Louisiana Spill: None of the components are listed. Massachusetts Spill: None of the components are listed. Massachusetts Substances: The following components are listed: Glycerol; Sucrose Michigan Critical Material: None of the components are listed. Minnesota Hazardous Substances: None of the components are listed. New Jersey Hazardous Substances: The following components are listed: Manganese dichloride New Jersey Spill: None of the components are listed. New Jersey Toxic Catastrophe Prevention Act: None of the components are listed. New York Acutely Hazardous Substances: None of the components are listed. New York Toxic Chemical Release Reporting: None of the</p>

15 . Regulatory information

components are listed.

Pennsylvania RTK Hazardous Substances: The following components are listed: Glycerol; Manganese dichloride; Sucrose

Rhode Island Hazardous Substances: None of the components are listed.

State regulations - California Prop. 65 : No products were found.

16 . Other information

Label requirements	: pUC18 Control Plasmid DNA	NOT EXPECTED TO PRODUCE SIGNIFICANT ADVERSE HEALTH EFFECTS WHEN THE RECOMMENDED INSTRUCTIONS FOR USE ARE FOLLOWED.
	: 1.42 M 2-Mercaptoethanol	HARMFUL IF SWALLOWED. CAUSES EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION.
	: XL1-Blue Competent Cells	HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Date of Issue : 01/09/2009

Version : 1

Notice to reader

DISCLAIMER: This Material Safety Data Sheet is offered without charge to the clients of Agilent Technologies. Data is the most current available to Agilent Technologies at the time of preparation and is issued as a matter of information only, no warranty as to its accuracy or completeness is expressed or implied.

▼ Indicates information that has changed from previously issued version.

Material Safety Data Sheet



Stratagene XL10-Gold Ultracompetent Cells, Catalog #200314

1. Product and company identification

Product name	: Stratagene XL10-Gold Ultracompetent Cells, Catalog #200314
Part No.	: XL10-Gold Ultracompetent cells 200315-41 pUC18 Control Plasmid 200231-42 DNA XL10-Gold 2-mercaptoethanol mix 200314-43
Manufacturer / Supplier	: Agilent Technologies, Inc. 1834 State Highway 71 West Cedar Creek, TX 78612
Emergency telephone number	: 1-800-894-1304
Use of the substance/preparation	: Chemical Kit
Validation date	: 11/19/2008

2. Hazards identification

Physical state	: XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA XL10-Gold 2-mercaptoethanol mix	Liquid. Liquid. Liquid.
Odor	: XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA XL10-Gold 2-mercaptoethanol mix	Not available. Not available. Characteristic.
OSHA/HCS status	: XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA XL10-Gold 2-mercaptoethanol mix	This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200). While this material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200), this MSDS contains valuable information critical to the safe handling and proper use of the product. This MSDS should be retained and available for employees and other users of this product. This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency overview-Signal Word	: WARNING !	
Emergency overview-Label Statement	: XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA XL10-Gold 2-mercaptoethanol mix XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA XL10-Gold 2-mercaptoethanol mix	HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. NOT EXPECTED TO PRODUCE SIGNIFICANT ADVERSE HEALTH EFFECTS WHEN THE RECOMMENDED INSTRUCTIONS FOR USE ARE FOLLOWED. COMBUSTIBLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED. CAUSES EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. Toxic if swallowed. Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not ingest. Avoid contact with eyes, skin and clothing. Contains material that may cause target organ damage, based on animal data. Wash thoroughly after handling. No known significant effects or critical hazards. Avoid prolonged contact with eyes, skin and clothing. Combustible liquid. Toxic if swallowed. Irritating to eyes and skin. May cause sensitization by skin contact. Keep away from heat, sparks and flame. Do not breathe vapor or mist.

2. Hazards identification

		XL10-Gold Ultracompetent cells	Do not ingest. Do not get on skin or clothing. Avoid contact with eyes. Use only with adequate ventilation. Wash thoroughly after handling.
		pUC18 Control Plasmid DNA	Contains material which may cause damage to the following organs: blood, kidneys, gastrointestinal tract, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.
		XL10-Gold 2-mercaptoethanol mix	Not available.
Routes of entry	:	XL10-Gold Ultracompetent cells	Inhalation. Ingestion.
		pUC18 Control Plasmid DNA	Eye contact. Ingestion.
		XL10-Gold 2-mercaptoethanol mix	Dermal contact. Inhalation.
<u>Potential acute health effects</u>			
Eyes	:	XL10-Gold Ultracompetent cells	No known significant effects or critical hazards.
		pUC18 Control Plasmid DNA	No known significant effects or critical hazards.
		XL10-Gold 2-mercaptoethanol mix	Irritating to eyes.
Skin	:	XL10-Gold Ultracompetent cells	No known significant effects or critical hazards.
		pUC18 Control Plasmid DNA	No known significant effects or critical hazards.
		XL10-Gold 2-mercaptoethanol mix	Irritating to skin. May cause sensitization by skin contact.
Inhalation	:	XL10-Gold Ultracompetent cells	No known significant effects or critical hazards.
		pUC18 Control Plasmid DNA	No known significant effects or critical hazards.
		XL10-Gold 2-mercaptoethanol mix	No known significant effects or critical hazards.
Ingestion	:	XL10-Gold Ultracompetent cells	Toxic if swallowed.
		pUC18 Control Plasmid DNA	No known significant effects or critical hazards.
		XL10-Gold 2-mercaptoethanol mix	Toxic if swallowed.
Medical conditions aggravated by over-exposure	:	XL10-Gold Ultracompetent cells	Repeated or prolonged exposure to the substance can produce target organs damage.
		pUC18 Control Plasmid DNA	Not applicable.
		XL10-Gold 2-mercaptoethanol mix	Repeated skin exposure can produce local skin destruction or dermatitis. Repeated or prolonged contact with spray or mist may produce chronic eye irritation and severe skin irritation.
Over-exposure signs/symptoms	:	XL10-Gold Ultracompetent cells	Not applicable.
		pUC18 Control Plasmid DNA	Not applicable.
		XL10-Gold 2-mercaptoethanol mix	Not applicable.

See toxicological information (section 11)

3. Composition/information on ingredients

Name	CAS number	%
XL10-Gold Ultracompetent cells	56-81-5	5 - 10
Glycerol	7773-01-5	5 - 10
Manganese dichloride	57-50-1	5 - 10
Sucrose	67-68-5	5 - 10
Dimethyl sulfoxide	7447-40-7	1 - 5
Potassium chloride		
XL10-Gold 2-mercaptoethanol mix	60-24-2	100
2-Mercaptoethanol		

There are no ingredients or additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

4. First aid measures

Eye contact	: XL10-Gold Ultracompetent cells	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if adverse health effects persist or are severe.
	pUC18 Control Plasmid DNA	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if adverse health effects persist or are severe.
	XL10-Gold 2-mercaptoethanol mix	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. Get medical attention if adverse health effects persist or are severe.
Skin contact	: XL10-Gold Ultracompetent cells	In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if adverse health effects persist or are severe.
	pUC18 Control Plasmid DNA	In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if adverse health effects persist or are severe.
	XL10-Gold 2-mercaptoethanol mix	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if adverse health effects persist or are severe.
Inhalation	: XL10-Gold Ultracompetent cells	If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention if adverse health effects persist or are severe.
	pUC18 Control Plasmid DNA	If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention if adverse health effects persist or are severe.
	XL10-Gold 2-mercaptoethanol mix	If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention if adverse health effects persist or are severe.
Ingestion	: XL10-Gold Ultracompetent cells	Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if adverse health effects persist or are severe.
	pUC18 Control Plasmid DNA	Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention if adverse health effects persist or are severe.
	XL10-Gold 2-	Do not induce vomiting unless directed to do so by medical

4. First aid measures

	mercaptoethanol mix	personnel. Never give anything by mouth to an unconscious person. Get medical attention if adverse health effects persist or are severe.
Protection of first-aiders	: XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA	Not applicable. Not applicable.
	XL10-Gold 2-mercaptoethanol mix	Not applicable.
Notes to physician	: No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.	

5. Fire-fighting measures

Flammability of the product	: XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA	Non-flammable. Non-flammable.
	XL10-Gold 2-mercaptoethanol mix	Flammable.
Products of combustion	: XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA XL10-Gold 2-mercaptoethanol mix	Decomposition products may include the following materials: carbon oxides sulfur oxides halogenated compounds metal oxide/oxides No specific data. Decomposition products may include the following materials: carbon oxides sulfur oxides
<u>Extinguishing media</u>		
Suitable	: XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA XL10-Gold 2-mercaptoethanol mix	Use an extinguishing agent suitable for the surrounding fire. Use an extinguishing agent suitable for the surrounding fire. Use dry chemical, CO ₂ , water spray (fog) or foam.
Not suitable	: XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA XL10-Gold 2-mercaptoethanol mix	Not applicable. Not applicable. Do not use water jet.
Special protective equipment for fire-fighters	: Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.	
Special remarks on fire hazards	: XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA XL10-Gold 2-mercaptoethanol mix	Not available. Not available. Not available.
Special remarks on explosion hazards	: Not available.	

6. Accidental release measures

Personal precautions	: XL10-Gold Ultracompetent cells	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
	pUC18 Control Plasmid DNA	No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep

6. Accidental release measures

	XL10-Gold 2-mercaptoethanol mix	unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8). No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Shut off all ignition sources. No flares, smoking or flames in hazard area. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see section 8).
Environmental precautions	: XL10-Gold Ultracompetent cells	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
	pUC18 Control Plasmid DNA	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
	XL10-Gold 2-mercaptoethanol mix	Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
Methods for cleaning up Small spill	: XL10-Gold Ultracompetent cells	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
	pUC18 Control Plasmid DNA	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
	XL10-Gold 2-mercaptoethanol mix	Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble or absorb with an inert dry material and place in an appropriate waste disposal container. Use spark-proof tools and explosion-proof equipment. Dispose of via a licensed waste disposal contractor.

7. Handling and storage

Handling	: XL10-Gold Ultracompetent cells	Do not ingest. Wash thoroughly after handling.
	pUC18 Control Plasmid DNA	Wash thoroughly after handling.
	XL10-Gold 2-mercaptoethanol mix	Do not ingest. Avoid contact with eyes, skin and clothing. Keep container closed. Use only with adequate ventilation. Keep away from heat, sparks and flame. To avoid fire or explosion, dissipate static electricity during transfer by grounding and bonding containers and equipment before transferring material. Use explosion-proof electrical (ventilating, lighting and material handling) equipment. Wash thoroughly after handling.
Storage	: Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.	

8. Exposure controls/personal protection

Product name

Exposure limits

United States

XL10-Gold Ultracompetent cells

Glycerol

ACGIH TLV (United States, 1/2008).

TWA: 10 mg/m³ 8 hour(s). Form: Mist

OSHA PEL (United States, 11/2006).

TWA: 5 mg/m³ 8 hour(s). Form: Respirable fraction

TWA: 15 mg/m³ 8 hour(s). Form: Total dust

OSHA PEL 1989 (United States, 3/1989).

TWA: 5 mg/m³ 8 hour(s). Form: Respirable fraction

TWA: 10 mg/m³ 8 hour(s). Form: Total dust

Manganese dichloride

ACGIH TLV (United States, 1/2008).

TWA: 0.2 mg/m³, (as Mn) 8 hour(s).

OSHA PEL 1989 (United States, 3/1989).

CEIL: 5 mg/m³, (as Mn)

NIOSH REL (United States, 12/2001).

TWA: 1 mg/m³, (as Mn) 10 hour(s).

STEL: 3 mg/m³, (as Mn) 15 minute(s).

OSHA PEL (United States, 11/2006).

CEIL: 5 mg/m³, (as Mn)

Sucrose

ACGIH TLV (United States, 1/2008).

TWA: 10 mg/m³ 8 hour(s).

OSHA PEL 1989 (United States, 3/1989).

TWA: 15 mg/m³ 8 hour(s). Form: Total dust

TWA: 5 mg/m³ 8 hour(s). Form: Respirable fraction

NIOSH REL (United States, 12/2001).

TWA: 10 mg/m³ 10 hour(s). Form: Total

TWA: 5 mg/m³ 10 hour(s). Form: Respirable fraction

OSHA PEL (United States, 11/2006).

TWA: 15 mg/m³ 8 hour(s). Form: Total dust

TWA: 5 mg/m³ 8 hour(s). Form: Respirable fraction

Dimethyl sulfoxide

AIHA WEEL (United States, 1/2008).

TWA: 250 ppm 8 hour(s).

XL10-Gold 2-mercaptoethanol mix

2-Mercaptoethanol

AIHA WEEL (United States, 1/2008).

TWA: 0.2 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

Engineering measures

- : If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

Personal protection

Eyes

- : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists, gases or dusts.

Skin

- : Chemical resistant protective gloves and clothing are recommended. The choice of protective gloves or clothing must be based on chemical resistance and other use requirements. Generally, BUNA-N offers acceptable chemical resistance. Individuals who are acutely and specifically sensitive to this chemical may require additional protective clothing.

Respiratory

- : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

Hands

- : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary.

Other protection

- : Not available.

Hygiene measures

- : Handle as biohazard material (Biosafety level 1). Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.

9. Physical and chemical properties

Physical state	: XL10-Gold Ultracompetent cells	Liquid.
	pUC18 Control Plasmid DNA	Liquid.
	XL10-Gold 2-mercaptoethanol mix	Liquid.
Flash point	: XL10-Gold Ultracompetent cells	Not applicable.
	pUC18 Control Plasmid DNA	Not applicable.
	XL10-Gold 2-mercaptoethanol mix	Closed cup: 74°C (165.2°F).
Flammable limits	: XL10-Gold Ultracompetent cells	Not applicable.
	pUC18 Control Plasmid DNA	Not applicable.
	XL10-Gold 2-mercaptoethanol mix	Lower: 2.3% Upper: 18%
Color	: XL10-Gold Ultracompetent cells	Not available.
	pUC18 Control Plasmid DNA	Not available.
	XL10-Gold 2-mercaptoethanol mix	Colorless.
Odor	: XL10-Gold Ultracompetent cells	Not available.
	pUC18 Control Plasmid DNA	Not available.
	XL10-Gold 2-mercaptoethanol mix	Characteristic.
pH	: XL10-Gold Ultracompetent cells	Not available.
	pUC18 Control Plasmid DNA	Neutral.
	XL10-Gold 2-mercaptoethanol mix	Not available.
Boiling/condensation point	: XL10-Gold Ultracompetent cells	Lowest known value: 100°C (212°F) (Water). Weighted average: 122.01°C (251.6°F)
	pUC18 Control Plasmid DNA	Lowest known value: 100°C (212°F) (Water).
	XL10-Gold 2-mercaptoethanol mix	157°C (314.6°F)
Melting/freezing point	: XL10-Gold Ultracompetent cells	May start to solidify at the following temperature: 19.8°C (67.6°F) This is based on data for the following ingredient: Glycerol. Weighted average: 3.02°C (37.4°F)
	pUC18 Control Plasmid DNA	May start to solidify at the following temperature: 0°C (32°F) This is based on data for the following ingredient: Water.
	XL10-Gold 2-mercaptoethanol mix	Not available.
Relative density	: XL10-Gold Ultracompetent cells	Weighted average: 1.29 (Water = 1)
	pUC18 Control Plasmid DNA	Not available.
	XL10-Gold 2-mercaptoethanol mix	Only known value: 1.1 (Water = 1) (2-Mercaptoethanol).
Specific gravity	: XL10-Gold Ultracompetent cells	Not available.
	pUC18 Control Plasmid DNA	Not available.
	XL10-Gold 2-mercaptoethanol mix	1.114 g/cm ³ [20°C (68°F)]

9. Physical and chemical properties

Vapor pressure	: XL10-Gold Ultracompetent cells	Highest known value: 0.06 kPa (0.4 mm Hg) (at 20°C) (Dimethyl sulfoxide).
	pUC18 Control Plasmid DNA	Highest known value: 2.3 kPa (17.5 mm Hg) (at 20°C) (Water).
	XL10-Gold 2-mercaptoethanol mix	0.1 kPa (1 mm Hg) (at 20°C)
Vapor density	: XL10-Gold Ultracompetent cells	Highest known value: 3.1 (Air = 1) (Glycerol). Weighted average: 2.91 (Air = 1)
	pUC18 Control Plasmid DNA	Highest known value: 0.62 (Air = 1) (Water).
	XL10-Gold 2-mercaptoethanol mix	2.7 (Air = 1)
Evaporation rate	: XL10-Gold Ultracompetent cells	0.026 (Dimethyl sulfoxide) compared with Butyl acetate.
	pUC18 Control Plasmid DNA	Not available.
	XL10-Gold 2-mercaptoethanol mix	Not available.

10. Stability and reactivity

Stability and reactivity	: The product is stable.	
Incompatibility with various substances	: Highly reactive or incompatible with the following materials: oxidizing materials and organic materials. Reactive or incompatible with the following materials: acids and alkalis.	
Hazardous decomposition products	: XL10-Gold Ultracompetent cells	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
	pUC18 Control Plasmid DNA	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
	XL10-Gold 2-mercaptoethanol mix	Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Conditions of reactivity - Flammability	: Flammable in the presence of the following materials or conditions: open flames, sparks and static discharge.	

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
2-Mercaptoethanol	LD50 Dermal	Rabbit	150 uL/kg	-
	LD50 Oral	Rat	244 mg/kg	-
Dimethyl sulfoxide	LD50 Dermal	Rat	40 gm/kg	-
	LD50 Oral	Rat	14500 mg/kg	-
Sucrose	LD50 Oral	Rat	29700 mg/kg	-
	LD50 Oral	Rat	250 mg/kg	-
Manganese dichloride	LD50 Dermal	Rabbit	>10 gm/kg	-
	LD50 Oral	Rat	12600 mg/kg	-
Potassium chloride	LD50 Oral	Rat	2600 mg/kg	-
	LD50 Oral	Rat	2600 mg/kg	-
Eyes	: XL10-Gold Ultracompetent cells	No known significant effects or critical hazards.		
	pUC18 Control Plasmid DNA	No known significant effects or critical hazards.		
	XL10-Gold 2-mercaptoethanol mix	Irritating to eyes.		
Skin	: XL10-Gold Ultracompetent cells	No known significant effects or critical hazards.		
	pUC18 Control Plasmid DNA	No known significant effects or critical hazards.		
	XL10-Gold 2-mercaptoethanol mix	Irritating to skin. May cause sensitization by skin contact.		
Inhalation	: XL10-Gold Ultracompetent cells	No known significant effects or critical hazards.		
	pUC18 Control Plasmid DNA	No known significant effects or critical hazards.		
	XL10-Gold 2-mercaptoethanol mix	No known significant effects or critical hazards.		

11 . Toxicological information

Ingestion : XL10-Gold Ultracompetent cells Toxic if swallowed.
 pUC18 Control Plasmid DNA No known significant effects or critical hazards.
 XL10-Gold 2-mercaptoethanol mix Toxic if swallowed.

Classification

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
XL10-Gold Ultracompetent cells						
Sucrose	A4	-	-	-	-	-

Potential chronic health effects

Chronic effects : Contains material that may cause target organ damage, based on animal data.
 Carcinogenicity : No known significant effects or critical hazards.
 Mutagenicity : No known significant effects or critical hazards.
 Teratogenicity : No known significant effects or critical hazards.
 Developmental effects : No known significant effects or critical hazards.
 Fertility effects : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Inhalation : No specific data.
 Ingestion : No specific data.
 Skin : Adverse symptoms may include the following:
 irritation
 redness
 Eyes : Adverse symptoms may include the following:
 pain or irritation
 watering
 redness

Target organs : XL10-Gold Ultracompetent cells Contains material which may cause damage to the following organs: blood, kidneys, gastrointestinal tract, upper respiratory tract, skin, central nervous system (CNS), eye, lens or cornea.
 pUC18 Control Plasmid DNA Not available.
 XL10-Gold 2-mercaptoethanol mix Not available.
 Other adverse effects : XL10-Gold Ultracompetent cells Not available.
 pUC18 Control Plasmid DNA Not available.
 XL10-Gold 2-mercaptoethanol mix Not available.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Test	Result	Species	Exposure
Dimethyl sulfoxide	-	Acute LC50 35 to 37 ml/L Fresh water	Fish	96 hours
	-	Acute LC50 34000000 ug/L Fresh water	Fish	96 hours
Manganese dichloride	-	Acute EC50 4700 ug/L Fresh water	Daphnia	48 hours
Glycerol	-	Acute LC50 54 to 57 ml/L Fresh water	Fish	96 hours
Potassium chloride	-	Acute EC50 83000 ug/L Fresh water	Daphnia	48 hours

12 . Ecological information

Acute LC50 337 mg/L Fresh water	Daphnia	48 hours
Acute LC50 435000 ug/L Fresh water	Fish	96 hours

Other adverse effects : No known significant effects or critical hazards.

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

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

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

14 . Transport information

Regulatory information

DOT / IMDG / IATA : Not regulated.

15 . Regulatory information

HCS Classification	: XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA	Toxic material Target organ effects Not regulated.
	: XL10-Gold 2-mercaptoethanol mix	Combustible liquid Toxic material Irritating material
U.S. Federal regulations	: XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA XL10-Gold 2-mercaptoethanol mix XL10-Gold Ultracompetent cells	<p>United States inventory (TSCA 8b): All components are listed or exempted.</p> <p>United States inventory (TSCA 8b): All components are listed or exempted.</p> <p>United States inventory (TSCA 8b): All components are listed or exempted.</p> <p>SARA 302/304/311/312 extremely hazardous substances: No products were found.</p> <p>SARA 302/304 emergency planning and notification: No products were found.</p> <p>SARA 302/304/311/312 hazardous chemicals: Potassium chloride; Glycerol; Manganese dichloride; Sucrose; Dimethyl sulfoxide</p> <p>SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Potassium chloride: Immediate (acute) health hazard, Delayed (chronic) health hazard; Glycerol: Immediate (acute) health hazard, Delayed (chronic) health hazard; Manganese dichloride: Delayed (chronic) health hazard; Sucrose: Delayed (chronic) health hazard; Dimethyl sulfoxide: Immediate (acute) health hazard, Delayed (chronic) health hazard</p>
	: pUC18 Control Plasmid DNA	<p>SARA 302/304/311/312 extremely hazardous substances: No products were found.</p> <p>SARA 302/304 emergency planning and notification: No</p>

15 . Regulatory information

<p>XL10-Gold 2-mercaptoethanol mix</p>	<p>products were found. SARA 302/304/311/312 hazardous chemicals: No products were found. SARA 311/312 MSDS distribution - chemical inventory - hazard identification: No products were found. SARA 302/304/311/312 extremely hazardous substances: No products were found. SARA 302/304 emergency planning and notification: No products were found. SARA 302/304/311/312 hazardous chemicals: 2-Mercaptoethanol SARA 311/312 MSDS distribution - chemical inventory - hazard identification: 2-Mercaptoethanol: Fire hazard, Immediate (acute) health hazard, Delayed (chronic) health hazard</p>
<p>XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA XL10-Gold 2-mercaptoethanol mix</p>	<p>Clean Water Act (CWA) 307: No products were found. Clean Water Act (CWA) 307: No products were found. Clean Water Act (CWA) 307: No products were found.</p>
<p>XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA XL10-Gold 2-mercaptoethanol mix</p>	<p>Clean Water Act (CWA) 311: No products were found. Clean Water Act (CWA) 311: Edetic acid Clean Water Act (CWA) 311: No products were found.</p>
<p>XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA XL10-Gold 2-mercaptoethanol mix</p>	<p>Clean Air Act (CAA) 112 accidental release prevention: No products were found. Clean Air Act (CAA) 112 accidental release prevention: No products were found. Clean Air Act (CAA) 112 accidental release prevention: No products were found.</p>
<p>XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA XL10-Gold 2-mercaptoethanol mix</p>	<p>Clean Air Act (CAA) 112 regulated flammable substances: No products were found. Clean Air Act (CAA) 112 regulated flammable substances: No products were found. Clean Air Act (CAA) 112 regulated flammable substances: No products were found.</p>
<p>XL10-Gold Ultracompetent cells pUC18 Control Plasmid DNA XL10-Gold 2-mercaptoethanol mix</p>	<p>Clean Air Act (CAA) 112 regulated toxic substances: No products were found. Clean Air Act (CAA) 112 regulated toxic substances: No products were found. Clean Air Act (CAA) 112 regulated toxic substances: No products were found.</p>

SARA 313

	<u>Product name</u>	<u>CAS number</u>	<u>Concentration</u>
Form R - Reporting requirements	: XL10-Gold Ultracompetent cells		
	Manganese dichloride	7773-01-5	5 - 10
	Hexaamminecobalt trichloride	10534-89-1	0.1 - 1
Supplier notification	: XL10-Gold Ultracompetent cells		
	Manganese dichloride	7773-01-5	5 - 10
	Hexaamminecobalt trichloride	10534-89-1	0.1 - 1

SARA 313 notifications must not be detached from the MSDS and any copying and redistribution of the MSDS shall include copying and redistribution of the notice attached to copies of the MSDS subsequently redistributed.

State regulations : XL10-Gold Ultracompetent cells

Connecticut Carcinogen Reporting: None of the components are listed.
 Connecticut Hazardous Material Survey: None of the components are listed.
 Florida substances: None of the components are listed.
 Illinois Chemical Safety Act: None of the components are listed.
 Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.

15 . Regulatory information

pUC18 Control Plasmid
DNA

XL10-Gold 2-
mercaptoethanol mix

Louisiana Reporting: None of the components are listed.
Louisiana Spill: None of the components are listed.
Massachusetts Spill: None of the components are listed.
Massachusetts Substances: The following components are listed: Glycerol; Sucrose
Michigan Critical Material: None of the components are listed.
Minnesota Hazardous Substances: None of the components are listed.
New Jersey Hazardous Substances: The following components are listed: Manganese dichloride
New Jersey Spill: None of the components are listed.
New Jersey Toxic Catastrophe Prevention Act: None of the components are listed.
New York Acutely Hazardous Substances: None of the components are listed.
New York Toxic Chemical Release Reporting: None of the components are listed.
Pennsylvania RTK Hazardous Substances: The following components are listed: Glycerol; Manganese dichloride; Sucrose
Rhode Island Hazardous Substances: None of the components are listed.

Connecticut Carcinogen Reporting: None of the components are listed.
Connecticut Hazardous Material Survey: None of the components are listed.
Florida substances: None of the components are listed.
Illinois Chemical Safety Act: None of the components are listed.
Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.
Louisiana Reporting: None of the components are listed.
Louisiana Spill: None of the components are listed.
Massachusetts Spill: None of the components are listed.
Massachusetts Substances: None of the components are listed.
Michigan Critical Material: None of the components are listed.
Minnesota Hazardous Substances: None of the components are listed.
New Jersey Hazardous Substances: None of the components are listed.
New Jersey Spill: None of the components are listed.
New Jersey Toxic Catastrophe Prevention Act: None of the components are listed.
New York Acutely Hazardous Substances: None of the components are listed.
New York Toxic Chemical Release Reporting: None of the components are listed.
Pennsylvania RTK Hazardous Substances: None of the components are listed.
Rhode Island Hazardous Substances: None of the components are listed.

Connecticut Carcinogen Reporting: None of the components are listed.
Connecticut Hazardous Material Survey: None of the components are listed.
Florida substances: None of the components are listed.
Illinois Chemical Safety Act: None of the components are listed.
Illinois Toxic Substances Disclosure to Employee Act: None of the components are listed.
Louisiana Reporting: None of the components are listed.
Louisiana Spill: None of the components are listed.
Massachusetts Spill: None of the components are listed.
Massachusetts Substances: The following components are

15 . Regulatory information

listed: 2-Mercaptoethanol

Michigan Critical Material: None of the components are listed.

Minnesota Hazardous Substances: None of the components are listed.

New Jersey Hazardous Substances: None of the components are listed.

New Jersey Spill: None of the components are listed.

New Jersey Toxic Catastrophe Prevention Act: None of the components are listed.

New York Acutely Hazardous Substances: None of the components are listed.

New York Toxic Chemical Release Reporting: None of the components are listed.

Pennsylvania RTK Hazardous Substances: The following components are listed: 2-Mercaptoethanol

Rhode Island Hazardous Substances: None of the components are listed.

State regulations - California Prop. 65 : No products were found.

16 . Other information

Label requirements	: XL10-Gold Ultracompetent cells	HARMFUL IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
	pUC18 Control Plasmid DNA	NOT EXPECTED TO PRODUCE SIGNIFICANT ADVERSE HEALTH EFFECTS WHEN THE RECOMMENDED INSTRUCTIONS FOR USE ARE FOLLOWED.
	XL10-Gold 2-mercaptoethanol mix	COMBUSTIBLE LIQUID AND VAPOR. HARMFUL IF SWALLOWED. CAUSES EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION.

Date of issue : 11/19/2008

Version : 1

Notice to reader

DISCLAIMER: This Material Safety Data Sheet is offered without charge to the clients of Agilent Technologies. Data is the most current available to Agilent Technologies at the time of preparation and is issued as a matter of information only, no warranty as to its accuracy or completeness is expressed or implied.

■ Indicates information that has changed from previously issued version.



MATERIAL SAFETY DATA SHEET (MSDS)

Telephone: (978) 927-5054
Toll free: (800) 632-5227
Fax: (978) 921-1350
Email: info@neb.com
Revision Date: 1/11

NEB #C2527

SECTION 1—CHEMICAL INFORMATION

Product Name: BL21(DE3) Competent *E. coli*

Cas.# None

SECTION 2—COMPOSITION/INFORMATION ON INGREDIENT

- | | | |
|-----------------------|-------|---------------|
| 1. Glycerol | 1-10% | Cas.# 56-81-5 |
| 2. Dimethyl Sulfoxide | 1-10% | Cas.# 67-68-5 |

The ingredients listed in this section include only those items that have more than 1% of a component classified as hazardous and 0.1% of a component classified as carcinogenic. If you have any questions, please contact info@neb.com.

SECTION 3—HAZARDOUS IDENTIFICATION

Emergency Overview: Warning: May cause irritation to skin, eyes, and respiratory tract, may affect kidneys, blood and liver.
HMIS and NFPA Ratings: 0 – Minimal or None, 1 – Slight, 2 – Moderate, 3 – Serious, and 4 – Severe

Health: 1
Flammability: 1
Reactivity: 0

SECTION 4—FIRST AID MEASURES

Eyes: Flush eyes with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating eyelids. Call a physician.
Skin: Wash skin with soap and copious amount of water.
Ingestion: If the person is conscious, wash out mouth with water. Call a physician.
Inhalation: Remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Call a physician.

SECTION 5—FIRE FIGHTING MEASURES

Extinguishing Media: Water spray. Carbon dioxide, dry chemical powder or appropriate foam.
Special Fire Fighting Procedures: Wear self contained breathing apparatus and protective clothing to prevent contact with skin and eyes.
Fire and Explosion Hazards: Combustible liquid. Emits toxic fumes under fire conditions.

SECTION 6—ACCIDENTAL RELEASE MEASURES

Personal Precautions: Avoid breathing or contact with vapors, mist or gas.
Procedure of Personal Precaution: Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves and chemical safety goggles. Use non-sparking tools and equipment. Ventilate and evacuate area of leak or spill.
Environmental Precautions: Do not let product enter drains.
Methods For Cleaning Up: Cover with dry lime, sand, or soda ash. Sweep up and shovel. Place in covered container for disposal.

SECTION 7—HANDLING AND STORAGE

Handling: Provide appropriate exhaust ventilation.
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 in a dry and well ventilated place. Store at -20°C.

SECTION 8--EXPOSURE CONTROLS/PPE

Engineering Controls: Safety shower and eye wash. Mechanical exhaust.

Personal Protective Equipment

Eye Protection: Safety goggles.

Hand Protection: Compatible resistant gloves.

Respiratory Protection: Government approved respirator.

Hygiene Measure: General practice, wash (hands and skin) thoroughly after handling. Remove and wash contaminated clothing.

SECTION 9--PHYSICAL AND CHEMICAL PROPERTIES

Physical State: Form: Liquid Color: Clear or colorless Odor: No Data Available

Property	Value	Temperature or Pressure	
Boiling Point Range:		>189°C	
Melting Point Range:		>18.4°C	
Flash Point:		>87°C	Method: Closed cup
Auto Ignition Temp:		>215°C	
Vapor Pressure:	.42 mmHg	20°C	
Vapor Density:	2.7 g/l		
Specific Gravity:	1.1		
Solubility in Water:	Soluble		

SECTION 10--STABILITY AND REACTIVITY

Stability: Stable under recommended storage conditions.

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

Acute and Chronic Affects Based On Routes Of Exposure

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

Eye Contact: May cause irritation.

Skin Contact: May cause irritation.

Ingestion: May cause nausea, coughing, headache or diarrhea.

Inhalation: Unlikely at room temperature, inhalation of mist may cause irritation of respiratory tract.

Chronic Exposure

Target Organ(s): May cause kidney and liver damage.

Aggravation of Pre-existing Conditions: Persons with pre-existing skin disorder or eye problems or impaired liver or kidneys may be more susceptible to the effects of the material.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen.

IARC: No component of this product present at levels greater than or equal to 0.1 % is identified as probable, possible or confirmed human carcinogen.

ACGIH: No component of this product present at levels greater than or equal to 0.1 % is identified as a known or suspected human carcinogen or confirmed animal with unknown relevance humans.

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.**Conditions Aggravated By Exposure:** 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.**Target Organ (s) or System (s):** Eyes and Skin**Toxicity Data****Inhalation**Rat
40,250 ppm
LC50**Oral**Rat
3,300 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.

SkinRat
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.

IntravenousRat
5,360 mg /kg
LD50

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

Chronic Exposure - CarcinogenSpecies: 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.**Chronic Exposure - Mutagen**Species: Rat
Route: Intraperitoneal
Dose: 25 gm/kg
Exposure Time: 5D
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: AbortionSpecies: 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).

SECTION 12--ECOLOGICAL INFORMATION

Elimination Information (persistence and degradability): No data available.

Ecotoxicity Effects

Toxicity to fish	LC50-Pimephales promelas (fathead minnow) - 34,000 mg/l - 96 h
	LC50-Oncorhynchus mykiss (rainbow trout) - 35,000 mg/l - 96 h
Toxicity to daphnia and other aquatic invertebrates	EC50-Daphnia pulex (water flea) - 27,500 mg/l
Toxicity to algae	EC50 - Lepomis macrochirus (Blue Gill) - > 400,000 mg/l - 96 h

Further Information On Ecology: No data available.

SECTION 13--DISPOSAL CONSIDERATIONS

Dispose of container, unused contents and contaminated packaging in accordance with federal, state and local requirement. Contract with a licensed Chemical Waste Disposal Service.

SECTION 14--TRANSPORT INFORMATION

This product is not dangerous and no special precautions are needed according to DOT, ADR/RID (cross border), IMDG and IATA/ICAO.

SECTION 15--REGULATORY INFORMATION

OSHA Hazards: None known.

US Classification and Label Test

US Statements: Combustible. Readily absorbed through skin. Target Organ (s): Eyes, skin, liver and kidneys. Caution. Avoid contact and inhalation.

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

EU Additional Classification

S: 23 24/25

Safety Statements: Do not breath vapor. Avoid contact with skin and eyes.

SECTION 16--OTHER INFORMATION

DISCLAIMER

The information provided on the MSDS is furnished in good faith and based on our present knowledge. However, this MSDS shall not constitute a guarantee of any kind. Personnel handling this material must make independent determinations of the suitability and completeness of information from all sources to assure proper use and disposal of this material and the safety and health of employees and customers. NEB assumes no additional liability or responsibility resulting from the use of, or reliance on this information. This product is for R&D use only. Not for drug, household or other uses.

Questions about the information found on this MSDS should be directed to info@neb.com.



Home > Emergency Preparedness > Laboratory Security > Pathogen Safety Data Sheets (PSDS) >
Adenovirus types 1, 2, 3, 4, 5 and 7 - Material Safety Data Sheets (MSDS)

Adenovirus types 1, 2, 3, 4, 5 and 7 - Material Safety Data Sheets (MSDS)

MATERIAL SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

SECTION I - INFECTIOUS AGENT

NAME: *Adenovirus types 1, 2, 3, 4, 5 and 7*

SYNONYM OR CROSS REFERENCE: ARD, acute respiratory disease, pharyngoconjunctival fever

CHARACTERISTICS: *Adenoviridae*; non-enveloped, icosahedral virions, 70-90 nm diameter, doubled-stranded, linear DNA genome.

SECTION II - HEALTH HAZARD

PATHOGENICITY: Varies in clinical manifestation and severity; symptoms include fever, rhinitis, pharyngitis, tonsillitis, cough and conjunctivitis; common cause of nonstreptococcal exudative pharyngitis among children under 3 years; more severe diseases include laryngitis, croup, bronchiolitis, or severe pneumonia; a syndrome of pharyngitis and conjunctivitis (pharyngoconjunctival fever) is associated with adenovirus infection

EPIDEMIOLOGY: Worldwide; seasonal in temperate regions, with highest incidences in the fall, winter and early spring; in tropical areas, infections are common in the wet and colder weather; annual incidence is particularly high in children; adenovirus types 4 and 7 are common among military recruits (ARD)

HOST RANGE: Humans

INFECTIOUS DOSE: > 150 plaque forming units when given intranasally

MODE OF TRANSMISSION: Directly by oral contact and droplet spread; indirectly by handkerchiefs, eating utensils and other articles freshly soiled with respiratory discharge of an infected person; outbreaks have been related to swimming pools; possible spread through the fecal-oral route

INCUBATION PERIOD: From 1-10 days

COMMUNICABILITY: Shortly prior to and for the duration of the active disease

SECTION III - DISSEMINATION

RESERVOIR: Humans

ZOONOSIS: None

VECTORS: None

SECTION IV - VIABILITY

DRUG SUSCEPTIBILITY: No specific antiviral available; cidofovir has shown promise in the treatment of adenoviral ocular infections.

SUSCEPTIBILITY TO DISINFECTANTS: Susceptible to 1% sodium hypochlorite, 2% glutaraldehyde, 0.25% sodium dodecyl sulfate

PHYSICAL INACTIVATION: Sensitive to heat >56°C; unusually stable to chemical or physical agents and adverse pH conditions

SURVIVAL OUTSIDE HOST: Resistance to chemical and physical agents allows for prolonged survival outside of the body. Adenovirus type 3 survived up to 10 days on paper under ambient conditions; adenovirus type 2 survived from 3-8 weeks on environmental surfaces at room temperature

SECTION V - MEDICAL

SURVEILLANCE: Monitor for symptoms; confirm by serological analysis

FIRST AID/TREATMENT: Mainly supportive therapy

IMMUNIZATION: Vaccine available for adenovirus types 4 and 7 (used for military recruits)

PROPHYLAXIS: None available

SECTION VI - LABORATORY HAZARDS

LABORATORY-ACQUIRED INFECTIONS: Ten cases documented up to 1988

SOURCES/SPECIMENS: Respiratory secretions

PRIMARY HAZARDS: Ingestion; droplet exposure of the mucous membrane

SPECIAL HAZARDS: Contact with feces from infected animals

SECTION VII - RECOMMENDED PRECAUTIONS

CONTAINMENT REQUIREMENTS: Biosafety level 2 practices and containment facilities for all activities involving the virus and potentially infectious body fluids or tissues

PROTECTIVE CLOTHING: Laboratory coat; gloves when skin contact with infectious materials is unavoidable

OTHER PRECAUTIONS: None

SECTION VIII - HANDLING INFORMATION

SPILLS: Allow aerosols to settle; wearing protective clothing gently cover the spill with absorbent paper towel and apply 1% sodium hypochlorite starting at the perimeter and working towards the centre; allow sufficient contact time (30 min) before clean up

DISPOSAL: Decontaminate all wastes before disposal; steam sterilization, incineration, chemical disinfection

STORAGE: In sealed containers that are appropriately labelled

SECTION IX - MISCELLANEOUS INFORMATION

Date prepared: November 1999

Prepared by: Office of Laboratory Security, PHAC

Although the information, opinions and recommendations contained in this Material Safety Data Sheet are compiled from sources believed to be reliable, we accept no responsibility for the accuracy, sufficiency, or reliability or for any loss or injury resulting from the use of the information. Newly discovered hazards are frequent and this information may not be completely up to date.

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Date Modified: 2001-01-23

Info on Cell Line(s)

Cell Biology

ATCC® Number: **CRL-1573™** [Order this Item](#) Price: **\$279.00**

Designations: 293 [HEK-293]

Depositors: FL Graham

Biosafety Level: 2 [CELLS CONTAIN ADENOVIRUS]

Shipped: frozen

Medium & Serum: See Propagation

Growth Properties: adherent

Organism: *Homo sapiens* (human)
epithelial

Morphology:



Source: **Organ:** embryonic kidney
Cell Type: transformed with adenovirus 5 DNA

Permits/Forms: In addition to the MTA mentioned above, other ATCC and/or regulatory permits may be required for the transfer of this ATCC material. Anyone purchasing ATCC material is ultimately responsible for obtaining the permits. Please click here for information regarding the specific requirements for shipment to your location.

Restrictions: These cells are distributed for research purposes only. 293 cells, their products, or their derivatives may not be distributed to third parties.

Applications: efficacy testing [92587]
transfection host (Nucleofection technology from Lonza Roche FuGENE® Transfection Reagents)
virucide testing [92579]

Receptors: vitronectin, expressed

Tumorigenic: YES
Amelogenin: X
CSF1PO: 11,12
D13S317: 12,14
D16S539: 9,13

DNA Profile (STR): D5S818: 8,9
D7S820: 11,12
TH01: 7,9.3
TPOX: 11
vWA: 16,19

Cytogenetic Analysis:

Related Links ▶

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[Cell Micrograph](#)

[Make a Deposit](#)

[Frequently Asked Questions](#)

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[Related Cell Culture Products](#)

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MATERIAL SAFETY DATA SHEET

MSDS FOR ANIMAL CELL CULTURES (Biosafety Level 1 or 2)

MATERIAL SAFETY DATA SHEET

SECTION 1 - SUBSTANCE IDENTITY AND COMPANY INFORMATION

Product Name: Various Animal Cell Cultures at Biosafety Level 1 or 2
ATCC Catalog #: Various

COMPANY INFORMATION: AMERICAN TYPE CULTURE COLLECTION
PO BOX 1549
MANASSAS, VA 20108

FOR INFORMATION CALL: 800-638-6597 or 703-365-2700
AFTER-HOURS CONTACT: 703-365-2710
CHEMTREC EMERGENCY: 800-424-9300 or 703-527-3887

SECTION 2 - COMPOSITION/INFORMATION ON INGREDIENTS

Either frozen or growing cells shipped in liquid cell culture medium (a mixture of components that may include, but is not limited to: inorganic salts, vitamins, amino acids, carbohydrates and other nutrients dissolved in water). Frozen Cultures may also contain a 5%-10% solution of Dimethyl sulfoxide as a cryoprotectant.

SECTION 3 - HAZARD IDENTIFICATION

HMIS Rating: Health: 0 Flammability: 0 Reactivity: 0
NFPA Rating: Health: 0 Flammability: 0 Reactivity: 0

This substance is not hazardous as defined by OSHA 29CFR 1910.1200 however this product should be handled according to good lab practices, with proper personal protective equipment, proper engineering controls and within the parameters of the purchaser's safety program.

Health Hazards

For Biosafety Level 1 Cell Cultures

Handle as a potentially biohazardous material under at least Biosafety Level 1 containment. This cell line is not known to cause disease in healthy adult humans. These cells have **NOT** been screened for Hepatitis B, human immunodeficiency viruses or other adventitious agents, unless otherwise reported on the Certificate of Analysis. Universal Precautions according to 29 CFR 1910.1030 should be followed at all times when manipulating these cell lines.

See next page for Biosafety Level 2 cell cultures.



MATERIAL SAFETY DATA SHEET

For Biosafety Level 2 Cell Cultures

Handle as a potentially biohazardous material under at least Biosafety Level 2 containment. These cell lines are associated with human disease, hazards include: percutaneous injury, ingestion, mucous membrane exposure (U.S. Government Publication **Biosafety in Microbiological and Biomedical Laboratories**). These cells have **NOT** been screened for Hepatitis B, human immunodeficiency viruses or other adventitious agents, unless otherwise reported on the Certificate of Analysis. Regardless of results reported on the Certificate of Analysis Universal Precautions according to 29 CFR 1910.1030 should be followed at all times when manipulating these cell lines.

SECTION 4 -

FIRST AID MEASURES

Report to your Safety Office and Seek Medical Attention as Soon as Possible

Ingestion: If person is unconscious seek emergency medical attention; never give anything by mouth to an unconscious person. If the person is conscious wash mouth out with copious amounts of water and call a physician then administer three cupfuls of water. Do not induce vomiting unless directed to do so by a physician.

Inhalation: If person is unconscious seek emergency medical attention, if person is conscious remove to fresh air and call a physician.

Dermal exposure: Immediately wash skin with copious amounts of water followed by washing with soap and copious amounts of water. Remove all contaminated clothing.

Eye exposures: Flush eyes with copious amounts of water for at least 15 minutes with eyelids separated and call a physician.

SECTION 5 -

FIRE FIGHTING MEASURES

Flammability: Data not available

Suitable Extinguishing Media: Water spray, carbon dioxide, dry chemical powder, Halon (where regulations permit), or appropriate foam.

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent inhalation, ingestion, skin and eye contact.

Specific Hazard(s): Responders should take into consideration the biohazard risk associated with responding to a fire in the area where the material may be stored or handled.



MATERIAL SAFETY DATA SHEET

SECTION 6 - ACCIDENTAL RELEASE MEASURES

Procedure(s) of Personal Precaution(s): At a minimum use PPE listed in Section 8. Wear laboratory coat, gloves and eye protection. Avoid all contact.

Methods for Cleaning Up

Patient/Victim: Wash with soap and water. Work clothes should be laundered separately. Launder contaminated clothing before re-use. Do not take clothing home.

Equipment/Environment: Allow aerosols to settle; wearing protective clothing, gently cover spill with paper towel and apply 1% sodium hypochlorite, starting at perimeter and working towards the center; allow sufficient contact time before clean up (30 min).

Note: The use of additional PPE may be necessary for cleaning solutions.

SECTION 7 - HANDLING AND STORAGE

Handle and store according to instructions on product information sheet and label.

Special Requirements:

Follow established laboratory procedures when handling material.

SECTION 8 - EXPOSURE CONTROLS/PERSONAL PROTECTION

Use Personal Protective Equipment: Including Eye Protection, Chemical Resistant Gloves, and appropriate clothing to prevent skin exposure. In addition, a Respiratory protection program that complies with OSHA 29 CFR 1910.134 and ANSI Z88.2 requirements or European Standard EN 149 must be followed whenever workplace conditions warrant respirator use.

Engineering Controls: The use and storage of this material requires user to maintain and make available appropriate eyewash and safety shower facilities. Use fume hood or other appropriate ventilation method to keep airborne concentrations as low as possible.

Exposure Limits: No exposure limits for this material have been established by ACGIH, NIOSH, or OSHA.

SECTION 9 - PHYSICAL AND CHEMICAL PROPERTIES

Data Not Available

SECTION 10 - STABILITY AND REACTIVITY

Hazardous polymerization will not occur.

SECTION 11 - TOXICOLOGICAL INFORMATION

Route of Exposure

American Type Culture Collection
P.O. Box 1549
Manassas, VA 20108
July 2010

Emergency Telephone: (703) 365-2710 (24 hours)
Information Telephone: (703) 365-2700 Ext.2303



MATERIAL SAFETY DATA SHEET

Eye Contact: Data not available. Avoid eye contact.
Skin Contact: Data not available. Avoid skin contact.
Skin Absorption: Data not available. Avoid skin absorption.
Inhalation: Data not available. Avoid inhalation.
Ingestion: Data not available. Avoid ingestion.
Parenteral Exposure: Data not available. Avoid parenteral exposure.

Sensitization

Skin: Data not available
Respiratory: Data not available

Target Organ(s) or System(s): Data not available

Signs and Symptoms of Exposure

Skin and Mucous Membranes: Data not available
Respiratory: Data not available
Gastrointestinal: Data not available

Toxicity Data: Data not available
Effects of Long Term or Repeated Exposure: Data not available
Chronic Exposure-Teratogen: Data not available
Chronic Exposure-Mutagen: Data not available
Chronic Exposure-Reproductive Hazard: Data not available

SECTION 12 - ECOLOGICAL INFORMATION

No ecological information available.

SECTION 13 - DISPOSAL CONSIDERATIONS

Decontaminate all wastes before disposal (steam sterilization, chemical disinfection, and/or incineration).
Dispose of in accordance with applicable regulations.

SECTION 14 - TRANSPORT INFORMATION

Contact ATCC for transport information.

SECTION 15 - REGULATORY INFORMATION

Contact ATCC for regulatory information.

SECTION 16 - OTHER INFORMATION



ATCC™

MATERIAL SAFETY DATA SHEET

THE INFORMATION PRESENTED IN THIS DOCUMENT IS BELIEVED TO BE CORRECT BASED UPON DATA AVAILABLE TO ATCC. USERS SHOULD MAKE AN INDEPENDENT DECISION REGARDING THE ACCURACY OF THIS INFORMATION BASED ON THEIR NEEDS AND DATA AVAILABLE TO THEM. ALL SUBSTANCES AND MIXTURES MAY PRESENT UNKNOWN HAZARDS AND ALL NECESSARY SAFETY PRECAUTIONS SHOULD BE TAKEN. ATCC ASSUMES NO LIABILITY RESULTING FROM USING OR COMING IN CONTACT WITH THIS SUBSTANCE.

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product code V49320
Product name pAd/CMV/V5-DEST™ Gateway® Vector

Contact manufacturer
 INVITROGEN CORPORATON
 1600 FARADAY AVENUE
 PO BOX 6482
 CARLSBAD, CA 92008
 760-603-7200

Info on Vector(s)

INVITROGEN CORPORATION
 2270 INDUSTRIAL STREET
 BURLINGTON, ONT
 CANADA L7P 1A1
 800-263-6236

GIBCO PRODUCTS
 INVITROGEN CORPORATION
 3175 STALEY ROAD P.O. BOX 68
 GRAND ISLAND, NY 14072
 716-774-6700

2. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous/Non-hazardous Components

The product contains no substances which at their given concentration, are considered to be hazardous to health

3. HAZARDS IDENTIFICATION

Emergency Overview

The product contains no substances which at their given concentration, are considered to be hazardous to health.

Form
 suspension

Principle Routes of Exposure/

Potential Health effects

Eyes	No information available
Skin	No information available
Inhalation	No information available
Ingestion	No information available

Specific effects

Carcinogenic effects	No information available
Mutagenic effects	No information available
Reproductive toxicity	No information available

Sensitization

No information available

Target Organ Effects

No information available

4. FIRST AID MEASURES

Skin contact	Wash off immediately with plenty of water
Eye contact	Rinse thoroughly with plenty of water, also under the eyelids.
Ingestion	Never give anything by mouth to an unconscious person
Inhalation	Move to fresh air
Notes to physician	Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	Dry chemical
Special protective equipment for firefighters	Wear self-contained breathing apparatus and protective suit

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	Use personal protective equipment
Methods for cleaning up	Soak up with inert absorbent material

7. HANDLING AND STORAGE

Handling	No special handling advice required
Storage	Keep in properly labelled containers

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure controls

Exposure limits

Engineering measures Ensure adequate ventilation, especially in confined areas

Personal protective equipment

Respiratory protection	In case of insufficient ventilation wear suitable respiratory equipment
Hand protection	Protective gloves
Eye protection	Safety glasses with side-shields
Skin and body protection	Lightweight protective clothing
Hygiene measures	Handle in accordance with good industrial hygiene and safety practice
Environmental exposure controls	Prevent product from entering drains

9. PHYSICAL AND CHEMICAL PROPERTIES

General Information

Form	suspension
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Important Health Safety and Environmental Information

Boiling point/range	°C No data available	°F No data available
Melting point/range	°C No data available	°F No data available
Flash point	°C No data available	°F No data available
Autoignition temperature	°C No data available	°F No data available
Oxidizing properties	No information available	

Water solubility

No data available

10. STABILITY AND REACTIVITY

Stability	Stable.
Materials to avoid	No information available
Hazardous decomposition products	No information available
Polymerization	Hazardous polymerisation does not occur

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Principle Routes of Exposure/

Potential Health effects

Eyes	No information available
Skin	No information available
Inhalation	No information available
Ingestion	No information available

Specific effects

Carcinogenic effects	No information available
Mutagenic effects	No information available
Reproductive toxicity	No information available
Sensitization	No information available

Target Organ Effects

No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity effects	No information available.
Mobility	No information available.
Biodegradation	Inherently biodegradable.
Bioaccumulation	Does not bioaccumulate.

13. DISPOSAL CONSIDERATIONS

Dispose of in accordance with local regulations

14. TRANSPORT INFORMATION

IATA

Proper shipping name	Not classified as dangerous in the meaning of transport regulations
Hazard Class	No information available
Subsidiary Class	No information available
Packing group	No information available
UN-No	No information available

15. REGULATORY INFORMATION

International Inventories

U.S. Federal Regulations

SARA 313

Not regulated

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product contains the following HAPs:

U.S. State Regulations

California Proposition 65

This product contains the following Proposition 65 chemicals:

WHMIS hazard class:

Non-controlled

This product has been classified according to the hazard criteria of the CPR and the MSDS contains all of the information required by the CPR

16. OTHER INFORMATION

This material is sold for research and development purposes only. It is not for any human or animal therapeutic or clinical diagnostic use. It is not intended for food, drug, household, agricultural, or cosmetic use. An individual technically qualified to handle potentially hazardous chemicals must supervise the use of this material.

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End of Safety Data Sheet