THE UNIVERSITY OF WESTERN ONTARIO
BIOHAZARDOUS AGENTS REGISTRY FORM
Approved Biohazards Subcommittee: September 25, 2009
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 or in charge of a laboratory/facility where the use of Level 1, 2 or 3 biohazardous 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 biohazards 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 Biohazard 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: Jun Yang
SIGNATURE:
DEPARTMENT: Mechanical and Materials Engineering
ADDRESS: SEB 3089
PHONE NUMBER: ext. 80158
EMERGENCY PHONE NUMBER(S):
EMAIL: jyang@eng.uwo.ca

Location of experimental work to be carried out: Building(s) SEB Room(s) 3074

*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 12.0, Approvals).

FUNDING AGENCY/AGENCIES: NSERC, CIHR, OCE, UWO, MRI
GRANT TITLE(S): Blood-on-a-chip: multiscale transport phenomena in microcirculation; Biophysical studies of alpha4Beta1 integrin–ligand interactions at a single molecule level and a single cell level; Microfluidics meets Microbiology

PLEASE ATTACH A BRIEF DESCRIPTION OF YOUR WORK THAT EXPLAINS THE BIOHAZARDS USED AND HOW THEY WILL BE USED. PROJECTS SUBMITTED WITHOUT A SUMMARY WILL NOT BE REVIEWED. A GRANT SUMMARY PAGE MAYBE ADEQUATE IF IT PROVIDES SUFFICIENT DETAIL ABOUT EACH BIOHAZARD USED.

Names of all personnel working under Principal Investigators supervision in this location:

Nour Gjomaim
Qiuquan Guo
Binyu Yu
Tingjie Li

*** DESCRIPTION MUST BE ATTACHED TO THIS FORM OR PROJECT WILL NOT BE REVIEWED***

1.0 Microorganisms

1.1 Does your work involve the use of biological agents? Ø YES O NO
(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? Ø YES O NO
If YES, please give the name of the species. E. coli, S. aureus
What is the origin of the microorganism(s)? Cedarlane
Please describe the risk (if any) of escape and how this will be mitigated:
~~No risk they are~~ The risk is low. all experiments are conducted in Biosafety level 2 lab. &

Please attach the CFIA permit. Attached at the end
Please describe any CFIA permit conditions:

1.2 Please complete the table below:

Name of Biological agent(s)*	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	Ø Yes O No	Ø Yes O No	O Yes O No	0.1 L	Cedarlane	O 1 Ø 2 O 3
S. aureus	Ø Yes O No	Ø Yes O No	Ø Yes O No	0.1 L	Cedarlane	O 1 Ø 2 O 3
	O Yes O No	O Yes O No	O Yes O No			O 1 O 2 O 3
	O Yes O No	O Yes O No	O Yes O No			O 1 O 2 O 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? Ø YES O 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	Ø Yes O No	~~Endothelial cells from Lonza~~	Not applicable
Rodent	O Yes Ø No		
Non-human primate	O Yes Ø No		
Other (specify)	O Yes Ø No		

*** DESCRIPTION MUST BE ATTACHED TO THIS FORM OR PROJECT WILL NOT BE REVIEWED***

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)*	Supplier / Source
Human	✓ Yes O No	endothelial cell line from Lonza	Lonza
Rodent	O Yes ✓ No		
Non-human primate	O Yes ✓ No		
Other (specify)	O Yes ✓ 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 O 1 ✓ 2 O 3

3.0 Use of Human Source Materials

3.1 Does your work involve the use of human source materials? ✓ YES O 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/NO**	**Name of Infectious Agent (If applicable)**	**PHAC or CFIA Containment Level (Select one)**
Human Blood (whole) or other Body Fluid		✓ Yes O No O Unknown		O 1 ✓ 2 O 3
Human Blood (fraction) or other Body Fluid		O Yes ✓ No O Unknown		O 1 O 2 O 3
Human Organs or Tissues (unpreserved)		O Yes ✓ No O Unknown		O 1 O 2 O 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? O YES ✓ NO If no, please proceed to Section 5.0

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

Bacteria Used for Cloning *	Plasmid(s) *	Source of Plasmid	Gene Transfected	Describe the change that results

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

4.3 Will genetic modification(s) involving viral vectors be made? O YES, complete table below O NO

Virus Used for Vector Construction	Vector(s) *	Source of Vector	Gene(s) Transduced	Describe the change that results

* Please attach a Material Safety Data Sheet or equivalent.

4.4 Will genetic sequences from the following be involved?

- HIV O YES, please specify _____ O NO
- HTLV 1 or 2 or genes from any Level 1 or Level 2 pathogens O YES, specify _____ O NO
- SV 40 Large T antigen O YES O NO
- E1A oncogene O YES O NO
- Known oncogenes O YES, please specify _____ O NO
- Other human or animal pathogen and or their toxins O YES, please specify _____ O NO

4.5 Will virus be replication defective? O YES O NO

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

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

5.0 Human Gene Therapy Trials

5.1 Will human clinical trials be conducted involving a biological agent? O YES ✓O 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? O YES O 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? O YES, number: _____ O NO O PENDING

6.0 Animal Experiments

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

6.2 Name of animal species to be used_____

6.3 AUS protocol # _____

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

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

_____

_____

*** DESCRIPTION MUST BE ATTACHED TO THIS FORM OR PROJECT WILL NOT BE REVIEWED***

7.0 Use of Animal species with Zoonotic Hazards

7.1 Will any of the following animals or their organs, tissues, lavages or other body fluids including blood be used?

- Pound source dogs O YES O NO
- Pound source cats O YES O NO
- Cattle, sheep or goats O YES O NO
- Non-human primates O YES, please specify species _____ O NO
- Wild caught animals O YES, please specify species & colony # _____ O NO
- Birds O YES O NO
- Others (wild or domestic) O YES, please specify _____ O NO

8.0 Biological Toxins

8.1 Will toxins of biological origin be used? O YES O NO If no, please proceed to Section 9.0

8.2 If YES, please name the toxin(s)_____
Please attach information, such as a Material Safety Data Sheet, for the toxin(s) used.

8.3 What is the LD_{50} (specify species) of the toxin_____

8.4 How much of the toxin is handled at one time*? _____

8.5 How much of the toxin is stored*? _____

8.6 Will any biological toxins be used in live animals? O YES, Please provide detais:_____ O NO

*For information on biosecurity requirements, please see:
http://www.uwo.ca/humanresources/docandform/docs/healthandsafety/biosafety/Biosecurity_Requirements.pdf

9.0 Insects Requiring CFIA Permits

9.1 Do you use insects that require a permit from the CFIA? O YES O NO
If no, please proceed to Section 10.0

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

9.3 What is the origin of the insect? _____

9.4 What is the life stage of the insect? _____

9.5 What is your intention? O Initiate and maintain colony, give location: _____
O "One-time" use, give location: _____

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

9.7 Please attach the CFIA permit.

9.8 Please describe any CFIA permit conditions:
_____
_____

*** DESCRIPTION MUST BE ATTACHED TO THIS FORM OR PROJECT WILL NOT BE REVIEWED***

10.0 Plants Requiring CFIA Permits

10.1 Do you use plants that require a permit from the CFIA? O YES O 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? O Grow and maintain a crop O "One-time" use

10.6 Do you do any modifications to the plant? O YES O 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? O YES O NO
If NO, please forward the permit to he Biosafety Officer when available.

10.9 Please describe any CFIA permit conditions:
_____
_____
_____

11.0 Import Requirements

11.1 Will any of the above agents be imported? O YES, please give country of origin_____
If no, please proceed to Section 12.0 O NO

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

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

11.4 Has the import permit been sent to OHS? O YES, please provide permit # _____ O 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 biohazardous agents in Sections 1.0 to 9.0 have been trained.

SIGNATURE _____

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13.0 Containment Levels

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

13.2 Has the facility been certified by OHS for this level of containment?

✓ YES, permit # if on-campus Bio-UWO-0149

O NO, please certify

O NOT REQUIRED for Level 1 containment

14.0 Procedures to be Followed

14.1 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/

SIGNATURE _____ Date: N. Dec. 2. 2009

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

_____

_____

_____

14.3 Please outline what will be done if there is an exposure to the biohazards listed, such as a needlestick injury:

As ~~suffy~~ required by UWO biosafety procedure

_____

15.0 Approvals

UWO Biohazard Subcommittee: SIGNATURE: _____
Date: _____

Safety Officer for Institution where experiments will take place: SIGNATURE: _____
Date: _____

Safety Officer for University of Western Ontario (if different from above): SIGNATURE: _____
Date: _____

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

Special Conditions of Approval:

*** DESCRIPTION MUST BE ATTACHED TO THIS FORM OR PROJECT WILL NOT BE REVIEWED***

Human aortic endothelial cell (HAEC) is cultured in both petri-dish and microchannel system. After cell comes confluent, it will be transferred to a small petri-dish (60mm) for atomic force microscopy (AFM) scan. The morphology and mechanical property will be measured. Critical dry is also performed for endothelial cells sometimes.

Human raw blood was drawn from a healthy donor in the university hospital and stored in a vacutainer containing anticoagulant (EDTA) at 4Â°C in the lab refrigerator. Blood sample was taken out with syringe and loaded into the Lab-on-a-CD device for blood separation. After experiment, the sample was wash with bleach. The waste was collected, and assorted into solid waste and liquid waste. They were stored in the labeled container for autoclave.

The antibacterial activities of TiO2 coating on silicon wafer obtained against S.aureus and E.coli were studied using the so-called antibacterial drop-test. S.aureus ATCC6538 and E.coli O157 were used as the experimental bacteria. E.coli, precultured in 15ml of nutrient broth (DifcoTM BD) at 37° C for 24h, were washed by centrifuging at 4000 rpm for 10min. After removing the supernatant, the cells were wash with phosphate buffer solution (PBS) twice and were resuspended and diluted to approximately 2×105 CFU/ml with PBS solution.The samples were placed in the sterilized petridishes. Then 100ul of PBS solution with bacteria was added dropwise onto the surface of each sample, and uncoated piece of silicon wafer was chose as a blank reference. The petridishes were sealed and were laid at incubator at 37° C with the humidity 46% for different time or laid at ambient temperature under UV-light for different time period.
After each time period the bacteria containing drops were washed from the surface of the sample by using 5ml PBS in the sterilized petri dish. The 100ul each of bacteria suspension was dispersed on the plate count agar. The number of surviving bacteria colony on the petri dishes were counted after incubation for 24 h at 37°C.

Disposable biohazard waste including: Bacterial aqueous solution, plastic pipets, plastic tubes, disposable inoculating loops, petri dish with Plate count agar.

Public Health Agency of Canada
Agence de la santé publique du Canada

Office of Laboratory Security
Bureau de sécurité des laboratoires

Centre for Emergency Preparedness and Response
Centre de mesures et d'interventions d'urgence
100 chemin Colonnade Road, Loc.: 6201A
Ottawa, Ontario, Canada K1A 0K9

WHO Collaborating Centre for Biosafety

Centre collaborateur OMS pour les techniques de biosécurité

Fax: (613) 941-0596 Tel: (613) 957-1779

DATE_____ FROM / DE : Marianne Heisz

TO / À : Jun Yang & Edmond Leung
University of Western Ontario
Mechanical & Materials Engineering

FAX: 519 - 661-3020 TEL: 519 - 661-2111 x. 80158 PAGES TO FOLLOW / PAGES À SUIVRE : 1

COMMENTS - COMMENTAIRES

Please see attached a letter for your attention. Original will follow through regular mail. Thank you.	Vous trouverez sous pli une lettre à votre attention. La copie originale suivra par le courrier régulier. Merci

Public Health Agency of Canada / Agence de la santé publique du Canada

Your file / Votre référence

Our file / Notre référence

Canadian end-user compliance with the *Laboratory Biosafety Guidelines, 3rd Ed., 2004*

This letter serves to confirm that the Office of Laboratory Security has reviewed a Containment Level 2 checklist for the facility identified below, and found the information submitted acceptable.

Organization:	University of Western Ontario Mechanical & Materials Engineering
Attention:	Jun Yang & Edmond Leung
Address:	1151 Richmond Street N. SEB 3088 London, ON N6A 5B9
Laboratory Room Number(s):	SEB 3074
Type of work:	■ *in vitro* only ☐ *in vitro* and *in vivo**
Compliance Letter expiry date:	NOVEMBER 1 5, 2010

To renew your compliance letter please complete a CL2 checklist and fax it to our office at (613) 941-0596. The checklist can be obtained from the following website: www.phac-aspc.gc.ca/ols-bsl/pathogen/index.html

Should you have any questions regarding this letter, please do not hesitate to contact our office at (613) 957-1779.

Sincerely,

Marianne Heisz
Chief, Importation and Regulatory Affairs

OCTOBER 2 7, 2008
Date

*The Office of Laboratory Security must be contacted prior to initiating any work involving domestic animals including poultry, cattle, sheep, swine and horses.

Canada

------- Original Message -------
Subject:[Fwd: RE: Biohazardous Agents Registry Form: Yang]
Date: Tue, 08 Dec 2009 15:25:45 -0500
From: Jennifer Stanley <jstanle2@uwo.ca>
To: Jennifer Stanley <jstanle2@uwo.ca>

-------- Original Message --------
Subject: RE: Biohazardous Agents Registry Form: Yang
Date: Tue, 08 Dec 2009 14:34:53 -0500
From: Jun Yang <jyang237@uwo.ca>
To: 'Jennifer Stanley' <jstanle2@uwo.ca>
References: <4B1D4561.6080609@uwo.ca>
<A1AA2B9FC03E46029B71E8DD02A7FCB0@Bionano> <4B1D6944.7070006@uwo.ca>
<fc17e2b71e5f2.4b1e4ae6@uwo.ca>

Hi, Jennifer:

I think you can use the enclosed MSDS since endothelial cell lines are similar from one company to another.

Regarding blood, sorry I made a mistake. The blood is not infected, which is from health donors.

Best regards!

Jun

From: Jennifer Stanley [mailto:jstanle2@uwo.ca]
Sent: 2009年12月8日 12:48 PM
To: Jun Yang
Subject: Re: Biohazardous Agents Registry Form: Yang

Hi Dr. Yang

Perhaps if you give me the exact cell line name I will be able to find it on the Lonza site?

Also, I noticed on Table 3.2 that you are using human blood that is infected...can you tell me what it is infected with?

Regards

Jennifer

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Bacteria

ATCC® Number: 33807™ Order this Item
Price: $240.00

Organism: *Staphylococcus aureus* subsp. *aureus* Rosenbach
Designations: D0318
Isolation: clinical isolate
Depositor: JC Feeley
History: ATCC <<--JC Feeley<<--Wisconsin State Hlth. Dept
Biosafety Level: 2
Shipped: freeze-dried
Growth Conditions: ATCC medium3: Nutrient agar or nutrient broth
Temperature: 37.0°C
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.
Comments: Does not produce pyrogenic exotoxin C

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Bacteria

ATCC® Number: 29425™ Order this Item
Price: $195.00

Organism: *Escherichia coli* (Migula) Castellani and Chalmers
Designations: K12
Isolation: Basel, 1969 [185139]
Depositor: R Yuan
History: ATCC <<--R Yuan<<--W. Arber
Biosafety Level: 1
Shipped: frozen
Growth Conditions: ATCC medium3: Nutrient agar or nutrient broth
Temperature: 37.0°C
Duration: aerobic
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.
References: 185139: R Yuan, personal communication

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All prices are listed in U.S. dollars and are subject to change without notice. A discount off the current list price will be applied to most cultures for nonprofit institutions in the United States. Cultures that are ordered as test tubes or flasks will carry an additional laboratory fee. Fees for permits, shipping, and handling may apply.
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invitrogen

Material Safety Data Sheet

Revision Date: 10-Jul-2007

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

Product code C0065C
Product name HAEC, 500,000 cells/vial

Company/Undertaking Identification

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

INVITROGEN CORPORATION
3 FOUNTAIN DRIVE
INCHINNAN BUSINESS PARK
PAISLEY, PA4 9RF
SCOTLAND
011 44 141 814 6100

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

CASCADE BIOLOGICS
INVITROGEN CORPORATION
1341 S.W. CUSTER DRIVE
PORTLAND, OR 97219
++1 503-292-9521
++1 800-778-4770

2. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous/Non-hazardous Components

Chemical Name	CAS-No	Weight %
dimethylsulfoxide	67-68-5	7-13

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

3. HAZARDS IDENTIFICATION

3. HAZARDS IDENTIFICATION

Emergency Overview

Components of the product may be absorbed into the body through the skin

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	Mild eye irritation.
Skin	Moderate skin irritation. Components of the product may be absorbed into the body through the skin.
Inhalation	No information available
Ingestion	May be harmful if swallowed.

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

HMIS

Health	1
Flammability	0
Reactivity	0

4. FIRST AID MEASURES

Skin contact	Wash off immediately with soap and plenty of water removing all contaminated clothes and shoes.
Eye contact	Rinse thoroughly with plenty of water, also under the eyelids.
Ingestion	Rinse mouth.
Inhalation	Move to fresh air
Notes to physician	Treat symptomatically

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	Water spray. Carbon dioxide (CO2). Foam. Dry powder. alcohol-resistant foam. The product is not flammable.
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. Clean contaminated surface thoroughly. Take up mechanically and collect in suitable container for disposal.

7. HANDLING AND STORAGE

Handling Avoid contact with skin and eyes.
Storage Keep in properly labelled containers.

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure controls

Exposure limits

Chemical Name	OSHA PEL (TWA)	OSHA PEL (Ceiling)	ACGIH OEL (TWA)	ACGIH OEL (STEL)
dimethylsulfoxide	-	-	-	-

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

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	soluble	

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

Chemical Name	LD50 (oral,rat/mouse)	LD50 (dermal,rat/rabbit)	LC50 (inhalation,rat/mouse)
dimethylsulfoxide	14500 mg/kg (Rat)	No data available	No data available

Principle Routes of Exposure/ Potential Health effects

Eyes	Mild eye irritation.
Skin	Moderate skin irritation. Components of the product may be absorbed into the body through the skin.
Inhalation	No information available
Ingestion	May be harmful if swallowed.

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

Chemical Name	TSCA	PICCS	ENCS	DSL	NDSL	AICS
dimethylsulfoxide	Listed	Listed	Listed	Listed	-	Listed

U.S. Federal Regulations

SARA 313
This product is not regulated by SARA.

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)
This product does not contains HAPs.

U.S. State Regulations

Chemical Name	Massachusetts - RTK	New Jersey - RTK	Pennsylvania - RTK	Illinois - RTK	Rhode Island - RTK
dimethylsulfoxide	-	-	-	-	-

California Proposition 65

This product does not contain chemicals listed under Proposition 65

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.

The above information was acquired by diligent search and/or investigation and the recommendations are based on prudent application of professional judgment. The information shall not be taken as being all inclusive and is to be used only as a guide. All materials and mixtures may be present unknown hazards and should be used with caution. Since Invitrogen Corporation cannot control the actual methods, volumes, or conditions of use, the Company shall not be held liable for any damages or losses resulting from the handling or from contact with the product as described herein. THE INFORMATION IN THIS MSDS DOES NOT CONSTITUTE A WARRANTY, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTCULAR PURPOSE.

End of Safety Data Sheet