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	Brian Shilton
SIGNATURE	
DEPARTMENT	Biochemistry
ADDRESS	Medical Sciences Building, Rm 332; London, Ontario
PHONE NUMBER	519-661-4124
EMERGENCY PHONE NUMBER(S)	226-663-7192
EMAIL	bshilton@uwo.ca

Location of experimental work to be carried out: Building(s) _Medical Sciences____ Room(s)_329___

*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_____
GRANT TITLE(S): ___Chemical-Mechanical Coupling in ABC Transport Systems_____

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. Description is attached – see page 8.

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

Alister Gould
Magdalena Cybulska

*** 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? X 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? O YES X 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)*	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
BL21(DE3)	Yes X No	Yes X No	Yes X No	4 L	Lab Stock	X 1 2 3
XL1-Blue	Yes X No	Yes X No	Yes X No	4 L	Stratagene -propagated in lab	X 1 2 3
	Yes No	Yes No	Yes No			1 2 3
	Yes No	Yes No	Yes No			1 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 X 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 No		Not applicable
Rodent	Yes No		
Non-human primate	Yes No		
Other (specify)	Yes 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 No		
Rodent	Yes No		
Non-human primate	Yes No		
Other (specify)	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 1 2 3

3.0 Use of Human Source Materials

3.1 Does your work involve the use of human source materials? YES X 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 No Unknown		O 1 O 2 O 3
Human Blood (fraction) or other Body Fluid		Yes No Unknown		O 1 O 2 O 3
Human Organs or Tissues (unpreserved)		Yes No 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? X YES NO If no, please proceed to Section 5.0

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

Bacteria Used for Cloning *	Plasmid(s) *	Source of Plasmid	Gene Transfected	Describe the change that results
XL1-Blue	*pProEX-HTa*	*Invitrogen originally; now propagated*		*Bacteria produce the protein in question when induced with IPTG*

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

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

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 X 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 X 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 YES, specify: _____ NO

6.5 Will the agent(s) be shed by the animal: YES 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 YES X NO
- Pound source cats YES X NO
- Cattle, sheep or goats YES X NO
- Non-human primates YES, please specify species _____ X NO
- Wild caught animals YES, please specify species & colony # _____ X NO
- Birds YES X NO
- Others (wild or domestic) YES, please specify _____ X NO

8.0 Biological Toxins

8.1 Will toxins of biological origin be used? YES X 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? YES, Please provide detais:_____ 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? YES X 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? 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:
_____
_____

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10.0 Plants Requiring CFIA Permits

10.1 Do you use plants that require a permit from the CFIA? YES X 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 O "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 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? YES, please give country of origin_____
If no, please proceed to Section 12.0 X NO

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

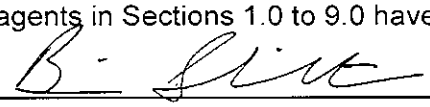
11.4 Has the import permit been sent to OHS? YES, please provide permit # _____ NO

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 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. X 1 2 3

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

YES, permit # if on-campus_____

NO, please certify

X 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: February 22, 2010

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.

____No additional risk reduction measures are required for the agents in use. _____

_____

_____

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

Occassionally, bacterial culture may splash onto exposed skin (i.e. wrist area, between glove and labcoat). This would require thorough washing of exposed skin along with treatment using hand sanitizer or 70% alcohol. In the unlikely event that skin is breached with a sharp object (which are typically not required for work with bacterial cultures), we would wash thoroughly, treat the wound with antibiotic, and dress it assuming it is only a small cut or puncture. An accident report would be submitted and the wound closely monitored for signs of infection.

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:

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Description of Work

The biohazardous agents comprise *Escherichia coli* K12 derived strains of bacteria and plasmid vectors bearing antibiotic resistance markers. The work conducted with these agents includes:

1. Production of competent *E. coli* K12 bacteria. A culture of bacteria is grown in LB broth (usually without antibiotic, although occasionally the bacteria chromosome will have certain genes disrupted and will contain an antibiotic resistance marker, in which case antibiotic is included in the media) to mid-log phase. The bacteria are exposed to certain buffers that include chemicals to induce "competence" – the ability to acquire exogenous DNA – and then aliquoted and snap frozen in liquid nitrogen and stored at -80°C.
2. Transformation of a competent plasmid-free *E. coli* K12 derivative background with a plasmid containing an antibiotic resistance marker. The antibiotics in use in the laboratory include resistance to ampicillin, tetracycline, kanamycin, and chloramphenicol. Competent bacteria are incubated with the plasmid, heat-shocked, and then grown at 37°C in the absence of antibiotic. The bacteria are then plated on LB-agarose and colonies are formed from cells that have acquired the plasmid.
3. Growth of small cultures: 1 to 50 mL. Small cultures of plasmid-carrying bacteria are grown in the presence of antibiotic in order to purify plasmid DNA from the cells, or to use them as a starter culture for a larger volume growth.
4. Large volume cultures: up to 4 L. Larger volumes of bacteria are produced in order to harvest the cells and extract recombinant proteins from them. After growth, the cells are harvested by centrifugation or ultrafiltration, broken open by treatment with lysozyme and cell membrane disruption (French tissue press, cell homogenizer, or sonicator).

Disposal of contaminated media and labware:

1. LB-Agar plates are stored temporarily in a biohazard bag that is ultimately autoclaved before disposal.
2. Spent culture media (from which bacteria have been harvested) is treated with bleach to kill any remaining organisms.
3. Laboratory consumables (pipette tips, disposable culture tubes, etc) are stored temporarily in a biohazard bag that is ultimately autoclaved before disposal.

MATERIAL SAFETY DATA SHEET

NEW ENGLAND BioLabs Inc.
New England Biolabs
32 Tozer Road
Beverly MA 01915

EMERGENCY TELEPHONE NO. 1-800-632-5227
OTHER INFORMATION CALLS 1-978-927-5054
FAX: 1-978-921-1350
INTERNET e-mail: info@neb.com

Strain #E4109S

SECTION 1 - PRODUCT

Product Name: *E. coli* K12 ER2925

SECTION 2–COMPOSITION/ INFORMATION ON INGREDIENT

Strains supplied by NEB are all derivatives of *E. coli* K12, *E. coli* B or hybrids of these two strains. *E. coli* K12 and B are nonpathogenic isolates. K12 is the standard nonpathogenic host, exempt from the NIH Recombinant DNA Advisory Committee (RAC) guidelines (1).

E. coli B has also been shown to lack common pathogenicity-related sequences (2).

References:

1. Federal Register, (1986) Vol. V1: 88, 6952–16985.
2. Kuhnert, P., Hacker, I. Muldorfer, A.P. Burnens, J. Nicolet and J. Frey (1997). Detection system for Escherichia coli-specific virulence genes.: absence of virulence determinants in B and C strains. Appl. Environ. Microbiol. 63(2): 703– 709.

MATERIAL SAFETY DATA SHEET

IDENTIFICATION

Stratagene
11011 N. Torrey Pines Rd.
La Jolla, CA 92037

Date of last update: 6/2/2004
Phone #: 800-894-1304
Fax #: 858-535-0071

Catalog # : 1071-13
CAS # : 67-68-5

Product Name: DMSO

HAZARDOUS COMPONENTS

Chemical Name & Synonyms: Dimethyl Sulfoxide* A 10846* Deltan* Demeso* Demasorb, Demavet* Demsodrox, Dermasorb* Dimethyl Sulfoxide* Dimethyl Sulphoxide* Dimexide* Dipirartril-Tropico* DMS-70* DMS-90* DMSO* Dolicur* Domoso* Dromisol* Durasorb* Gamasol 90* Hyadur* Infiltrina* M 176* Methane, Sulfinylbis-* Methylsulfinylmethane* NSC-763* RIMSO-50* Somipront* SQ 9453* Sulfinylbis (Methane)* Syntexan* Topsym*

OSHA PEL Limits: N/A
ACGIH TLV: N/A
Other Limits Recommended: N/A

KIT	DMSO-containing component	%
200124 Epicurian Coli® TKX1 Competent Cells	200124-41 TKX1 Competent Cells	<10%
200129 Epicurian Coli® XL1-Red Competent Cells	200129-41 XL1-Red Competent Cells 200236-41 XL1-Blue Competent Cells	<10%
200130 Epicurian Coli® XL1-Blue Subcloning-Grade Competent Cells	200130-41 XL1-Blue Subcloning Competent Cells	<10%
200131 Epicurian Coli® BL21(DE3) Competent Cells	200131-41 BL-21 (DE3) Cells	<10%
200132 Epicurian Coli® BL21(DE3)pLysS Competent Cells	200132-41 BL-21 (DE3) pLysS Cells	<10%
200133 Epicurian Coli® BL21 Competent Cells	200133-41 BL-21 Competent Cells	<10%
200134 Epicurian Coli® TKB1 Competent Cells	200134-41 TKB1 Competent Cells	<10%
200150 Epicurian Coli® XL2-Blue Ultracompetent Cells	200150-41 Ultra Comp XLII-Blue	<10%
200152 Epicurian Coli® SURE®2 Supercompetent Cells	200152-41 Ultra Comp SURE®	<10%
200170 Epicurian Coli® ABLE® Competent Cells	200171-41 ABLE® C 200172-41 ABLE® K	<10%
200171 Epicurian Coli® ABLE® C Competent Cells	200171-41 ABLE® C	<10%
200230 Epicurian Coli® XL1-Blue MRF Super Competent Cells	200230-41 XL1-Blue MRF'	<10%
200231 Epicurian Coli® SCS 1 Supercompetent Cells	200230-41 SCS1	<10%
200233 Epicurian Coli® NM522 Competent Cells	200233-41 NM522 Competent Cells	<10%

200234 Epicurian Coli® JM101 Competent Cells	200234-41 JM101 Competent Cells	<10%
200235 Epicurian Coli® JM109 Competent Cells	200235-41 JM109 Competent Cells	<10%
200236 Epicurian Coli® XL1-Blue Supercompetent Cells	200236-41 XL1-Blue Competent Cells	<10%
200238 Epicurian Coli® SURE® Competent Cells	200238-41 SURE® Competent Cells	<10%
200247 Epicurian Coli® SCS110 Competent Cells	200247-41 SCS110 Competent Cells	<10%
200248 Epicurian Coli® XL1-Blue MRF Kan Supercompetent Cells	200248-41 XL1-Blue MRF' Kan	<10%
200249 Epicurian Coli® XL1-Blue Competent Cells	200236-41 XL1-Blue Competent Cells	<10%
200314 Epicurian Coli® XL10-Gold® Ultracompetent Cells	200315-41 XL10-Gold Competent Cells	<10%
200315 Epicurian Coli® XL10-Gold® Ultracompetent Cells	200315-41 XL10-Gold Competent Cells	<10%
200317 Epicurian Coli® XL10-Gold® KANr	200317-41 XL10-Gold® KANr	<10%
230130 Epicurian Coli® BL21-Gold Competent Cells	230130-41 BL21-Gold Competent Cells	<10%
230132 Epicurian Coli® BL21-Gold(DE3) Competent Cells	230132-41 BL21-Gold(DE3) Competent Cells	<10%
230134 Epicurian Coli® BL21-Gold(DE3) PLysS competent Cells	230134-41 BL21-Gold(DE3) PLysS Competent Cells	<10%
230135 Epicurian Coli® BL21-Gold(DE3) LacZ Competent Cells	230135-41 BL21-Gold(DE3) LacZ Competent Cells	<10%
230240 Epicurian Coli® BL21-CodonPlus™-RIL	230240-41 BL21- CodonPlus™-RIL Competent Cells	<10%
230245 Epicurian Coli® BL21-CodonPlus™(DE3)-RIL	230245-41 BL21 (DE3) RIL Competent Cells	<10%
230250 Epicurian Coli® BL21-CodonPlus™-RP	230250-41 Codon Plus RP Competent Cells 230255-41 Codon Plus DE3 RP Competent Cells	<10%
230255 Epicurian Coli® BL21-CodonPlus™(DE3)-RP	230255-41 Codon Plus DE3 RP Competent Cells	<10%
230265 Epicurian Coli® BL21-CodonPlus™(DE3)-RIL-X	230265-41 Codon Plus RIL (DE3) MET Cell	<10%
230275 Epicurian Coli® BL21-CodonPlus™(DE3)-RP-X	230275-41 Codon Plus RP (DE3) MET-Cell	<10%
230325 Epicurian Coli® SoloPack® Gold Cells	230325-41 SoloPack® Gold Cells	<10%
230350 Epicurian Coli® SoloPack® Gold Cells	230350-41 SoloPack® Gold SuperCompetent Cells	<10%

TOXICITY DATA

Irritation Data:

SKN-RBT	10 mg/24H open Mld.	AIHAAP	23,95,62
SKN-RBT	500 mg/24H Mld.	85JCAE	-,1044,86
EYE-RBT	100 mg	TXAPA9	39,129,77
EYE-RBT	500 mg/24H Mld.	85JCAE	-,1044,86

Toxicity Data:

ORL.-RAT	LD_{50}:	14,500 mg/kg	TXAPA9	15,74,69
SKN-RAT	LD_{50}:	40 gm/kg	ANYAA9	141,96,67
IPR-RAT	LD_{50}:	8200 mg/kg	FCTOD7	22,665,84
SCU-RAT	LD_{50}:	12 gm/kg	ARZNAD	14,1050,64
IVN-RAT	LD_{50}:	5360 mg/kg	TXAPA9	7,104,65
UNR-RAT	LD_{50}:	1300 mg/kg	NTIS**	AD-A159-418
SKN-MUS	LD_{50}:	50 gm/kg	ANYAA9	141,96,67
ORL-MUS	LD_{50}:	7920 mg/kg	CHTPBA	3,10,68
IPR-MUS	LD_{50}:	2500 mg/kg	RPTOAN	35,300,72
SCU-MUS	LD_{50}:	14 gm/kg	ANYAA9	141,96,67
IVN-MUS	LD_{50}:	3100 mg/kg	TXAPA9	15,74,69
ORL-DOG	LD_{50}:	>10 gm/kg	ANYAA9	141,96,67
IVN-DOG	LD_{50}:	2500 mg/kg	CNCRA6	31,7,63
ORL-CKN	LD_{50}:	12 gm/kg	JPPMAB	15,688,63
ORL-MAM	LD_{50}:	21,400 mg/kg	GISAAA	39(4),86,74
ORL-BWD	LD_{50}:	100 mg/kg	TXAPA9	21,315,72

Reviews, Standards, and Regulations:

OEL=MAK
OEL-RUSSIA: STEL 20 mg/m^3 JAN 93
OEL-SWITZERLAND: TWA 50 ppm (160 mg/m^3); SKIN JAN 93
NOHS 1974: HZD 80564; NIS 11; TNF 476; NOS 25; TNE 22461
NOES 1983: HZD 80564; NIS 29; TNF 3507; NOS 40; TNE 44947; TFE 16837
EPA GENETOX program 1988, Positive: Aspergillus-Aneuploidy; S. Cerevisiae gene conversion.
EPA GENETOX program 1988, Negative: SHE-clonal assay; Cell transform. - mouse embryo.
EPA GENETOX program 1988, Negative: Cell transform. - RLV F344 Rat embryo.
EPA GENETOX program 1988, Negative: D. melanogaster - Whole sex chrom. Loss; Host -mediated assay.
EPA GENETOX program 1988, Negative: N. crassa - aneuploidy; E. coli PolA with S9.
EPA GENETOX program 1988, Negative: Histidine reversion - Ames test; in vitro SCE-nonhuman.
EPA GENETOX program 1988, Negative: D. melanogaster sex-linked lethal.
EPA GENETOX program 1988, Inconclusive: Aspergillus - Recombination; Carcinogenicity - Mouse/Rat
EPA GENETOX program 1988, Inconclusive: D. melanogaster - reciprocal translocation.
EPA GENETOX program 1988, Inconclusive: Rodent dominant lethal; B. subtilis REC assay.
EPA GENETOX program 1988, Inconclusive: E. coli PolA without S9.
EPA TSCA Section 8(B) Chemical Inventory
EPA TSCA Section 8(D) Unpublished health/safety studies
EPA TSCA Test Submission (TSCATS) Data Base, January 1997

Target Organ Data:

Behavioral (altered sleep time)
Gastrointestinal (nausea or vomiting)
Liver (jaundice, other or unclassified)
Effects on fertility (pre-implantation mortality)
Effects on embryo or fetus (Fetotoxicity)
Specific developmental abnormalities (musculoskeletal system)

Only selected Registry of Toxic Effects of Chemical Substances (RTECS) data is presented here. See actual entry in RTECS for complete information.

RTECS #: PV6210000, Methyl Sulfoxide

Health Hazard Data

Acute Effects:

May be harmful if swallowed, inhaled or absorbed through skin.
Vapor or mist is irritating to the eyes, mucous membranes and upper respiratory tract.
Causes skin irritation.
Avoid contact with DMSO solutions containing toxic materials or materials with unknown toxicological properties. Dimethyl Sulfoxide is readily absorbed through skin and may carry such materials into the body.

Chronic Effects:

Target Organs: Eyes, Skin

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

First Aid:

Eyes : In case of contact, immediately flush with copious amounts of water for at least 15 minutes.
Skin : In case of contact, immediately flush with copious amounts of water for at least 15 minutes while removing contaminated clothing and shoes.
Inhalation: Remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.
Ingestion: Wash out mouth with water provided person is conscious.

Wash contaminated clothing before reuse.
In all cases, call a physician.

Physical Data

MF: C_2H_6OS
Boiling point.....: 189°C
Melting point.....: 18.4°C
Specific Gravity (H_2O = 1): 1.101
Vapor Density.....: 2.7
Vapor Pressure.....: 0.42 mm @ 20°C
Flashpoint.....: 185°F (85°C)
Autoignition Temperature..: 573°F (300°C)
Explosion Limits in Air:
Lower .....: 3.5%
Upper .....: 63%

Fire and Explosion Hazard Data

Extinguishing Media:
Water Spray.
Carbon Dioxide, Dry chemical powder, or appropriate Foam

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

Unusual Fire and Explosion Hazards:
Emits toxic fumes under fire conditions.

Reactivity Data

Incompatibilities:
Acid chlorides
Phosphorus halides
Strong acids
Strong oxidizing agents
Strong reducing agents
Sensitive to moisture

Hazardous Combustion or Decomposition Products:
Toxic fumes of :
Carbon monoxide and carbon dioxide
Sulfur oxides

Stability: Stable

Hazardous polymerization: Will not occur.

Additional Information: 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, perchloric and periodic acids. When heated above its boiling point, methyl sulfoxide degrades, giving off formaldehyde, methyl mercaptan, and sulfur dioxide.

Spill or Leak Procedures

Steps to be taken if Material is Released or Spilled:
•Evacuate area.

- •Wear self-contained breathing apparatus, rubber boots and heavy rubber gloves.
- •Absorb on sand or vermiculite and place in closed containers until proper disposal is possible.
- •Ventilate the area and wash spill site after material pickup is complete.

Waste Disposal Method:

This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber.

Observe all federal, state and local environmental regulations.

Precautions to be Taken in Handling and Storage

Wear appropriate NIOSH/MSHA-approved respirator, chemical-resistant gloves, safety goggles and other protective clothing.
Ensure that a safety shower and eye bath are available.
Use only in a chemical fume hood.
Do not breathe vapor.
Avoid contact with eyes, skin and clothing.
Avoid prolonged or repeated exposure.
Readily absorbed through skin.
Wash thoroughly after handling.
Keep tightly closed.
Keep away from heat and open flame.
Store in a cool, dry place.

Label Precautionary Statements:

Irritant.
Irritating to eyes, respiratory system, and skin.
Combustible.
Target Organs: eyes, skin
Readily absorbed through skin.
In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
Wear suitable protective clothing.
Do not breathe vapor.

The above information is believed to be correct but does not purport to be all-inclusive and shall be used only as a guide. Stratagene shall not be held liable for any damage resulting from handling or from contact with the above product.