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	Peter Chidiac
DEPARTMENT	Physiology and Pharmacology
ADDRESS	MSB272
PHONE NUMBER	x83318 (office) x80085 (lab)
EMERGENCY PHONE NUMBER(S)	519-719-6099
EMAIL	Peter.chidiac@schulich.uwo.ca

Location of experimental work to be carried out: Building(s) ____MSB_____ Room(s)__275, 295____

*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, NSERC, HSFO_____
GRANT TITLE(S): __ Role of RGS2 in the response of cells to stress._____
_Novel modes of heterotrimeric G protein regulation_____
_Mechanism of the protective effect of RGS2 in cardiac hypertrophy_____

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

Name	UWO E-mail Address	Date of Biosafety Training
Peihsen Zhao	pzhao7@uwo.ca	Registered for refresher training
William Xue	wxue4@uwo.ca	20-Oct-2008
Lylia Nini	lylianini@yahoo.com	2009
Hanna Kuk	hkuk2@uwo.ca	17-Jun-2010
Katherine Lee	Klee428@uwo.ca	Registered for Aug 24, 2011 session

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.

CELL CULTURE AND EXOGENOUS PROTEIN EXPRESSION

Our laboratory regularly cultures mammalian, insect, and bacterial cells to study the behaviours of specific proteins (mostly G proteins and their modulators) and the biochemical pathways that utilize these proteins in cells. All cells are stored, used, and disposed of in accordance with UWO Laboratory Biosafety Guidelines. Cell stocks are stored in a liquid nitrogen container designed for this purpose, or in the case of E. Coli glycerol stocks in a -80C freezer. Exogenous proteins are expressed via bacterial cell transformation, baculoviral infection in insect cells, and transient transfection or adenoviral infection in mammalian cells.

E Coli are grown in the main laboratory (M275) on agar plates or in suspension with shaking at volumes of up to 1 litre at temperatures ranging from ambient to 37C. These are used either for the production of plasmids for mammalian transfection or for the overexpression of individual proteins for affinity purification.

Sf9 cells are grown in the lab or in a dedicated cell culture room (M275A) at room temperature as either monolayers in disposable flasks or suspended in shaking flasks. These cells are either infected with a single baculovirus to produce individual proteins for purification or are multiply infected with 2-5 baculoviruses to prepare cytosolic or cell membrane fractions that are stored and frozen for later use in assays. Sf9 cells are also used to propagate baculoviruses for later use.

Mamalian cells are used to study the roles of proteins of interest in cellular signaling, metabolism, gene regulation, etc. We use both established cell lines (HEK-293, CHO, HeLa, H9C2, and UMR-106) and primary cultures derived from mouse or rat tissues (cardiomyocytes, osteoblasts, hepatocytes, adipocytes, vascular smooth muscle cells, fibroblasts). Expression of exogenous proteins is achieved through transient or stable transfection of plasmids, or infection with adenovirus encoding specific proteins. All mammalian cells are housed in a 37C CO2-controlled incubator in a dedicated cell culture room (M275A). All cell isolation procedures and the passaging and transfection/infection of both insect and mammalian cells are carried out in a certified biological safety cabinet.

All cells are grown in either sterile disposable plastic or sterile glass containers. After use, plastic culture flasks, pipettes, etc., are collected in biohazard garbage bags and then sealed and autoclaved prior to disposal. Used medium is collected in a special container and sterilized with bleach. The biological safety cabinet used for cell culture is sterilized after each use with isopropyl alcohol and kept under a germicidal UV light. Re-usable glass flasks for Sf9 and bacterial cell cultures are sterilized using bleach and then autoclaved before being used again.

Proper protective gear is worn for all cell culture procedures.

BIOHAZARDOUS SUBSTANCES

The use of biohazardous substances in the lab is infrequent. Bordatella pertussis is a Schedule 1 toxin in Canada. It is a protein that enters cells and inactivates a subset of heterotrimeric G proteins and this property is associated with the respiratory effects of the whooping cough bacteria. Pertussis toxin comes as a lyophilized powder that is stored at 4C. When handling, gloves and safety glasses are worn and the vial is opened only in the fume hood to avoid inhalation of the powder. The powder (50 μg) is dissolved in distilled water, aliquoted into 10 equal portions, and then frozen for later use. Pertussis toxin solution is added directly to cultured cells to test whether G proteins of the Gi/o subfamily (which are selectively inhibited by the toxin) are involved in a particular process. When finished, the containers used for these cells and to contain the toxin are treated as standard biohazard waste.

Please include a one page research summary or teaching protocol.

G protein coupled receptors account for >1% of the proteins encoded by the human genome and serve as direct or indirect targets for roughly half all therapeutically used drugs. In the body, GPCRs enable cell to cell communication by recognizing extracellular signals and activating intracellular GTP binding proteins (G proteins). Whereas GPCRs turn on G proteins by promoting GTP binding in exchange for the non-activating nucleotide GDP, other cellular proteins exist that decrease G protein activity by promoting the hydrolysis of bound GTP to GDP, or by slowing down the rate of GDP/GTP exchange.

The Chidiac laboratory uses primarily biochemical and cell-based assays to study how G proteins are controlled by GPCRs and other cellular proteins. The latter include the Regulator of G protein signaling (RGS) proteins, which are GTPase accelerating proteins, and the GoLoco motif-containing proteins, which are inhibitors of nucleotide exchange. In addition to their modulatory effects on GPCR signaling, these two groups of proteins are also being studied in terms of their novel biochemical and cellular properties. The main proteins under investigation in the lab include the RGS protein RGS2, the GoLoco motif-containing protein G18 (aka AGS4 or GPSM3), and the multidomain protein RGS14, which contains both RGS and GoLoco functions.

RSG2 is expressed throughout the body in mammals, with highest levels in the cardiovascular, respiratory and immune systems. In the cardiovascular system, RGS2 has been shown to limit blood pressure, and it also appears to play a protective role in the pathophysiology of heart failure by limiting cardiomyocyte hypertrophy (Zou et al., Cell Signal. 2006 Oct;18(10):1655; Nunn et al., Cell Signal. 2010 22:1231). Thus RGS2 knockout mice have increased blood pressure and increased sensitivity to experimentally induced cardiac hypertrophy. These animals additionally are reported to have increased anxiety and altered immune function, and we recently reported also that they have a lean phenotype compared to wild type controls (Nunn et al., Cell Signal. 2011 23:1375). RGS2 is upregulated by G protein signaling, which appears to be important in receptor desensitization (Roy et al., 2006 281:32684), and by cell stress, suggesting a role in the stress response. A number of non-G protein targets for RGS2 have been identified, and we have found that it can bind to the translational machinery and inhibit mRNA translation (Nguyen et al., J Cell Biol. 2009 186:755). Currently, we are investigating how this novel effect of RGS2 might contribute to its protective effect in heart failure, and also how it relates to the role of RGS2 in the stress response.

The GoLoco protein G18 has been the subject of only a few studies. It contains three GoLoco motifs that impede G protein activation, and we have discovered that it also contains a 4th G protein-binding domain that exhibits novel functions (Zhao et al., J Biol Chem. 2010 285:9008). We are continuing to investigate the function of this protein in G protein signaling and other cellular processes using a variety of cellular and biochemical approaches.

RGS14 is a multifunctional protein that can regulate G protein activity via both its RGS domain and its GoLoco motif. Our work indicates that intermolecular interactions within RGS14 may dictate its effects on heterotrimeric G proteins (Hepler et al., Biochemistry 2005 44:5495), and we are continuing to investigate these.

Overall, our research protein is aimed at better understanding how GPCR signaling is controlled by accessory proteins that regulate GPCR-stimulated G protein activity, and also investigating how such proteins may act in other ways in the cell. This will provide a better understanding of how these therapeutically important protein targets function under normal and pathophysiological conditions, and also uncover related pathways and their potential importance in health and disease.

1.0 Microorganisms

1.1 Does your work involve the use of biological agents? x YES O 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? 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)* (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 (strains DH5alpha, Bl21, and XL1-Blue)	O Yes X No	O Yes X No	O Yes X No	8.0	Stratagene	x 1 O 2 O 2+ O 3
baculovirus	O Yes x No	O Yes x No	O Yes x No	0.5	collaborators	x 1 O 2 O 2+ O 3
adenovirus (replication deficient)	O Yes x No	O Yes x No	O Yes x No	0.5	collaborators	O 1 x 2 O 2+ O 3
	O Yes O No	O Yes O No	O Yes O No			O 1 O 2 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? x 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	O Yes X No		Not applicable
Rodent	X Yes O No	heart, fat, liver, bone, fibroblasts	2007-004
Non-human primate	O Yes X No		
Other (specify)	O Yes X 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	x Yes O No	HEK-293, HeLa	2	ATCC
Rodent	x Yes O No	UMR-106, CHO, H9C2		collaborators
Non-human primate	x Yes O No			
Other (specify)	O Yes O No	Sf9 insect cells	1	ATTC

*Please attach a M plier. (For more information, see www.atcc.org)

Yes

2.4 For above name level required O 1 X 2 O 2+ O 3

3.0 Use of Human Source Materials

3.1 Does your work involve the use of human source materials? O 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/UNKNOWN**	**Name of Infectious Agent (If applicable)**	**PHAC or CFIA Containment Level (Select one)**
Human Blood (whole) or other Body Fluid	Not Applicable	O Yes O Unknown		O 1 O 2 O 2+ O 3
Human Blood (fraction) or other Body Fluid	Not Applicable	O Yes O Unknown		O 1 O 2 O 2+ O 3
Human Organs or Tissues (unpreserved)	Not Applicable	O Yes O Unknown		O 1 O 2 O 2+ O 3
Human Organs or Tissues (preserved)	Not Applicable	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 O NO If no, please proceed to Section 5.0

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

Bacteria Used for Cloning *	Plasmid(s) **	Source of Plasmid	Gene Transfected	Describe the change that results from transformation or tranfection
XL-1 Blue *DH5alpha (cloning)* *BL21 (protein purification)*	*pCDNA3* *pGEX4T* *pET19B*	*Invitrogen* *GE Healthcare* *Qiagen* Missouri S&T *cDNA Resource Center* *Addgene*	*RGS1, RGS2, RGS4, RGS5, RGS8, RGS16, G18, Gαo, Gαi2, Gαs, Gαq, various GPCRs, various transcription*	*Changes in G protein-mediated signaling, altered gene expression, changes in de novo protein synthesis*

		Various collaborators	*factors*	

* 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?
X YES, complete table below O NO

Virus Used for Vector Construction	Vector(s) *	Source of Vector	Gene(s) Transduced	Describe the change that results from transduction
adenovirus		*Various collaborators*	*RGS2, RGS2(eIF2B binding domain), RGS4, GFP*	*Changes in G protein-mediated signaling, altered gene expression, changes in de novo protein synthesis*
baculovirus			*Various GPCRs, G protein subunits, initiation factors*	

* Please attach a Material Safety Data Sheet or equivalent.

4.4 Will genetic sequences from the following be involved?

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

4.5 Will virus be replication defective?
adenovirus is replication defective; baculovirus is not

Onlogenes ie E1A

4.6 Will virus be infectious to humans or animals?
adenovirus can infect mammalian cells; baculovirus cannot infect humans or animals

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

5.0 Human Gene Therapy Trials

5.1 Will human clinical trials be conducted involving a biological agent? O 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? 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? x YES O NO If no, please proceed to section 7.0

6.2 Name of animal species to be used___C57Bl/6 mice, rats_____

6.3 AUS protocol # _____2007-004_____

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

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

_____

_____

7.0 Use of Animal species with Zoonotic Hazards

7.1 Will any animals with zoonotic hazards or their organs, tissues, lavages or other body fluids including blood be used (see list below)? O YES x No If no, please proceed to section 8.0

7.2 Will live animals be used? O YES O No

7.3 If yes, please specify the animal(s) used:

- Pound source dogs O YES O NO
- Pound source cats O YES O NO
- Cattle, sheep or goats O YES, please specify species _____ 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, please specify species _____ O NO
- Others (wild or domestic) O YES, please specify _____ O NO

7.4 If no live animals are used, please specify the source of the specimens:

_____

8.0 Biological Toxins

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

8.2 If YES, please name the toxin(s)___pertussis toxin_____
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__ IVN-RAT LD50: 114ug/kg; IPR-MUS LD50: 17ug/kg; IVNMUS LD50: 127ug/kg; ICE-MUS TDLo: 200ng/kg. _____

8.4 How much of the toxin is handled at one time*? _____5 µg_____

8.5 How much of the toxin is stored*? _____50 µg_____

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

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

9.0 Insects

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

10.0 Plants

10.1 Do you use plants? O 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? 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 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? O YES, please give country of origin_____ X NO

Usually we just import plasmids from other labs or suppliers. Adenoviruses and pertussis toxin so far have only been received from within Canada.

If no, please proceed to Section 12.0

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 biological agents in Sections 1.0 to 9.0 have been trained.

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. O 1 x 2 O 2+ O 3

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

X YES, date of most recent biosafety inspection: _ Jun 17, 2010_____
O NO, please certify
O NOT REQUIRED for Level 1 containment

13.3 Please indicate permit number (not applicable for first time applicants): _ BIO-UWO-0205_____

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.

_____
_____
_____

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:

__An emergency shower and eyewash are available in the lab, and a first aid and spill kits are in neighbouring labs or hallways. These will be used if necessary in the case of accidental spills or splashes onto lab workers (who will also be wearing appropriate protective gear). In the event of a needlestick or other injury, the procedure according to Section 3.5 (Medical Procedures and Incident Reporting) of the UWO Biosafety Guidelines and Proceduers Manual will be followed

_____

Typo

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/

SIGNATURE  Date: August 3, 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:

Canadian Food Inspection Agency | Agence canadienne d'inspection des aliments

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

Bureau du confinement des biorisques et sécurité
Direction générale des sciences, ACIA
59 promenade Camelot, Ottawa, Ontario K1A 0Y9
Tél: (613) 221-7068 Téléc: (613) 228-6129
Courriel: ImportZoopath@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

Info on E. coli

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 consider 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
- PA309
- 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
- XLOLR
- Y10
- Y1090 (1090)
- YN2980
- W3110
- 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,

Cinthia Labrie

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

Canada

Conforms to ANSI Z400.1 Standard (United States)

Material Safety Data Sheet

Agilent Technologies

Stratagene XL1-Blue MRF' E. coli Host Strain Catalog #200301

1. Product and company identification

Product name : Stratagene XL1-Blue MRF' E. coli Host Strain Catalog #200301

Material uses : Analytical reagent.
0.5 ml

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

Part No. : 200301

Validation date : 03/30/2011

In case of emergency : 1-800-894-1304

2. Hazards identification

Physical state : Liquid.

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).

Emergency overview

Signal word : CAUTION!

Hazard statements : MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Precautions : Avoid breathing vapor or mist. Avoid contact with eyes, skin and clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

Potential acute health effects

Inhalation : Slightly irritating to the respiratory system.

Ingestion : No known significant effects or critical hazards.

Skin : Slightly irritating to the skin.

Eyes : Moderately irritating to eyes.

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.

Target organs : Contains material which may cause damage to the following organs: kidneys, upper respiratory tract, skin, eye, lens or cornea.

Over-exposure signs/symptoms

Inhalation : Adverse symptoms may include the following:
respiratory tract irritation
coughing

Ingestion : No specific data.

Skin : Adverse symptoms may include the following:
irritation
redness

2. Hazards identification

Eyes : Adverse symptoms may include the following:
irritation
watering
redness

Medical conditions aggravated by over-exposure : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

3. Composition/information on ingredients

Name	CAS number	%
Glycerol	56-81-5	10 - 30
Sodium chloride	7647-14-5	0.1 - 1

There are no 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 : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.

Skin contact : 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 immediately.

Inhalation : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.

Ingestion : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

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 : In a fire or if heated, a pressure increase will occur and the container may burst.

Extinguishing media

Suitable : Use an extinguishing agent suitable for the surrounding fire.

Not suitable : None known.

Special exposure hazards : No action shall be taken involving any personal risk or without suitable training.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
halogenated compounds
metal oxide/oxides

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.

6. Accidental release measures

Personal precautions : 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 : 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 : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, 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 : Potentially biohazardous material. Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing vapor or mist. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.

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

Ingredient	Exposure limits
Glycerol	**ACGIH TLV (United States, 2/2010).** TWA: 10 mg/m³ 8 hour(s). Form: Inhalable fraction. See Appendix C, paragraph A. Inhalable Particulate Mass TLVs (IPM–TLVs) for those materials that are hazardous when deposited anywhere in the respiratory tract. **OSHA PEL (United States, 6/2010).** 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

Recommended monitoring procedures : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment.

Engineering measures : Use only with adequate ventilation. 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.

8. Exposure controls/personal protection

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.

Personal protection

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.

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 or dusts.

Skin : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Environmental exposure controls : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

Other protection : Not available.

9. Physical and chemical properties

Physical state : Liquid.

Flash point : Not available.

Auto-ignition temperature : Not available.

Flammable limits : Not available.

Color : Not available.

Odor : Not available.

pH : 7

Boiling/condensation point : 100°C (212°F)

Melting/freezing point : 0°C (32°F)

Density : Not available.

Vapor pressure : Not available.

Vapor density : Not available.

Odor threshold : Not available.

Evaporation rate : Not available.

Solubility : Easily soluble in the following materials: cold water and hot water.

10. Stability and reactivity

Chemical stability : The product is stable.

Conditions to avoid : No specific data.

Materials to avoid : Reactive or incompatible with the following materials: oxidizing materials, reducing materials, metals, acids and alkalis.
Slightly reactive or incompatible with the following materials: organic materials and moisture.

Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
Glycerol	LD50 Oral	Rat	12600 mg/kg	-
Sodium chloride	LC50 Inhalation Dusts and mists	Rat	>42 g/m³	1 hours
	LD50 Oral	Rat	3000 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Exposure	Observation
Glycerol	Eyes - Mild irritant	Rabbit	-	-	-
	Skin - Mild irritant	Rabbit	-	-	-
Sodium chloride	Eyes - Moderate irritant	Rabbit	-	-	-
	Skin - Mild irritant	Rabbit	-	-	-

Sensitizer

Conclusion/Summary : Not available.

Chronic toxicity / Carcinogenicity / Mutagenicity / Teratogenicity / Reproductive toxicity

Not available.

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.

Aquatic ecotoxicity

Product/ingredient name	Result	Species	Exposure
Glycerol	Acute LC50 54 to 57 ml/L Fresh water	Fish - Oncorhynchus mykiss - 0.9 g	96 hours
Sodium chloride	Acute EC50 402600 to 469200 ug/L Fresh water	Daphnia - Daphnia magna	48 hours
	Acute LC50 >5600 ppm Fresh water	Crustaceans - Asellus communis	48 hours
	Acute LC50 1000000 ug/L Fresh water	Fish - Morone saxatilis - LARVAE	96 hours

Conclusion/Summary : Not available.

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. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. 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. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. 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 : Irritating material
Target organ effects

U.S. Federal regulations : **TSCA 8(a) IUR**: Partial exemption

United States inventory (TSCA 8b): All components are listed or exempted.

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: Sodium chloride; Glycerol
SARA 311/312 MSDS distribution - chemical inventory - hazard identification: Sodium chloride: Immediate (acute) health hazard, Delayed (chronic) health hazard; Glycerol: Immediate (acute) health hazard, Delayed (chronic) health hazard

Clean Air Act Section 112(b) Hazardous Air Pollutants (HAPs) : Not listed

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

15. Regulatory information

State regulations

Massachusetts	: The following components are listed: GLYCERINE MIST
New York	: None of the components are listed.
New Jersey	: The following components are listed: GLYCERIN; 1,2,3-PROPANETRIOL
Pennsylvania	: The following components are listed: 1,2,3-PROPANETRIOL

California Prop. 65

No products were found.

16. Other information

Label requirements	: MAY CAUSE RESPIRATORY TRACT, EYE AND SKIN IRRITATION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
Date of issue	: 03/30/2011
Date of previous issue	: No previous validation.
Version	: 1

Indicates information that has changed from previously issued version.

Notice to reader

Disclaimer: The information contained in this document is based on Agilent's state of knowledge at the time of preparation. No warranty as to its accurateness, completeness or suitability for a particular purpose is expressed or implied.

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

Product code A102081A
Product name Baculovirus 1L Expression

MSDS'

Company/Undertaking Identification

INVITROGEN CORPORATON
5791 VAN ALLEN WAY
PO BOX 6482
CARLSBAD, CA 92008
760-603-7200

INVITROGEN CORPORATION
5250 MAINWAY DRIVE
BURLINGTON, ONT
CANADA L7L 6A4
800-263-6236

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

24 hour Emergency Response (Transport): 866-536-0631
301-431-8585
Outside of the U.S. ++1-301-431-8585

For research use only

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. We recommend handling all chemicals with caution.

3. HAZARDS IDENTIFICATION

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

3. HAZARDS IDENTIFICATION

Form
Liquid

Principle Routes of Exposure/ Potential Health effects

Eyes	No information available
Skin	No information available
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	0
Flammability	0
Reactivity	0

4. FIRST AID MEASURES

Skin contact	Wash off immediately with plenty of water. If symptoms persist, call a physician.
Eye contact	Rinse thoroughly with plenty of water, also under the eyelids. If symptoms persist, call a physician.
Ingestion	Never give anything by mouth to an unconscious person. If symptoms persist, call a physician.
Inhalation	Move to fresh air. If symptoms persist, call a physician.
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 Liquid

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	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

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

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

For research use only

16. OTHER INFORMATION

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 present unknown hazards and should be used with caution. Since the Company 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, EXPRESSED OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

End of Safety Data Sheet

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

Canada

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.

Date Modified: 2011-02-18

Info on Cell Line(s)

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. 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.

See next page for Biosafety Level 2 cell cultures.

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.

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 a 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

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

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.

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ATCC Advanced Catalog Search » Product Details

Product Description

Before submitting an order you will be asked to read and accept the terms and conditions of ATCC's Material Transfer Agreement or, in certain cases, an MTA specified by the depositing institution.

Customers in Europe, Australia, Canada, China, Hong Kong, India, Israel, Japan, Korea, Macau, Mexico, New Zealand, Singapore, and Taiwan, R.O.C. must contact a local distributor for pricing information and to place an order for ATCC cultures and products.

Print this Page

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)

Morphology: epithelial

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 Transfection Reagents)
viruscide testing [92579]

Receptors: vitronectin, expressed

Tumorigenic: YES

DNA Profile (STR): Amelogenin: X
CSF1PO: 11,12
D13S317: 12,14
D16S539: 9,13
D5S818: 8,9
D7S820: 11,12
THO1: 7,9.3
TPOX: 11
vWA: 16,19

Related Links

- NCBI Entrez Search
- Cell Micrograph
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- Material Transfer Agreement
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Product Description

Before submitting an order you will be asked to read and accept the terms and conditions of ATCC's Material Transfer Agreement or, in certain cases, an MTA specified by the depositing institution.

Customers in Europe, Australia, Canada, China, Hong Kong, India, Israel, Japan, Korea, Macau, Mexico, New Zealand, Singapore, and Taiwan, R.O.C. must contact a local distributor for pricing information and to place an order for ATCC cultures and products.

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Cell Biology

ATCC® Number: CCL-2™ Order this Item

Price: $279.00

Designations: HeLa

Depositors: WF Scherer

Biosafety Level: 2 [Cells contain human papilloma virus]

Shipped: frozen

Medium & Serum: See Propagation

Growth Properties: adherent

Organism: *Homo sapiens* (human)

Morphology: epithelial

PHOTO

Source:
Organ: cervix
Disease: adenocarcinoma
Cell Type: epithelial

Cellular Products:
keratin
Lysophosphatidylcholine (lyso-PC) induces AP-1 activity and c-jun N-terminal kinase activity (JNK1) by a protein kinase C-independent pathway [26623]

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.

Applications:
transfection host ([21491] Nucleofection technology from Lonza
Roche Transfection Reagents)
screening for Escherichia coli strains with invasive potential [21447]
[21481]

Virus Susceptibility:
Human adenovirus 3
Encephalomyocarditis virus
Human poliovirus 1
Human poliovirus 2
Human poliovirus 3

DNA Profile (STR):
Amelogenin: X
CSF1PO: 9,10
D13S317: 12,13.3
D16S539: 9,10

Related Links

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ATCC | THE ESSENTIALS OF LIFE SCIENCE RESEARCH GLOBALLY DELIVERED

Product Description

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Cell Biology

ATCC® Number: CRL-1661™ Order this Item

Price: $329.00

Designations: UMR-106

Depositors: AE Bogden

Biosafety Level: 1

Shipped: frozen

Medium & Serum: See Propagation

Growth Properties: adherent

Organism: Rattus norvegicus (rat)

Morphology: epithelial

Source:
Organ: bone
Strain: Sprague-Dawley
Disease: osteosarcoma

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.

Receptors: parathyroid hormone (PTH); 1-25(OH)2D3 (bone resorbing steroid hormone)

Comments:

Propagation:
The UMR-106 cell line is a clonal derivative of a transplantable rat osteosarcoma that had been induced by injection of radiophosphorous (32P).
ATCC complete growth medium: The base medium for this cell line is ATCC-formulated Dulbecco's Modified Eagle's Medium, Catalog No. 30-2002. Modify the medium by the addition of the following components: fetal bovine serum to a final concentration of 10%.
Temperature: 37.0°C
Both the original sarcoma and the cloned line were developed by T.J. Martin at the University of Sheffield.

Subculturing:
Subcultivation Ratio: A subcultivation ratio of 1:4 to 1:8 is recommended
Medium Renewal: 2 to 3 times per week
Remove medium, and rinse with 0.25% trypsin, 0.03% EDTA solution. Remove the solution and add an additional 1 to 2 ml of trypsin-EDTA solution. Allow the flask to sit at room temperature (or at 37C) until the cells detach.

Related Links

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ATCC | THE ESSENTIALS OF LIFE SCIENCE RESEARCH GLOBALLY DELIVERED

Product Description

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Cell Biology

ATCC® Number: CCL-61™ Order this Item

Price: $279.00

Designations: CHO-K1

Depositors: TT Puck

Biosafety Level: 1

Shipped: frozen

Medium & Serum: See Propagation

Growth Properties: adherent

Organism: Cricetulus griseus (hamster, Chinese)

Morphology: epithelial-like

Source: **Organ:** ovary

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.

Isolation: **Isolation date:** 1957

Applications: transfection host (Nucleofection technology from Lonza Roche Transfection Reagents)

Virus Resistance: poliovirus 2; modoc virus; Button Willow virus

Cytogenetic Analysis: Chromosome Frequency Distribution 50 Cells: 2n = 22. Stemline number female, hypodiploid.

Gender:

Comments: The CHO-K1 cell line was derived as a subclone from the parental CHO cell line initiated from a biopsy of an ovary of an adult Chinese hamster by T. T. Puck in 1957. [22224]
The cells require proline in the medium for growth. [25976]

Propagation: **ATCC complete growth medium:** The base medium for this cell line is ATCC-formulated F-12K Medium, Catalog No. 30-2004. To make the complete growth medium, add the following components to the base medium: fetal bovine serum to a final concentration of 10%.
Temperature: 37.0°C

Subculturing: **Protocol:**

1. Remove and discard culture medium.
2. Briefly rinse the cell layer with 0.25% (w/v) Trypsin- 0.53 mM EDTA

Related Links

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Cell Biology

ATCC® Number:	CRL-1446™ Order this Item	Price:	$279.00
Designations:	H9c2(2-1)		
Depositors:	W Carlisle		
Biosafety Level:	1		
Shipped:	frozen		
Medium & Serum:	See Propagation		
Growth Properties:	adherent		
Organism:	Rattus norvegicus (rat)		
Morphology:	myoblast		
Source:	**Strain:** BD1X **Organ:** heart **Tissue:** myocardium		
Cellular Products:	myokinase; creatine phosphokinase; myosin		
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.		
Applications:	transfection host (Roche Transfection Reagents)		
Receptors:	acetylcholine, expressed		
Age:	embryo		
Comments:			
Propagation:	H9c2(2-1) is a subclone of the original clonal cell line derived from embryonic BD1X rat heart tissue by B. Kimes and B. Brandt and exhibits many of the properties of skeletal muscle. Myoblastic cells in this line will fuse to form multinucleated myotubes and respond to acetylcholine stimulation. Fusion occurs faster if the serum concentration in the medium is reduced to one percent. **ATCC complete growth medium:** The base medium for this cell line is ATCC-formulated Dulbecco's Modified Eagle's Medium, Catalog No. 30-2002. To make the complete growth medium, add the following components to the base medium: fetal bovine serum to a final concentration of 10%. **Atmosphere:** air, 95%; carbon dioxide (CO2), 5% **Temperature:** 37.0°C		
Subculturing:	**Protocol:** The myoblastic population will become depleted rapidly if the cultures are allowed to become confluent. To prevent loss of myoblastic cells, cultures should be subcultured before they become confluent, and the line should be recloned periodically with selection for myoblastic cells.		

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ATCC | THE ESSENTIALS OF LIFE SCIENCE RESEARCH GLOBALLY DELIVERED

Product Description

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Cell Biology

ATCC® Number: CRL-1711™ Order this Item

Price: $279.00

Designations: Sf9

Depositors: G Smith, C Cherry, MD Summers

Biosafety Level: 1

Shipped: frozen

Medium & Serum: See Propagation

Growth Properties: mixed: adherent/suspension

Organism: Spodoptera frugiperda (fall armyworm)

Morphology: epithelial

Source: **Organ:** ovary

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.

Isolation: **Isolation date:** 1983

Applications: transfection host (Roche Transfection Reagents technology from amaxa)

Virus Susceptibility: Nuclear polyhedrosis virus, Autographa californica
St. Louis encephalitis virus

Age: pupa
Gender: female

Comments: This line can be used to replicate baculovirus expression vectors.
It is important to use the medium described below.

Propagation: **ATCC complete growth medium:** The base medium for this cell line is Grace's Insect Medium Supplemented (GIBCO/Invitrogen Cat. No. 11605-094 or equivalent). To make the complete growth medium, add the following components to the base medium: heat-inactivated insect cell culture tested fetal bovine serum to a final concentration of 10%.
Atmosphere: air, 100%
Temperature: 28.0°C
Growth Conditions: The recommended media are formulated for use without CO2. Omission of the yeastolate or lactalbumin hydrolysate will lead to poor performance by this line.

Related Links

NCBI Entrez Search

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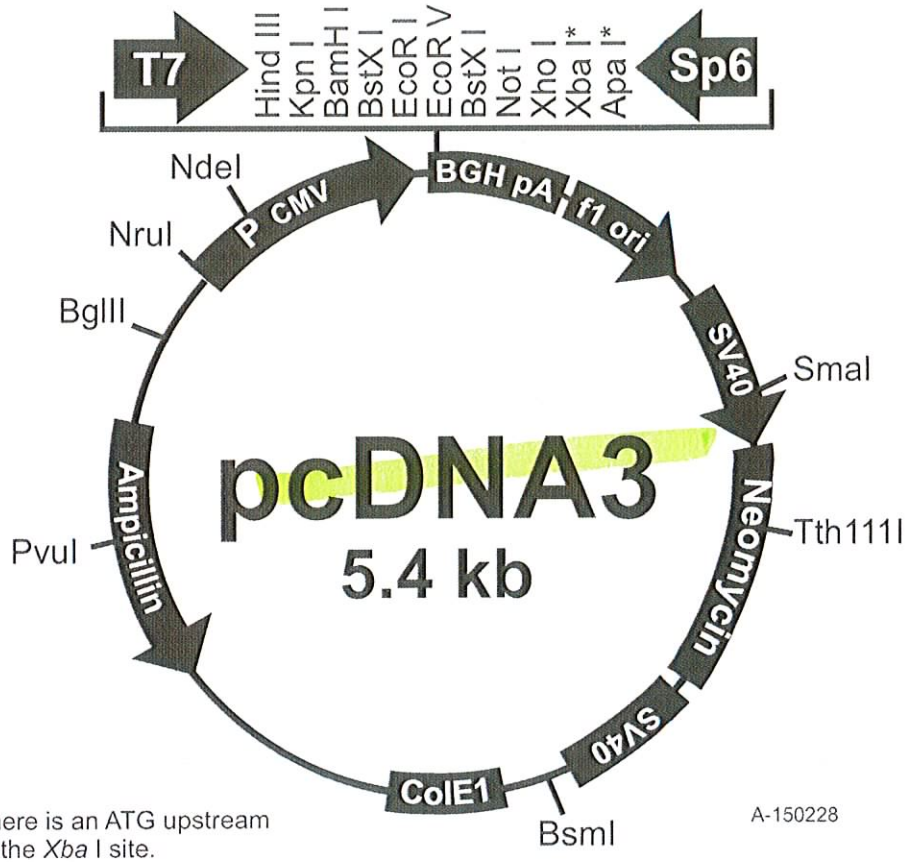
Related Cell Culture Products

Comments for pcDNA3:
5446 nucleotides

CMV promoter: bases 209-863
T7 promoter: bases 864-882
Polylinker: bases 889-994
Sp6 promoter: bases 999-1016
BGH poly A: bases 1018-1249
SV40 promoter: bases 1790-2115
SV40 origin of replication: bases 1984-2069
Neomycin ORF: bases 2151-2945
SV40 poly A: bases 3000-3372
ColE1 origin: bases 3632-4305
Ampicillin ORF: bases 4450-5310

Invitrogen
life technologies

Info on Plasmid(s)



* There is an ATG upstream of the *Xba* I site.

A-150228

The sequence of pcDNA3 has been compiled from information in sequence databases, published sequences, and other sources. This vector has not yet been completely sequenced. If you suspect an error in the sequence, please contact Invitrogen's Technical Services Department.

GE Healthcare

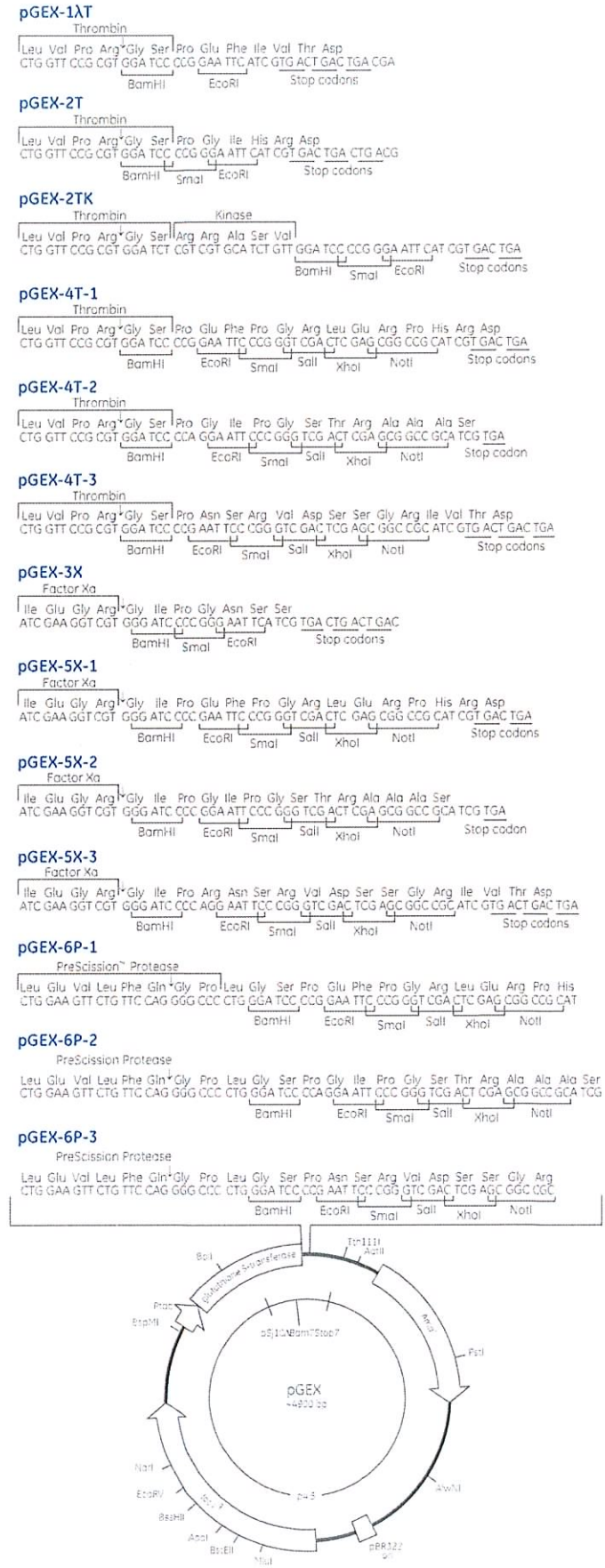
pGEX vectors, GST Gene Fusion System

Map of the glutathione S-transferase fusion vectors showing reading frames and main features. Even though stop codons in all three frames are not depicted in this map, all thirteen vectors have stop codons in all three frames downstream from the multiple cloning site.

Ordering information

Product	Quantity	Code no.
pGEX-1λT EcoRI/BAP	5 µg	28-9546-56
pGEX-2T	25 µg	28-9546-53
pGEX-2TK	25 µg	28-9546-46
pGEX-3X	25 µg	28-9546-54
pGEX-4T-1	25 µg	28-9545-49
pGEX-4T-2	25 µg	28-9545-50
pGEX-4T-3	25 µg	28-9545-52
pGEX-5X-1	25 µg	28-9545-53
pGEX-5X-2	25 µg	28-9545-54
pGEX-5X-3	25 µg	28-9545-55
pGEX-6P-1	25 µg	28-9546-48
pGEX-6P-2	25 µg	28-9546-50
pGEX-6P-3	25 µg	28-9546-51

Do you want to learn more? Read the GST Gene Fusion System Handbook (18-1142-75). Please contact your local GE Healthcare representative for a printed copy.



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For local office contact information, visit
www.gelifesciences.com/contact

www.gelifesciences.com/pgex

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Japan

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28-9191-62 AC 07/2009

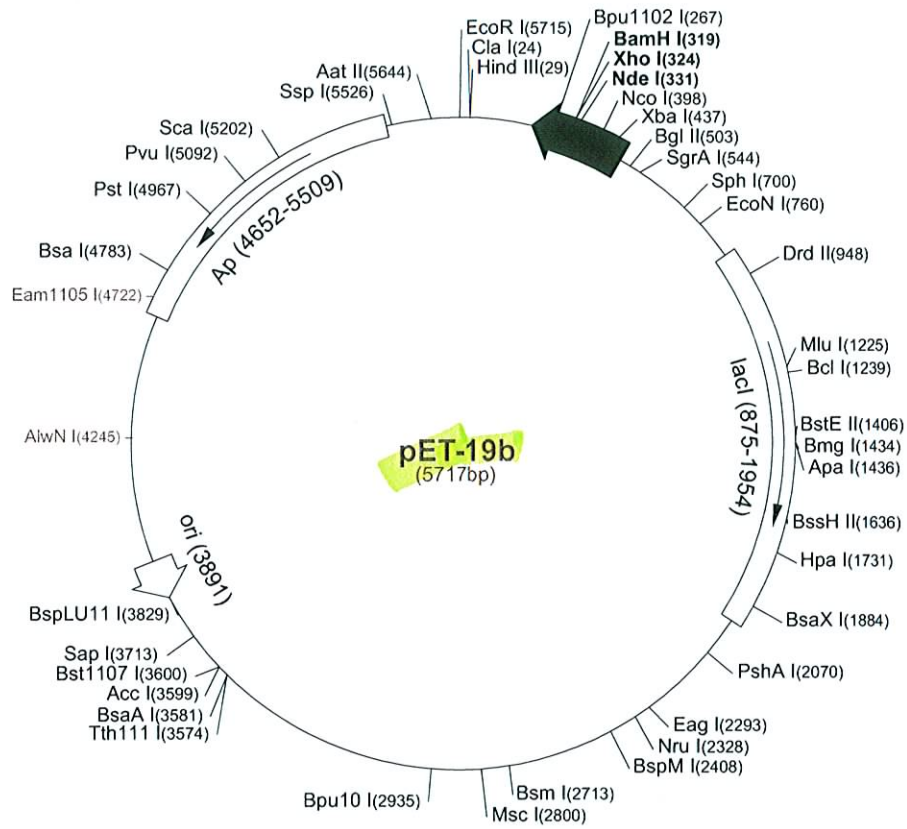
pET-19b Vector

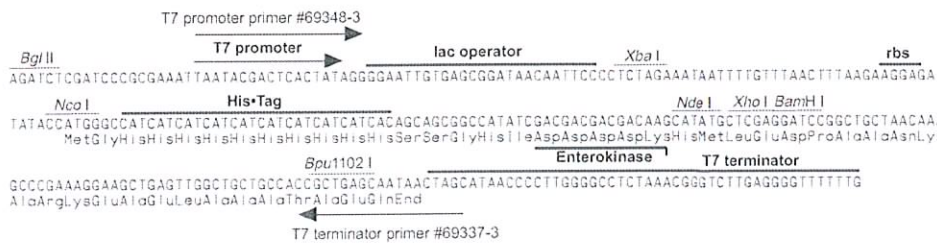
TB049 12/98

The pET-19b vector (Cat. No. 69677-3) carries an N-terminal His•Tag® sequence followed by an enterokinase site and three cloning sites. Unique sites are shown on the circle map. Note that the sequence is numbered by the pBR322 convention, so the T7 expression region is reversed on the circular map. The cloning/expression region of the coding strand transcribed by T7 RNA polymerase is shown below.

pET-19b sequence landmarks

T7 promoter	472-488
T7 transcription start	471
His•Tag coding sequence	366-395
Multiple cloning sites (*Nde* I -*Bam*H I)	319-335
T7 terminator	213-259
lacI coding sequence	875-1954
pBR322 origin	3891
bla coding sequence	4652-5509





pET-19b cloning/expression region

pET-19b Restriction Sites

TB049 12/98

Enzyme	# Sites	Locations				
AatII	1	5644				
AccI	1	3599				
AceIII	7	992	1720	2051	3338	3479
		3781	5021			
AciI	89					
AflIII	2	1225	3829			
AluI	24					
AlwI	16					
Alw21I	8	725	1209	2532	2823	3647
		4147	5308	5393		
Alw44I	4	1205	3643	4143	5389	
AlwNI	1	4245				
ApaI	1	1436				
ApaBI	2	909	2406			
ApoI	2	1500	5715			
AvaI	2	324	2779			
AvaII	9	1777	2153	2241	2490	2793
		2835	3114	4860	5082	
BamHI	1	319				
BanI	12					
BanII	3	609	623	1436		
BbsI	5	1371	1710	2084	2947	5700
BbvI	28					
BccI	16					
Bce83I	7	208	2039	2209	3920	4218
		4459	5327			
BceII	5	744	1085	1712	2521	4331
BcgI	8	1517	1551	2051	2085	3406
		3440	5227	5261		
BclI	1	1239				
BfaI	6	257	438	2843	4324	4577
		4912				
BglI	3	2289	2523	4842		
BglII	1	503				
BmgI	1	1434				
BpmI	6	1063	1552	2186	2740	3356
		4792				
Bpu10I	1	2935				
Bpu1102I	1	267				
BsaI	1	4783				
BsaAI	1	3581				
BsaBI	3	502	508	3026		
BsaHI	8	548	569	683	1182	1865
		2560	5259	5641		
BsaJI	11					
BsaWI	7	189	1544	2047	3018	4035
		4182	5013			
BsaXI	1	1884				
BsbI	2	3545	5265			
BscGI	13					
BsgI	3	1076	1276	2989		
BsiI	3	4002	5386	5693		
BsiEI	6	2010	2296	3745	4169	5092
		5241				
BsiI	22					
BsmI	1	2713				
BsmAI	7	922	1327	1453	1840	3470
		4783	5559			
BsmBI	2	1840	3470			
BsmFI	4	686	2227	2452	3100	
BsoFI	52					
Bsp24I	12					
Bsp1286I	11					
BspEI	2	189	3018			
BspGI	3	2413	2490	3355		
BspLU11I	1	3829				
BspMI	1	2408				
BsrI	25					
BsrBI	3	458	3762	5563		
BsrDI	4	1272	1638	4783	4957	
BsrFI	8	160	535	544	911	2123
		2283	2637	4802		

Enzyme	# Sites	Locations				
BssHII	1	1636				
Bst1107I	1	3600				
BstEII	1	1406				
BstXI	3	1027	1156	1279		
BstYI	11					
Cac8I	41					
CjeI	26					
CjePI	28					
ClaI	1	24				
CviJI	96					
CviRI	26					
DdeI	11					
DpnI	29					
DraI	3	4588	4607	5299		
DrdI	2	3522	3937			
DrdII	1	948				
DsaI	3	398	662	2801		
EaeI	7	355	533	665	1899	2293
		2798	5110			
EagI	1	2293				
Eam1105I	1	4722				
EarI	3	843	3713	5517		
EciI	5	1002	2749	3903	4049	4877
Eco47III	3	630	2131	3083		
Eco57I	2	4377	5389			
EcoNI	1	760				
EcoO109I	5	240	658	2793	2835	5698
EcoRI	1	5715				
EcoRII	10	129	948	1263	1803	1860
		2412	2795	3855	3976	3989
EcoRV	2	187	1675			
FauI	18					
FokI	14					
FspI	3	2712	2810	4944		
GdiII	6	355	533	665	1899	2293
		5110				
HaeI	8	953	2274	2346	2403	2800
		3844	3855	4307		
HaeII	13					
HaeIII	29					
HgaI	15					
HgiEII	2	823	4415			
HhaI	44					
Hin4I	5	16	1124	2495	4721	4795
HincII	2	1731	5263			
HindIII	1	29				
HinfI	14					
HpaI	1	1731				
HphI	17					
MaeII	12					
MaeIII	18					
MboII	15					
MluI	1	1225				
MmeI	2	4044	4228			
MnlI	34					
MscI	1	2800				
MseI	24					
MslI	10	1277	1565	1595	2385	2816
		3011	3402	4974	5133	5492
MspI	35					
MspA1I	11					
MwoI	44					
NarI	5	548	569	683	1865	2560
NciI	14					
NcoI	1	398				
NdeI	1	331				
NgoAIV	4	535	2123	2283	2637	
NlaIII	31					
NlaIV	28					
NruI	1	2328				
NspI	4	700	3174	3466	3833	
Pfl1108I	2	2112	4740			

Enzyme	# Sites	Locations				
PflMI	3	807	2675	2724		
PleI	7	486	774	861	1657	3723
		4208	4711			
PshAI	1	2070				
Psp5II	2	2793	2835			
Psp1406I	5	887	2255	3154	4948	5321
PstI	1	4967				
PvuI	1	5092				
PvuII	3	1825	1918	3420		
RcaI	4	623	4549	5557	5662	
RsaI	4	165	1372	3635	5202	
SapI	1	3713				
Sau96I	22					
Sau3AI	29					
ScaI	1	5202				
ScrFI	24					
SfaNI	24					
SfcI	5	138	471	4094	4285	4963
SgrAI	1	544				
SphI	1	700				
SspI	1	5526				
StyI	3	244	398	2723		
TaqI	14					
TaqII	8	1133	1351	2024	3731	5070
		5255	5408	5425		
TfiI	7	1904	2206	2360	2658	2879
		3383	3804			
ThaI	39					
TseI	28					
Tsp45I	9	124	1406	2234	2501	3268
		3481	3576	4978	5189	
Tsp509I	16					
Tth111I	1	3574				
Tth111II	8	324	1064	1757	3290	4419
		4426	4458	5714		
UbaJI	24					
VspI	4	486	1910	1969	4894	
XbaI	1	437				
XcmI	3	1081	1597	1615		
XhoI	1	324				
XmnI	2	3387	5321			

Enzymes that do not cut pET-19b:

AflII	AgeI	AscI	AvrII	BaeI
BseRI	BsrGI	Bsu36I	DraIII	FseI
KpnI	MunI	NheI	NotI	NsiI
NspV	PacI	PmeI	PmlI	RleAI
RsrII	SacI	SacII	SalI	SexAI
SfiI	SgfI	SmaI	SnaBI	SpeI
SrfI	Sse8387I	StuI	SunI	SwaI

Toxin Info

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TOCRIS
bioscience

Tocris House, IO Centre
Moorend Farm Avenue,
Bristol, BS11 0QL, UK
Phone: + 44(0)117 916 3333
Fax: + 44(0)117 916 3344

Material Safety Data Sheet

MSDS Preparation Date: 24/07/2008
MSDS Revision Date: 25/07/2011

Pertussis Toxin	Cat. No: 3097	Batch No: 3

1. COMPOSITION/INFORMATION ON INGREDIENTS
For batch specific information, please see Product Information sheet.

2. PHYSICAL AND CHEMICAL PROPERTIES
For batch specific information, please see Product Information sheet.

3. HANDLING AND STORAGE
Use in a chemical fume hood, with air supplied by an independent system. Avoid inhalation, contact with eyes, skin and clothing. Avoid prolonged or repeated exposure.

Material should be stored in a tightly sealed container under the storage condition stated on the Product Information sheet and on the vial label.

4. STABILITY AND REACTIVITY
Stability: Stable under normal handling conditions.

Conditions to avoid: Not applicable for this product

Hazardous Combustion/Decomposition of Product: May emit toxic gases such as carbon dioxide, carbon monoxide and nitrogen oxide upon thermal decomposition.

5. HAZARDS IDENTIFICATION
Exposure may cause irritation to eyes, mucous membranes, upper respiratory tract and skin.

6. TOXICOLOGICAL INFORMATION
To the best of our knowledge, the chemical, physical and toxicological properties have not been fully investigated.

RTECS No:	XW5883750
Target Organs:	Eyes, Respiratory system, Skin
Toxicity Data:	IVN-RAT LD50: 114ug/kg; IPR-MUS LD50: 17ug/kg; IVN-MUS LD50: 127ug/kg; ICE-MUS TDLo: 200ng/kg.

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

7. REGULATORY INFORMATION
Classification: Toxic. May be harmful or fatal if inhaled, swallowed or absorbed through skin

Safety Phrases:	S22 - Do not breathe dust S24/25 - Avoid contact with skin and eyes S36/37/39 - Wear suitable protective clothing, gloves and eye/face protection
Risk Phrases:	R23/24/25 - Toxic by inhilation, in contact with skin and if swallowed

8. EXPOSURE CONTROLS/PERSONAL PROTECTION
Wear appropriate chemical resistant gloves, safety goggles and other protective clothing to prevent contact with eyes and skin. Laboratory should be equipped with a safety shower and eye wash station. Avoid prolonged or repeated exposure. Do not breathe dust. Do not get in eyes, on skin or on clothing. Wash thoroughly after handling.

9. FIRST-AID MEASURES
In cases of SKIN CONTACT: Wash with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes and wash before wearing. In case of eye contact, flush with copious amounts of water for at least 15 minutes.

In cases of INHALATION: Remove to fresh air and monitor breathing. If breathing becomes difficult, give oxygen. If breathing stops, give artificial respiration.

In cases of INGESTION: If swallowed, rinse mouth out with water, contact local poison centre and call a physician.

10. FIRE-FIGHTING MEASURES
Extinguishing Media: Material is non-combustible. Use extinguishing media appropriate to surrounding fire conditions.

Unusual Fire and Explosive Hazards: May emit toxic gases upon thermal decomposition.

Special Fire-Fighting Procedures: Wear protective clothing to prevent contact with skin and eyes.

11. ACCIDENTAL RELEASE MEASURES
Wear appropriate protective clothing. Cover spillage with suitable absorbent material. Using non-spark tools, sweep up material and place in an appropriate container. Decontaminate spill site with with 10% caustic solution and ventilate area until after disposal is complete. Hold all material for appropriate disposal as described under DISPOSAL CONDITIONS.

12. ECOLOGICAL INFORMATION
Data not yet available - treat as potentially toxic if released into the environment.

13. DISPOSAL CONDITIONS
As specific country, federal, state and local environmental regulations are varied and change frequently, we recommend that you contact your local department for Health Services for information on the correct disposal of this product.

14. TRANSPORT INFORMATION
U.N.Number: UN2811
Proper Shipping Name: Toxins extracted from living sources, solid, n.o.s.
IATA Class: 6.1
IATA Packing Group: I

15. OTHER INFORMATION
Due to the nature of this material. It must only be handled by suitably qualified experienced scientists in appropriately equipped and authorised facilities. The above information is believed to be correct but does not purport to be all inclusive and should be used as a guide only for experienced personnel. Always consult your safety advisor and follow appropriate local and national safety legislature. The absence of warning must not, under any circumstance, be taken to mean that no hazard exists.

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Product Information

Pertussis Toxin	Cat.No: 3097	Batch No: 3

Protein toxin produced by Bordatella pertussis; has a molecular weight of ~105,700 Daltons and is composed of 5 subunits (S-1, S-2, S-3, S-4 and S-5) in a 1:1:1:2:1 ratio. Arranged in an A-B structure, the A protomer (S1) functions as a catalytic subunit while the B oligomer (S2, S3, S4 & S5) forms the receptor binding element.

Description:

Bacterial toxin that catalyses ADP-ribosylation of G-proteins Gi, Go and Gt. Impairs G protein heterotrimer interaction with receptors, blocking receptor coupling.

Physical and Chemical Properties:

CAS Number: [70323-44-3] Physical Appearance: White lyophilised solid

Storage:

Store the lyophilised solid at +4oC. Once reconstituted store at +4oC. Long term storage of this product in solution is not recommended.

Solubility:

Each vial, when reconstituted to 500µl with sterile distilled water, contains 50µg of protein (0.1µg/µl) in 0.01M sodium phosphate buffer, pH 7.0, with 0.05M sodium chloride. The resulting suspension should be made uniform by gentle mixing prior to use. Do not sterile filter as this will result in loss of material.

Stability and Solubility Advice:

This product should not be frozen. Pertussis toxin can be permanently inactivated by boiling at 100oC for 15-30 minutes

Other Information:

Please note that this product is not activated. While cells will activate the pertussis toxin if working in an intact system, in a cell free system, activation is required. This can be achieved by pre-incubation of the toxin with high concentrations of dithiothreitol (DTT), see Kaslow et al (1987) for suggested conditions.

If inactivated, this product is not considered hazardous by ingestion; pertussis toxin is degraded by the low pH in the gut and is not absorbed. Take special care when working in conjunction with hypodermic needles. If i.v. or i.m. injection should occur, consult a physician.

References:

Wolff *et al* (1980) Calmodulin activates prokaryotic adenylate cyclase. Proc.Natl.Acad.Sci.USA **77** 3841. **Tamura** *et al* (1982) Subunit structure of islet-activating protein, pertussis toxin, in conformity with the A-B model. Biochemistry **21** 5516. **Hewlett** *et al* (1983) Induction of a novel morphological response in Chinese Hamster Ovary cells by pertussis toxin. Infect.Immunol. **40** 123 **Kaslow** *et al* (1987) Structure-activity analysis of the activation of pertussis toxin Biochem. ***26*** 123.

Western

TOXIN USE RISK ASSESSMENT

Name of Toxin:	Pertussis
Proposed Use Dose:	5 µg
Proposed Storage Dose:	50 µg
LD_{50} (species):	114 µg

Calculation:

114 µg/kg x 50 kg/person

Dose per person based on LD_{50} in µg = 5700

LD_{50} per person with safety factor of 10 based on LD_{50} in µg = 570

Comments/Recommendations: