Modification Form for Permit BIO-RRI-0021

Permit Holder: Gregory Dekaban

Approved Personnel
(Please stroke out any personnel to be removed)

~~Mia Merrill~~

~~Ryan Buenoueeso~~

~~Bryan Ao~~

~~John Barrell~~

~~Xizhong Zhang~~

Sonali deChickera

Additional Personnel
(Please list additional personnel here)

Christy Willert
Patrick Anderson (4th yr. student)

	Please stroke out any approved Biohazards to be removed below	Write additional Biohazards for approval below. Give the full name - do not abbreviate.
Approved Microorganisms	E. coli (DH5 alpha), E. coli (Top 10), E.coli (stable 2, stable 4 strains), E.coli (HB 101), E.coli (XL-10 Gold). Recombinant Adenovirus 5 GFP. Recombinant AD 5-12-rat her2/neu (mutant inactivated - non-	
Approved Primary and Established Cells	[primary]: (human) blood, (robdent) blood, spleen, lymph node. [established]: (human) HEK 293, HEK 293T, Hela, U937, THP-, (rodent) mouse L cells, mouse macrophages IC-21, mouse DC 2.4 cells, mouse HIH 3T3	B16F10 melanoma cells
Approved Use of Human Source Material	Human Blood (whole) of other Body Fluid from Dr.Ronan Foley (McMaster) or Red Cross	
Approved Genetic Modifications (Plasmids/Vectors)	[plasmids]: pHR: cPPT-EF-GW-SIN vector cloning backbone, HIV packaging plasmids for gag/pol and VSV envelope (pCMVdR8.91 and pMD.G). (Lenitivirus vector backbone plus transgene) pCCL.sin.gfp/luc,	
Approved Use of Animals	mice	
Approved Biological Toxin(s)	Lipopolysaccharide	

** PLEASE ATTACH A MATERIAL SAFETY DATA SHEET OR EQUIVALENT FOR NEW BIOHAZARDS.*
*** PLEASE ATTACH A BRIEF DESCRIPTION OF THE WORK THAT EXPLAINS THE BIOHAZARDS USED AND HOW THEY WILL BE STORED, USED AND DISPOSED OF..*

As the principal investigator, I have ensured that all of the personnel named on the form have been trained. 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 of Permit Holder _____

Current Classification: 2+ **Containment Level for Added Biohazards:** CL 1

Date of Last Biohazardous Agents Registry Form: May 21, 2010

Date of Last Modification (if applicable): May 20, 2010

BioSafety Officer(s): _____ June 03, 2011

Chair, Biohazards Subcommittee: _____ **Date:** _____

This cell line will be used to create a mouse model of melanoma in C57BL/6 mice.

Designations: B16-F10

Biosafety Level: 1

Shipped: frozen

Medium & Serum: See Propagation

Growth Properties: adherent

Organism: *Mus musculus* (mouse)

Morphology: melanocyte

Source:
Organ: skin
Strain: C57BL/6J
Disease: melanoma

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 (technology from amaxa)

Propagation:
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%.
Temperature: 37.0°C
Atmosphere: air, 95%; carbon dioxide (CO2), 5%

Subculturing:
Protocol:

1. Remove and discard culture medium.
2. Briefly rinse the cell layer with 0.25% (w/v) Trypsin- 0.53 mM EDTA solution to remove all traces of serum that contains trypsin inhibitor.
3. Add 2.0 to 3.0 ml of Trypsin-EDTA solution to flask and observe cells under an inverted microscope until cell layer is dispersed (usually within 5 to 15 minutes).
   Note: To avoid clumping do not agitate the cells by hitting or shaking the flask while waiting for the cells to detach. Cells that are difficult to detach may be placed at 37°C to facilitate dispersal.
4. Add 6.0 to 8.0 ml of complete growth medium and aspirate cells by gently pipetting.
5. Add appropriate aliquots of the cell suspension to new culture vessels.
6. Incubate cultures at 37°C.

Subcultivation Ratio: A subcultivation ratio of 1:10 is recommended
Medium Renewal: Every 2 to 3 days

1.

Preservation:
Freeze medium: culture medium, 95%; DMSO, 5%
Storage temperature: liquid nitrogen vapor phase

Related Products: Recommended medium (without the additional supplements or serum described under ATCC Medium):ATCC 30-2002
recommended serum:ATCC 30-2020

References:

22151: Fidler IJ. Biological behavior of malignant melanoma cells correlated to their survival in vivo. Cancer Res. 35: 218-224, 1975. PubMed: 1109790
22191: Fidler IJ, et al. Tumoricidal properties of mouse macrophages activated with mediators from rat lymphocytes stimulated with concanavalin A. Cancer Res. 36: 3608-3615, 1976. PubMed: 953987
22192: Fidler IJ, Bucana C. Mechanism of tumor cell resistance to lysis by syngeneic lymphocytes. Cancer Res. 37: 3945-3956, 1977. PubMed: 908034
22243: Fidler IJ, Kripke ML. Metastasis results from preexisting variant cells within a malignant tumor. Science 197: 893-895, 1977. PubMed: 887927
23224: Briles EB, Kornfeld S. Isolation and metastatic properties of detachment variants of B16 melanoma cells. J. Natl. Cancer Inst. 60: 1217-1222, 1978. PubMed: 418183
23362: . . Nat. New Biol. 242: 148-149, 1973.
16173787: Li M, et al. Loss of intracisternal A-type retroviral particles in BL6 melanoma cells transfected with MHC class I genes. J.Gen. Virol. 77: 2757-2765, 1996. PubMed: 8922469

Return to Top

Back to my Search

THE UNIVERSITY OF WESTERN ONTARIO
BIOHAZARDOUS AGENTS REGISTRY FORM
Approved Biohazards Subcommittee: May 7, 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 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	**Gregory A. Dekaban**
SIGNATURE	
DEPARTMENT	**Biotherapeutics Research Laboratory, Molecular Brain Research Group**
ADDRESS	**Room 2214A, Robarts Research Institute**
PHONE NUMBER	**519-931-5777 ext. 24241**
EMERGENCY PHONE NUMBER(S)	**519-472-4627 (home) or 519-282-0642 (cell)**
EMAIL	**dekaban@robarts.ca**

Location of experimental work to be carried out: Building(s) **Robarts, Rms 2214, 2215, 2218 and 2222**

*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: **CIHR – Terry Fox Foundation; OICR**
GRANT TITLE(S): _____

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

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

Christy Willert	**Mia Merrill**
Sonali de Chickera	
Bryan Au	
Ryan Buensuceso	

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

Key words: immunotherapy, dendritic cells, cancer vaccine, cellular MRI, super paramagnetic iron oxide, nanoparticles,

Dendritic cells (DC) are highly specialized for immune-surveillance, and the induction and regulation of primary immune responses. This unique capacity reflects their ability to ingest foreign and self antigen (Ag) which they transport to secondary lymphoid tissues. In addition, DC are exquisitely equipped to sense "danger" stimuli, such as microbes or self-molecules released from inflamed or damaged tissues, including tumors. These microenvironmental cues transform DC into potent Ag-presenting cells (APC) that can stimulate and regulate Ag-specific effector T cells. Due to these key properties, DC are promising therapeutic candidates for the treatment of cancer, including breast cancer. Despite promising trials involving well over a 1000 human subjects, significant barriers remain to the broad implementation of efficacious and reliable DC-based vaccines. This is largely due to the low level of DC maturation and poor migration of these *in vitro* DC ; fewer than 5% of injected DC migrate to secondary lymphoid tissues. To address this problem, we are working to increase the migration efficiency of Ag-loaded DC and thereby increase the potency and frequency of Ag presentation. Sensitive, non-invasive imaging methods are essential to gaining critical information about the fate of DC-based vaccines in humans *in vivo* and will facilitate the development of effective DC-based immunotherapies for the generation of potent, anti-tumor immunity.

The **goal** of this proposal is to follow the trafficking of DC *in vivo* in the context of two murine breast tumour models by applying cellular magnetic resonance (MR) imaging methods. The optimized techniques we have developed for labelling DC with superparamagnetic iron oxide nanoparticles (SPIO) permit imaging of their *in vivo* migration into lymphoid tissues using a clinical MR scanner, and are directly translatable to human subjects. We will translate our mouse studies to human DC, and develop an *in vivo* migration assay for human DC in CB17*scid* mice. We will also extend the cellular MRI technology to the tracking of other cell-based therapeutics developed by the other members of our CIHR Terry Fox team. This proposal has three specific aims:

SPECIFIC AIM 1: ***Determine if quantitative MR image data correlates to SPIO$^+$DC induced breast tumour Ag specific immunity and tumor regression.*** Using SPIO$^+$DC we will assess whether the presence of a breast tumour affects SPIO$^+$DC migration and their immunogenicity in the target lymph node. We will determine whether quantitative MRI image data of SPIO$^+$DC migration correlates with tumour regression in two mouse breast cancer models.

SPECIFIC AIM 2: ***Evaluate the migratory function and immunogenicity of SPIO$^+$DC obtained from tumor bearing mice.*** SPIO$^+$DC will be prepared from tumour bearing mice and the in vivo migration and immunogenicity of these SPIO$^+$DC compared in tumour and non-tumour bearing mice. We will examine whether MR image data can detect differences in DC migration in this context.

SPECIFIC AIM 3: ***In human translational studies assess the migratory function and immunogenicity of SPIO$^+$ human DC derived from blood monocytes using CB17scid mice.*** We will first optimize the DC migration model in CB17*scid* mice and test whether Feraheme, a new FDA approved SPIO, is suitable for *in vivo* DC tracking by MRI. We will correlate quantitative MR image data to the migration and immunogenicity of normal and cancer patient SPIO$^+$moDC arriving in the CB17*scid* lymph node. Immunogenicity will be assessed in restimulation assays involving autologus PBL for memory recall responses to tetanus toxoid and in a MLR assay.

This multi-disciplinary approach applying cellular MRI technology to assess DC-based vaccine efficacy will be critical in evaluating DC-based anti-cancer therapy in future clinical trials.

Project description

Adenovirus and lentiviral vectors are made under certified level 2 or level 2+3 conditions. The adenoviral and lentiviral vectors used in this project are for the purpose of loading (via transduction) dendrtitic cells (DC) with a cancer or HIV antigen for the purpose of inducing an immune response in the mice given a DC-based vaccine. Both vectors are replication defective and the lentivirus is a second generation self-inactivating (SIN) vector. Infection take place in tissue culture under appropriate level 2 or level 2+3 conditions with primary prepared mouse bone marrow derived DC. Following infection the DC are matured for 3 to 5 days in culture, washed extensively and then injected into the footpads of mice. Mice are kept in the Robarts external barrier facility room that can handle level 2 animals. Animals injected with mouse or human DC that have under gone prior virus transduction that go for MR imaging are perfused with formalin first before they are taken for imaging. Thus there is no chance for exposure to an infectious agent while imaging is taking place. If suitable approved level 2 containment boxes that permit imaging of virus infected animals become available in the future we will likely image under such conditions. We will submit a modification if we move in that direction.

The recombinant adenoviruses are either entirely based on Ad5 or we may switch to a recombinant version of Ad5 that has the Ad12 spike protein in place of the Ad5 spike protein. The Ad12 spike protein allows for more efficient infection at lower multiplicities of infection of hematopoetic cells.

The lentiviral vectors come from Invitrogen or from collaborator Dr. Jeffrey Medin who has supplied us with some proprietary vectors that have improvements in allowing for bicistronic mRNAs to be expressed or because they have dual promoters in them. I cannot supply MSDS (do not exist) or other information on the Medin vectors at this time. However, they are not that different than the commercially available ones from Invitrogen that we also use.

The cancer antigen currently is a rat Her2/neu gene that has been mutated to remove its active site from participating in cell transformation. Thus there is no safety concern or need to move to a higher containment level. This gene comes in two forms: (1) just the rat her2/neu mutant and (2) fused to the ovalbumin MHC class I peptide OT-1 and to the MHC class II peptide OT-2.

A few experiments may take place in the future where we transduce DC with a lentiviral vector that expresses both GFP and luciferase to see if we can use bioluminescent imaging as a means to track DC migration in vivo.

1.0 Microorganisms

1.1 Does your work involve the use of biological agents? ✓ 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 ✓ 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
E.Coli K12 Strains **	O Yes ✓ No	O Yes ✓ No	O Yes ✓ No	1 litre	Commercial Supplies ** Invitrogen	✓ 1 O 2 O 3
Recombinant Adeno Virus 5 **	✓ Yes O No	✓ Yes O No	✓ Yes O No	1 litre	Various – see attached**	O 1 ✓ 2 O 3
Recombinant Lenti Virals **	✓Yes O No	O Yes ✓No	O Yes ✓No	1 litre	Various – see attached**	O 1 ✓ 2 O 3 ***plus***
	O Yes O No	O Yes O No	O Yes O No			O 1 O 2 O 3

H. May 18/10

*Please attach a Material Safety Data Sheet or equivalent from the supplier.
**** See Attached Appendix I**

2.0 Cell Culture

2.1 Does your work involve the use of cell cultures? ✓ 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	✓Yes O No	**Blood**	**Not applicable**
Rodent	✓Yes O No	**Mouse blood, spleen, lymph node**	**2007-049-06**

Non-human primate	O Yes ✓No		
Other (specify)	O Yes ✓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)*	Supplier / Source
Human	✓Yes O No	**See Appendix II**	**In-House or ATCC**
Rodent	✓Yes O No	**See Appendix II**	**In-House or ATCC**
Non-human primate	✓Yes O No	**Cos – 1, Cos – 7, Vero**	**In-House or ATCC**
Other (specify)	O Yes O 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 O 3

3.0 Use of Human Source Materials

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

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

Human Source Material	**Source/Supplier /Company Name**	**Is Human Source Material Infected With An Infectious Agent? YES/NO**	**Name of Infectious Agent (If applicable)**	**PHAC or CFIA Containment Level (Select one)**
Human Blood (whole) or other Body Fluid	**Dr. Ronan Foley (McMaster University) or Red Cross**	O Yes O No ✓ Unknown		O 1 ✓2 O 3
Human Blood (fraction) or other Body Fluid		O Yes O No O Unknown		O 1 O 2 O 3
Human Organs or Tissues (unpreserved)		O Yes O No O Unknown		O 1 O 2 O 3
Human Organs or Tissues (preserved)		**Not Applicable**		**Not Applicable**

4.0 Genetically Modified Organisms and Cell lines

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

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

Bacteria Used for Cloning *	Plasmid(s) *	Source of Plasmid	Gene Transfected	Describe the change that results
See Appendix I	*See Appendix III*	*See Appendix III*	*See Appendix III*	*. See Appendix III*

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

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

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

Virus Used for Vector Construction	Vector(s) *	Source of Vector	Gene(s) Transduced	Describe the change that results
Ad5 HIV	**See Appendix III**	**See Appendix III**	**See Appendix III**	**See Appendix III**

* Please attach a Material Safety Data Sheet or equivalent.

4.4 Will genetic sequences from the following be involved?

- HIV ✓YES, please specify: **Gag/pol and envelope** O NO
- HTLV 1 or 2 or genes from any Level 1 or Level 2 pathogens O YES, specify: **Myxoma virus M11L** O NO
- SV 40 Large T antigen ✓ YES O NO
- E1A oncogene ✓ YES O NO
- Known oncogenes ✓ YES, please specify: rat her 2/neu (but using a mutant form that inactivates transforming ability O NO
- Other human or animal pathogen and or their toxins O YES, please specify _____ ✓ NO

4.5 Will virus be replication defective? ✓ YES O NO

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

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

5.0 Human Gene Therapy Trials

5.1 Will human clinical trials be conducted involving a biological agent? O YES ✓NO
(including but not limited to microorganisms, viruses, prions, parasites or pathogens of plant or animal origin)
If no, please proceed to Section 6.0

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

5.2 Will the biological agent be able to replicate in the host? 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? ✓ YES O NO If no, please proceed to section 7.0

6.2 Name of animal species to be used: **Mice**

6.3 AUS protocol #: **2007-049-06**

6.4 Will any of the agents listed in section 4.0 be used in live animals ✓ YES, specify: **Indirectly Lentiviruses and Adenoviruses transduced cells** O NO

6.5 Will the agent(s) be shed by the animal: O YES ✓ NO, please justify:
Infection occurs in cell in culture 3-5 days prior to cells being injected into footpad of mice. Virus replication defective and excessed washed away after infection.

7.0 Use of Animal species with Zoonotic Hazards

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

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

8.0 Biological Toxins

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

8.2 If YES, please name the toxin(s): **Lipopolysaccharide**
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____ mouse LD50 7.7mg/kg given iv, lowest toxic dose for human given iv is 4ng/kg; could not find human or NHP or human LD50 data (see attached RTECS data sheets attached)

8.4 How much of the toxin is handled at one time*? 200 to 400 ng per experiment

8.5 How much of the toxin is stored*? 1-2 mg

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

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

9.0 Insects Requiring CFIA Permits

9.1 Do you use insects that require a permit from the CFIA? O YES ✓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: _____

Appendix I

E. Coli strains used for bacterial cloning:

HB101	Invitrogen
DH5alpha	Invitrogen
Stable 2	Invitrogen
Stable 4	Invitrogen
XL-10 Gold	Stratagene
Top10	Invitrogen

Recombinant Viruses used to carry reporter genes and genes of candidate immunogens:

Recombinant Adenovirus 5 GFP	Jonathan Bramson	McMaster University
Recombinant Ad 5-12 – rat her2/neu (mutant inactivated – non-transforming form)	Jonathan Bramson	McMaster University
Recombinant Ad 5 – rat her2/neu (mutant inactivated – non-transforming form)	Jonathan Bramson	McMaster University
Recombinant Ad5 – ¡CD40-My D88 fusion protein	David Spencer	Baylor College, Medicine (Houston, TX)
Virapower Lentiviral vector system	Invitrogen	
Lentiviral vector system from Jeffrey Medin	University of Toronto/UHN	

MATERIAL SAFETY DATA SHEET

Date Printed: 05/11/2010
Date Updated: 02/28/2006
Version 1.2

Section 1 - Product and Company Information

Product Name	HB101 COMPETENT CELLS, UNI-PACK
Product Number	H3788
Brand	SIGMA
Company	Sigma-Aldrich Canada, Ltd
Address	2149 Winston Park Drive Oakville ON L6H 6J8 CA
Technical Phone:	9058299500
Fax:	9058299292
Emergency Phone:	800-424-9300

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
HB101 COMPETENT CELLS, UNI-PACK KIT	None	No

The hazards identified with this kit are those associated with the following substances. For additional information, please refer to the individual material safety data sheet(s).
Kit Components:
COMPETENT CELLS WITH 7% DMSO
PUC19 DNA

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Caution: Avoid contact and inhalation. Readily absorbed through skin. Target organ(s): Eyes. Skin.

HMIS RATING

HEALTH: 1*
FLAMMABILITY: 0
REACTIVITY: 0

NFPA RATING

HEALTH: 1
FLAMMABILITY: 0
REACTIVITY: 0

*additional chronic hazards present.

Section 7 - Handling and Storage

STORAGE

Store at -70°C

Section 14 - Transport Information

DOT

Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA
Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
S: 23-24/25
Safety Statements: Do not breathe spray. Avoid contact with skin and eyes.

US CLASSIFICATION AND LABEL TEXT
US Statements: Caution: Avoid contact and inhalation. Readily absorbed through skin. Target organ(s): Eyes. Skin.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Agilent Technologies

Stratagene XL10-Gold Ultracompetent Cells, Catalog #200314

1. Product and company identification

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

2. Hazards identification

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

2 . Hazards identification

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

See toxicological information (section 11)

3 . Composition/information on ingredients

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

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

4 . First aid measures

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

4 . First aid measures

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

5 . Fire-fighting measures

Flammability of the product :	XL10-Gold Ultracompetent cells	Non-flammable.
	pUC18 Control Plasmid DNA	Non-flammable.
	XL10-Gold 2-mercaptoethanol mix	Flammable.
Products of combustion :	XL10-Gold Ultracompetent cells	Decomposition products may include the following materials: carbon oxides sulfur oxides halogenated compounds metal oxide/oxides
	pUC18 Control Plasmid DNA	No specific data.
	XL10-Gold 2-mercaptoethanol mix	Decomposition products may include the following materials: carbon oxides sulfur oxides
Extinguishing media		
Suitable :	XL10-Gold Ultracompetent cells	Use an extinguishing agent suitable for the surrounding fire.
	pUC18 Control Plasmid DNA	Use an extinguishing agent suitable for the surrounding fire.
	XL10-Gold 2-mercaptoethanol mix	Use dry chemical, CO_2, water spray (fog) or foam.
Not suitable :	XL10-Gold Ultracompetent cells	Not applicable.
	pUC18 Control Plasmid DNA	Not applicable.
	XL10-Gold 2-mercaptoethanol mix	Do not use water jet.
Special protective equipment for fire-fighters :	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.	
Special remarks on fire hazards :	XL10-Gold Ultracompetent cells	Not available.
	pUC18 Control Plasmid DNA	Not available.
	XL10-Gold 2-mercaptoethanol mix	Not available.
Special remarks on explosion hazards :	Not available.	

6 . Accidental release measures

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

6 . Accidental release measures

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

7 . Handling and storage

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

8 . Exposure controls/personal protection

Product name	Exposure limits
United States	
XL10-Gold Ultracompetent cells	
Glycerol	**ACGIH TLV (United States, 1/2008).** TWA: 10 mg/m³ 8 hour(s). Form: Mist **OSHA PEL (United States, 11/2006).** TWA: 5 mg/m³ 8 hour(s). Form: Respirable fraction TWA: 15 mg/m³ 8 hour(s). Form: Total dust **OSHA PEL 1989 (United States, 3/1989).** TWA: 5 mg/m³ 8 hour(s). Form: Respirable fraction TWA: 10 mg/m³ 8 hour(s). Form: Total dust
Manganese dichloride	**ACGIH TLV (United States, 1/2008).** TWA: 0.2 mg/m³, (as Mn) 8 hour(s). **OSHA PEL 1989 (United States, 3/1989).** CEIL: 5 mg/m³, (as Mn) **NIOSH REL (United States, 12/2001).** TWA: 1 mg/m³, (as Mn) 10 hour(s). STEL: 3 mg/m³, (as Mn) 15 minute(s). **OSHA PEL (United States, 11/2006).** CEIL: 5 mg/m³, (as Mn)
Sucrose	**ACGIH TLV (United States, 1/2008).** TWA: 10 mg/m³ 8 hour(s). **OSHA PEL 1989 (United States, 3/1989).** TWA: 15 mg/m³ 8 hour(s). Form: Total dust TWA: 5 mg/m³ 8 hour(s). Form: Respirable fraction **NIOSH REL (United States, 12/2001).** TWA: 10 mg/m³ 10 hour(s). Form: Total TWA: 5 mg/m³ 10 hour(s). Form: Respirable fraction **OSHA PEL (United States, 11/2006).** TWA: 15 mg/m³ 8 hour(s). Form: Total dust TWA: 5 mg/m³ 8 hour(s). Form: Respirable fraction
Dimethyl sulfoxide	**AIHA WEEL (United States, 1/2008).** TWA: 250 ppm 8 hour(s).
XL10-Gold 2-mercaptoethanol mix	
2-Mercaptoethanol	**AIHA WEEL (United States, 1/2008).** TWA: 0.2 ppm 8 hour(s).

Consult local authorities for acceptable exposure limits.

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

Personal protection

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

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

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

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

Other protection : Not available.

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

9 . Physical and chemical properties

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

9 . Physical and chemical properties

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

10 . Stability and reactivity

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

11 . Toxicological information

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure
2-Mercaptoethanol	LD50 Dermal	Rabbit	150 uL/kg	-
	LD50 Oral	Rat	244 mg/kg	-
Dimethyl sulfoxide	LD50 Dermal	Rat	40 gm/kg	-
	LD50 Oral	Rat	14500 mg/kg	-
Sucrose	LD50 Oral	Rat	29700 mg/kg	-
Manganese dichloride	LD50 Oral	Rat	250 mg/kg	-
Glycerol	LD50 Dermal	Rabbit	>10 gm/kg	-
	LD50 Oral	Rat	12600 mg/kg	-
Potassium chloride	LD50 Oral	Rat	2600 mg/kg	-

Eyes	:	XL10-Gold Ultracompetent cells	No known significant effects or critical hazards.
		pUC18 Control Plasmid DNA	No known significant effects or critical hazards.
		XL10-Gold 2-mercaptoethanol mix	Irritating to eyes.
Skin	:	XL10-Gold Ultracompetent cells	No known significant effects or critical hazards.
		pUC18 Control Plasmid DNA	No known significant effects or critical hazards.
		XL10-Gold 2-mercaptoethanol mix	Irritating to skin. May cause sensitization by skin contact.
Inhalation	:	XL10-Gold Ultracompetent cells	No known significant effects or critical hazards.
		pUC18 Control Plasmid DNA	No known significant effects or critical hazards.
		XL10-Gold 2-mercaptoethanol mix	No known significant effects or critical hazards.

11 . Toxicological information

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

Classification

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

Potential chronic health effects

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

Over-exposure signs/symptoms

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

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

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

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

12 . Ecological information

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

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

13 . Disposal considerations

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

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

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

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

14 . Transport information

Regulatory information

DOT / IMDG / IATA : Not regulated.

15 . Regulatory information

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

15 . Regulatory information

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

SARA 313

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

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

State regulations	:	XL10-Gold Ultracompetent cells	**Connecticut Carcinogen Reporting**: None of the components are listed. **Connecticut Hazardous Material Survey**: None of the components are listed. **Florida substances**: None of the components are listed. **Illinois Chemical Safety Act**: None of the components are listed. **Illinois Toxic Substances Disclosure to Employee Act**: None of the components are listed.

15 . Regulatory information

	Louisiana Reporting: None of the components are listed. **Louisiana Spill**: None of the components are listed. **Massachusetts Spill**: None of the components are listed. **Massachusetts Substances**: The following components are listed: Glycerol;Sucrose **Michigan Critical Material**: None of the components are listed. **Minnesota Hazardous Substances**: None of the components are listed. **New Jersey Hazardous Substances**: The following components are listed: Manganese dichloride **New Jersey Spill**: None of the components are listed. **New Jersey Toxic Catastrophe Prevention Act**: None of the components are listed. **New York Acutely Hazardous Substances**: None of the components are listed. **New York Toxic Chemical Release Reporting**: None of the components are listed. **Pennsylvania RTK Hazardous Substances**: The following components are listed: Glycerol; Manganese dichloride;Sucrose **Rhode Island Hazardous Substances**: None of the components are listed.
pUC18 Control Plasmid DNA	**Connecticut Carcinogen Reporting**: None of the components are listed. **Connecticut Hazardous Material Survey**: None of the components are listed. **Florida substances**: None of the components are listed. **Illinois Chemical Safety Act**: None of the components are listed. **Illinois Toxic Substances Disclosure to Employee Act**: None of the components are listed. **Louisiana Reporting**: None of the components are listed. **Louisiana Spill**: None of the components are listed. **Massachusetts Spill**: None of the components are listed. **Massachusetts Substances**: None of the components are listed. **Michigan Critical Material**: None of the components are listed. **Minnesota Hazardous Substances**: None of the components are listed. **New Jersey Hazardous Substances**: None of the components are listed. **New Jersey Spill**: None of the components are listed. **New Jersey Toxic Catastrophe Prevention Act**: None of the components are listed. **New York Acutely Hazardous Substances**: None of the components are listed. **New York Toxic Chemical Release Reporting**: None of the components are listed. **Pennsylvania RTK Hazardous Substances**: None of the components are listed. **Rhode Island Hazardous Substances**: None of the components are listed.
XL10-Gold 2-mercaptoethanol mix	**Connecticut Carcinogen Reporting**: None of the components are listed. **Connecticut Hazardous Material Survey**: None of the components are listed. **Florida substances**: None of the components are listed. **Illinois Chemical Safety Act**: None of the components are listed. **Illinois Toxic Substances Disclosure to Employee Act**: None of the components are listed. **Louisiana Reporting**: None of the components are listed. **Louisiana Spill**: None of the components are listed. **Massachusetts Spill**: None of the components are listed. **Massachusetts Substances**: The following components are

15 . Regulatory information

listed: 2-Mercaptoethanol
Michigan Critical Material: None of the components are listed.
Minnesota Hazardous Substances: None of the components are listed.
New Jersey Hazardous Substances: None of the components are listed.
New Jersey Spill: None of the components are listed.
New Jersey Toxic Catastrophe Prevention Act: None of the components are listed.
New York Acutely Hazardous Substances: None of the components are listed.
New York Toxic Chemical Release Reporting: None of the components are listed.
Pennsylvania RTK Hazardous Substances: The following components are listed: 2-Mercaptoethanol
Rhode Island Hazardous Substances: None of the components are listed.

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

16 . Other information

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

Date of issue : 11/19/2008
Version : 1

Notice to reader

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

☑ Indicates information that has changed from previously issued version.

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

Product code 500257
Product name TOP 10 - ONE SHOT

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
Suspension

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	Suspension

Important Health Safety and Environmental Information

Boiling point/range	°C No data available	°F No data available
Melting point/range	°C No data available	°F No data available
Flash point	°C No data available	°F No data available
Autoignition temperature	°C No data available	°F No data available
Oxidizing properties	No information available	
Water solubility	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 **(Long Term 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

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

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

Product code 500320
Product name EM STBL4

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

Chemical Name	CAS-No	Weight %
Glycerol	56-81-5	7-13

3. HAZARDS IDENTIFICATION

3. HAZARDS IDENTIFICATION

Emergency Overview

The product contains no substances which at their given concentration, are considered to be hazardous to health
May be harmful if swallowed
May cause skin and eye irritation in susceptible persons

Form
Liquid

Principle Routes of Exposure/ Potential Health effects

Eyes	May cause eye irritation with susceptible persons.
Skin	May cause skin irritation in susceptible persons.
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
Eye contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes
Ingestion	Never give anything by mouth to an unconscious person
Inhalation	Move to fresh air
Notes to physician	Treat symptomatically.

5. FIRE-FIGHTING MEASURES

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

6. ACCIDENTAL RELEASE MEASURES

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

7. HANDLING AND STORAGE

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

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure controls

Exposure limits

Chemical Name	OSHA PEL (TWA)	OSHA PEL (Ceiling)	ACGIH OEL (TWA)	ACGIH OEL (STEL)
Glycerol	15 mg/m³ total dust 5 mg/m³ respirable fraction	-	10 mg/m³	-

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 under normal conditions.
Materials to avoid No information available
Hazardous decomposition products No information available
Polymerization Hazardous polymerisation does not occur.

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Chemical Name	LD50 (oral,rat/mouse)	LD50 (dermal,rat/rabbit)	LC50 (Inhalation,rat/mouse)
Glycerol	12600 mg/kg (Rat)	10 g/kg (Rabbit)	570 mg/m³ (Rat)

Principle Routes of Exposure/ Potential Health effects

Eyes	May cause eye irritation with susceptible persons.
Skin	May cause skin irritation in susceptible persons.
Inhalation	No information available
Ingestion	May be harmful if swallowed.

Specific effects **(Long Term 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	No information available.
Bioaccumulation	No information available

13. DISPOSAL CONSIDERATIONS

Dispose of in accordance with local regulations

14. TRANSPORT INFORMATION

IATA

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

15. REGULATORY INFORMATION

International Inventories

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

U.S. Federal Regulations

SARA 313
This product is not regulated by SARA.

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

U.S. State Regulations

Chemical Name	Massachusetts - RTK	New Jersey - RTK	Pennsylvania - RTK	Illinois - RTK	Rhode Island - RTK
Glycerol	Listed	-	Listed	-	Listed

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

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

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

Product code 18265017
Product name Subcloning Efficiency ™ DH5alpha™ Competent Cells

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 **(Long Term 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

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

invitrogen

Material Safety Data Sheet

Revision Date: 13-Feb-2009

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

Product code 500317
Product name ME STBL 2

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

2. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous/Non-hazardous Components

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

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

3. HAZARDS IDENTIFICATION

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

Form
Liquid

3. HAZARDS IDENTIFICATION

Principle Routes of Exposure/
Potential Health effects

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

Specific effects

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

Target Organ Effects No information available

HMIS

Health	1
Flammability	0
Reactivity	0

4. FIRST AID MEASURES

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

5. FIRE-FIGHTING MEASURES

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

6. ACCIDENTAL RELEASE MEASURES

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

7. HANDLING AND STORAGE

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

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure controls

Exposure limits

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

Engineering measures	Ensure adequate ventilation, especially in confined areas

Personal protective equipment

Respiratory protection	In case of insufficient ventilation wear suitable respiratory equipment
Hand protection	Impervious butyl rubber gloves. Nitrile gloves are not recommended. Some brands of Nitrile gloves have breakthrough times of five minutes.. Nitrile gloves are not recomended. Some brands of Nitrile gloves have breakthrough times of five minutes.
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	soluble	

10. STABILITY AND REACTIVITY

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

11. TOXICOLOGICAL INFORMATION

Acute toxicity

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

Principle Routes of Exposure/ Potential Health effects

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

Specific effects

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

Sensitization No information available

Target Organ Effects No information available

12. ECOLOGICAL INFORMATION

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

13. DISPOSAL CONSIDERATIONS

Dispose of in accordance with local regulations

14. TRANSPORT INFORMATION

IATA

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

15. REGULATORY INFORMATION

International Inventories

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

U.S. Federal Regulations

SARA 313
This product is not regulated by SARA.

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

U.S. State Regulations

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

California Proposition 65
This product does not contain chemicals listed under Proposition 65

WHMIS hazard class:
D2B Toxic materials

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

16. OTHER INFORMATION

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

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

End of Safety Data Sheet

VECTOR BIOLABS
THE ADENOVIRUS COMPANY

MATERIAL SAFETY DATA SHEET

EMERGENCY TELEPHONES: 1- 877-Biolabs 1-215-966-6045
http://www.vectorbiolabs.com

MATERIAL SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

SECTION I - INFECTIOUS AGENT

PRODUCT IDENTIFICATION:
All pre-made adenovirus made by Vector BioLabs.

BIOLOGICAL NAME: Adenovirus - Type 5
CHARACTERISTICS: Adenoviridae; non-enveloped, icosahedral virions, 75-80 nm diameter, doubledstranded, linear DNA genome. The recombinant viruses are based on human adenoviral backbone which is deleted in the essential E1 gene as well as the E3 gene. The viruses produced are thus non-replicative.

SECTION II - HEALTH HAZARD

PATHOGENICITY: Varies in clinical manifestation and severity; symptoms include fever, rhinitis, pharyngitis, cough and conjunctivitis. The risk from infection by defective recombinant adenoviral vectors depends both on the dose of virus and on the nature of the transgene. Adenovirus does not integrate into the host cell genome but can produce a strong immune response.
HOST RANGE: Humans and animals
INCUBATION PERIOD: from 1-10 days
MODE OF TRANSMISSION: In the laboratory, care must be taken to avoid spread of infectious material by aerosol, direct contact or accidental injection
CHEMICAL LISTED AS CARCINOGEN OR POTENTIAL CARCINOGEN: None

SECTION III - VIABILITY

DRUG SUSCEPTIBILITY: No specific antiviral available
SUSCEPTIBILITY TO DISINFECTANTS: Susceptible to 1% sodium hypochlorite, 2% glutaraldehyde. Recommend use of 1/3 volume of bleach for 30 minutes.
PHYSICAL INACTIVATION: Sensitive to heat; 1 hour at 56°C is used to inactivate virus.
SURVIVAL OUTSIDE HOST: Adenovirus type 5 survived from 3-8 weeks on environmental surfaces at room temperature.

SECTION IV - MEDICAL

SURVEILLANCE: Monitor for symptoms; confirm by serological analysis
FIRST AID/TREATMENT:
Contact: Immediately flush eyes and skin with plenty of water for at least 15 minutes. Call a physician.
Inhalation: N/A
Ingestion: Wash out mouth with water. Call a physician
Accidental injection: wash area with soap and water. Call a physician.

SECTION V – ACCIDENTAL RELEASE PROCEDURES

Pour 1 volume of Javel water over the leak(s) and wait for 15 minutes.
Wipe up carefully.
Hold for autoclave waste disposal and decontaminate work surfaces with 70% alcohol.

SECTION VI - RECOMMENDED PRECAUTIONS

CONTAINMENT REQUIREMENTS: Biosafety level 2 practices and containment facilities for all activities involving the virus and potentially infectious body fluids or tissues. This level consists of etiological agents considered to be of ordinary potential harm.
PROTECTIVE CLOTHING: Recombinants Adenovirus: Laboratory coat; gloves.

OTHER PRECAUTIONS:
Access to the laboratory is limited.
Work surfaces are decontaminated before and after each procedure
Mechanical pipetting devices are used for all procedures; mouth pipetting is prohibited.
Eating, drinking, and smoking are not permitted in the laboratory; food is not stored in laboratory areas.
Laboratory coats are worn in and are removed before leaving the laboratory.
Hands are washed before and after handling virus.

SECTION VII - HANDLING INFORMATION

DISPOSAL: Decontaminate all wastes before disposal; steam sterilization
STORAGE: In sealed containers that are appropriately labeled

SECTION VIII - MISCELLANEOUS INFORMATION

The above information and recommendations are believed to be accurate and represent the most complete information currently available to us. All materials and components may present unknown hazards and should be used with caution. Vector BioLabs, Inc assumes no liability resulting from use of the above products.

Date of revision: May 24, 2004

3701 Market Street, Suite 340, Philadelphia, PA 19104 Tel: 877-biolabs Fax: 215-966-6001 info@vectorbiolabs.com

MATERIAL SAFETY DATA SHEET

Revised 1/30/03
Replaces (None)
Printed 1/30/03

VIRAPOWER PKG. MIX 195 UG
INVITROGEN CORPORATION
MSDS ID: 442050

1. PRODUCT AND COMPANY INFORMATION

INVITROGEN CORPORATION
1600 FARADAY AVE.
CARLSBAD, CA 92008
760/603-7200

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

INVITROGEN CORPORATION
3 FOUNTAIN DR.
INCHINNAN BUSINESS PARK
PAISLEY, PA4 9RF
SCOTLAND
44-141 814-6100

INVITROGEN CORPORATION
P.O. BOX 12-502
PENROSE
AUCKLAND 1135
NEW ZEALAND
64-9-579-3024

INVITROGEN CORPORATION
2270 INDUSTRIAL ST.
BURLINGTON, ONT
CANADA L7P 1A1
905/335-2255

EMERGENCY NUMBER (SPILLS, EXPOSURES): 301/431-8585 (24 HOUR)
800/451-8346 (24 HOUR)
NON-EMERGENCY INFORMATION: 800/955-6288

Product Name:
ViraPower Lentiviral Support Kit

NOTE: If this product is a kit or is supplied with more than one material, please refer to the MSDS for each component for hazard information.

Product Use:
These products are for laboratory research use only and are not intended for human or animal diagnostics, therpeutic, or other clinical uses.

Synonyms:
Not available.

2. COMPOSITION, INFORMATION ON INGREDIENTS

The following list shows components of this product classified as hazardous based on physical properties and health effects:

Component	CAS No.	Percent
TRIZMA BASE	MIXTURE	10 - 30

3. HAZARDS IDENTIFICATION

********** EMERGENCY OVERVIEW **********
Warning!
Irritant.
Harmful if swallowed.
Harmful if absorbed.
Harmful by inhalation.
****

Potential Health Effects:
Eye:
Can cause moderate irritation, tearing and reddening, but not likely to permanently injure eye tissue.

Skin:
Can cause moderate skin irritation, defatting, and dermatitis. Not likely to cause permanent damage.
Upon prolonged or repeated exposure, harmful if absorbed through the skin.
May cause minor systemic damage.

Inhalation:
Can cause moderate respiratory irritation, dizziness, weakness, fatigue, nausea and headache.
Harmful! Can cause systemic damage (see "Target Organs).

Ingestion:
Mildly irritating to mouth, throat, and stomach. Can cause abdominal discomfort.
Harmful if swallowed. May cause systemic poisoning.

Chronic:
No data on cancer.

4. FIRST AID MEASURES

Eye:
Flush eyes with plenty of water for at least 20 minutes retracting eyelids often. Tilt the head to prevent chemical from transferring to the uncontaminated eye. Get immediate medical attention.

Skin:
Wash with soap and water. Remove contaminated clothing and launder. Get medical attention if irritation develops or persists.

Inhalation:
Can cause moderate respiratory irritation, dizziness, weakness, fatigue, nausea and headache.

4. FIRST AID MEASURES (CONT.)

Ingestion:
Do not induce vomiting and seek medical attention immediately. Drink two glasses of water or milk to dilute. Provide medical care provider with this MSDS.

Note To Physician:
Treat symptomatically.

5. FIRE FIGHTING MEASURES

Flashpoint Deg C:
Not available.

Upper Flammable Limit %:
Not available.

Lower Flammable Limit %:
Not available.

Autoignition Temperature Deg C:
Not available.

Extinguishing Media:
Can cause moderate irritation, tearing and reddening, but not likely to permanently injure eye tissue.
Use water spray/fog for cooling.

Firefighting Techniques/Equipment:
Do not enter fire area without proper protection including self-contained breathing apparatus and full protective equipment. Fight fire from a safe distance and a protected location due to the potential of hazardous vapors and decomposition products.

Hazardous Combustion Products:
Includes carbon dioxide, carbon monoxide, dense smoke.

6. ACCIDENTAL RELEASE MEASURES

Accidental releases may be subject to special reporting requirements and other regulatory mandates. Refer to Section 8 for personal protection equipment recommendations.

Spill Cleanup:
Exposure to the spilled material may be irritating or harmful. Follow personal protective equipment recommendations found in Section VIII of this MSDS. Additional precautions may be necessary based on special circumstances created by the spill including; the material spilled, the quantity of the spill, the area in which the spill occurred. Also consider

6. ACCIDENTAL RELEASE MEASURES (CONT.)

the expertise of employees in the area responding to the spill.
Prevent the spread of any spill to minimize harm to human health and the environment if safe to do so. Wear complete and proper personal protective equipment following the recommendation of Section VIII at a minimum. Dike with suitable absorbent material like granulated clay. Gather and store in a sealed container pending a waste disposal evaluation.

7. HANDLING AND STORAGE

Storage of some materials is regulated by federal, state, and/or local laws.

Storage Pressure:
Ambient

Handling Procedures:
Harmful or irritating material. Avoid contacting and avoid breathing the material. Use only in a well ventilated area.
Keep closed or covered when not in use.

Storage Procedures:
Store in a cool dry place. Isolate from incompatible materials.
Suitable for most general chemical storage areas.

8. EXPOSURE CONTROLS, PERSONAL PROTECTION

Exposure Limits:

Component	OSHA PEL (ppm)	AGCIH TWA (ppm)
TRIZMA BASE	Not established.	Not established.

Engineering Controls:
No exposure limits exist for the constituents of this product. Use local exhaust ventilation or other engineering controls to minimize exposures and maintain operator comfort.

Personal Protective Equipment:

Eye:
An eye wash station must be available where this product is used.
Wear chemical goggles.

Skin:
Wear protective gloves. Inspect gloves for chemical break-through and replace at regular intervals. Clean protective equipment regularly. Wash hands and other exposed areas with mild soap and water before eating, drinking, and when leaving work .

8. EXPOSURE CONTROLS, PERSONAL PROTECTION (CONT.)

Gloves should be used as minimum hand protection.

Respiratory:
A respiratory protection program that meets OSHA's 29 CFR 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant a respirator's use.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance/physical state:	Liquid solution / suspension
Odor:	No odor.
	Not established.
	Not established.
	Not established.
	Not established.
	Not established.
	Not established.
Specific Gravity/Density:	Not established.
Octanol/water Partition Coeff:	Not established.
Volatiles:	Not established.
Evaporation Rate:	Not established.
Viscosity:	Not established.

10. STABILITY AND REACTIVITY

Stability:
Stable under normal conditions.

Conditions to Avoid:
Strong alkalies. Strong oxidizing agents.

Hazardous Decomposition Products:
Carbon dioxide. Carbon monoxide. Nitrogen oxides.

Hazardous Polymerization:
Hazardous polymerization will not occur.

11. TOXICOLOGICAL INFORMATION

Acute Toxicity:

Dermal/Skin:
Not determined.

11. TOXICOLOGICAL INFORMATION (CONT.)

Inhalation/Respiratory:
Not determined.

Oral/Ingestion:
TRIZMA BASE: 5900 MG/KG

Target Organs: No data found.

Carcinogenicity:

NTP:
Not tested.

IARC:
Not listed.

OSHA:
Not regulated.

Other Toxicological Information

12. Ecological Information

Ecotoxicological Information: No ecological information available.

Environmental Fate (Degradation, Transformation, and Persistence):
Bioconcentration is not expected to occur.

13. DISPOSAL CONSIDERATIONS

Regulatory Information:
Not applicable.

Disposal Method:
Clean up and dispose of waste in accordance with all federal, state, and local environmental regulations.
Dispose of by incineration following Federal, State, Local, or Provincial regulations.

14. TRANSPORT INFORMATION

Proper Shipping Name: Not Determined.
Hazard Class:
Subsidiary Hazards:
ID Number:

14. TRANSPORT INFORMATION (CONT.)

Packing Group:

15. REGULATORY INFORMATION

UNITED STATES:

TSCA:
This product is solely for research and development purposes only and may not be used, processed or distributed for a commercial purpose. It may only be handled by technically qualified individuals.

Prop 65 Listed Chemicals:	PROP 65	PERCENT
No Prop 65 Chemicals.		

No 313 Chemicals

CANADA:

DSL/NDSL:
Not determined.

COMPONENT	WHMIS Classification
TRIZMA BASE	D2B

EUROPEAN UNION:

PRODUCT RISK PHRASES:
None assigned.

PRODUCT SAFETY PHRASES:
Not applicable.

PRODUCT CLASSIFICATION:
Not classified as hazardous

Component	EINECS Number
TRIZMA BASE	Not established.

16. OTHER INFORMATION

HMIS Rating 0-4:
FIRE: Not determined.
HEALTH: Not determined.
REACTIVITY: Not determined.

16. OTHER INFORMATION (CONT.)

Abbreviations
N/A - Data is not applicable or not available
SARA - Superfund and Reauthorization Act
HMIS - Hazard Material Information System
WHMIS - Workplace Hazard Materials Information System
NTP - National Toxicology Program
OSHA - Occupational Health and Safety Administration
IARC - International Agency for Research on Cancer
PROP 65 - California Safe Drinking Water and Toxic Enforcement Act of 1986
EINECS - European Inventory of Existing Commercial Chemical Substances

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 Invitrogen Corporation cannot control the actual methods, volumes, or conditions of use, the Company shall not be held liable for any damages or losses resulting from the handling or from contact with the product as described herein. THE INFORMATION IN THIS MSDS DOES NOT CONSTITUTE A WARRANTY, EXPRESS OR IMPLIED, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR ANY PARTICULAR PURPOSE.

Appendix II

Cell type
Unless otherwise noted ATCC sheets follow this page.

Human	HEK293	ATCC
	HEK293T	Invitrogen / ATCC
	Hela	In-house
	U937	ATCC
	THP-1	ATCC
Rodent	mouse L cells	In-house
	mouse macrophages IC-21	ATCC TIB-186
	mouse DC 2.4 cells*	Dr. Peta O'Connell (Robarts Research Institute, UWO)
	mouse HIH 3T3	Dr. Rod DeKoter (UWO)
NHP	Cos-1	in-house
	Cos-7	in-house
	Vero	Grant McFadden

- This cell line is not currently listed in the ATCC repository. It is a mouse immature DC-like cell line. DC2.4 cells were obtained from bone marrow cells infected with a retrovirus encoding *myc* and *raf* by using supernatant from NIH J2 Leuk cells, as previously described (Shen, Z., Reznikoff,G., Dranoff, G., Rock, KL. Cloned dendritic cells can present exogenous antigens on both MHC class I and II molecules. J. Immunology 1997; 158: 2723-2730). Due to the presence of the two oncogenes transduced into the bone marrow cells, this cell line should be considered LEVEL 2.

ATCC
The Global Bioresource Center™

Search Catalog
Select a Category
Go

Login Search Options

About | Cultures and Products | Science | Standards | Deposit Services | Custom Services | Product Use Policy

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: $256.00

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

PHOTO

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

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

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

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

Cytogenetic Analysis:

Related Links

- NCBI Entrez Search
- Cell Micrograph
- Make a Deposit
- Frequently Asked Questions
- Material Transfer Agreement
- Technical Support
- Related Cell Culture Products

This is a hypotriploid human cell line. The modal chromosome number was 64, occurring in 30% of cells. The rate of cells with higher ploidies was 4.2 %. The der(1)t(1;15) (q42;q13), der(19)t(3;19) (q12;q13), der(12)t (8;12) (q22;p13), and four other marker chromosomes were common to most cells. Five other markers occurred in some cells only. The marker der (1) and M8 (or Xq+) were often paired. There were four copies of N17 and N22. Noticeably in addition to three copies of X chromosomes, there were paired Xq+, and a single Xp+ in most cells.

Age: fetus

Comments:

Although an earlier report suggested that the cells contained Adenovirus 5 DNA from both the right and left ends of the viral genome [RF32764], it is now clear that only left end sequences are present. [39768]
The line is excellent for titrating human adenoviruses.
The cells express an unusual cell surface receptor for vitronectin composed of the integrin beta-1 subunit and the vitronectin receptor alpha-v subunit. [23406]
The Ad5 insert was cloned and sequenced, and it was determined that a colinear seqment from nts 1 to 4344 is integrated into chromosome 19 (19q13.2). [39768]

Propagation:

ATCC complete growth medium: The base medium for this cell line is ATCC-formulated Eagle's Minimum Essential Medium, Catalog No. 30-2003. 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
The cell line does not adhere to the substrate when left at room temperature for any length of time, therefore, live cultures may be received with the cells detached.The cells will re-attach to the flask over a period of several days in culture at 37C.

Subculturing:

Protocol:

1. Remove and discard culture medium.
2. Briefly rinse the cell layer with 0.25% (w/v) Trypsin- 0.53 mM EDTA solution to remove all traces of serum that contains trypsin inhibitor.
3. Add 2.0 to 3.0 ml of Trypsin-EDTA solution to flask and observe cells under an inverted microscope until cell layer is dispersed (usually within 5 to 15 minutes).
   Note: To avoid clumping do not agitate the cells by hitting or shaking the flask while waiting for the cells to detach. Cells that are difficult to detach may be placed at 37°C to facilitate dispersal.
4. Add 6.0 to 8.0 ml of complete growth medium and aspirate cells by gently pipetting.
5. Add appropriate aliquots of the cell suspension to new culture vessels.An inoculum of 2 X 10 (3) to 6 X 10 (3) viable cells/cm2 is recommended.
6. Incubate cultures at 37°C.6. Subculture when cell concentration is between 6 and 7 X 10(4) cells/cm2.

Subcultivation Ratio: 1:10 to 1:20 weekly.
Medium Renewal: Every 2 to 3 days

Preservation:

Freeze medium: Complete growth medium supplemented with 5% (v/v) DMSO
Storage temperature: liquid nitrogen vapor phase

Related Products:

Recommended medium (without the additional supplements or serum described under ATCC Medium): ATCC 30-2003
derivative: ATCC CRL-10852
derivative: ATCC CRL-12006
derivative: ATCC CRL-12007
derivative: ATCC CRL-12013
derivative: ATCC CRL-12479
derivative: ATCC CRL-2029
derivative: ATCC CRL-2368
purified DNA:ATCC CRL-1573D

References:

21624: Xie QW, et al. Complementation analysis of mutants of nitric oxide synthase reveals that the active site requires two hemes. Proc. Natl. Acad. Sci. USA 93: 4891-4896, 1996. PubMed: 8643499
21631: Da Costa LT, et al. Converting cancer genes into killer genes. Proc. Natl. Acad. Sci. USA 93: 4192-4196, 1996. PubMed: 8633039
22282: Graham FL, et al. Characteristics of a human cell line transformed by DNA from human adenovirus type 5. J. Gen. Virol. 36: 59-72, 1977. PubMed: 886304
22319: Graham FL, et al. Defective transforming capacity of adenovirus type 5 host-range mutants. Virology 86: 10-21, 1978. PubMed: 664220
22699: Harrison T, et al. Host-range mutants of adenovirus type 5 defective for growth in HeLa cells. Virology 77: 319-329, 1977. PubMed: 841862
23406: Bodary SC, McLean JW. The integrin beta 1 subunit associates with the vitronectin receptor alpha v subunit to form a novel vitronectin receptor in a human embryonic kidney cell line. J. Biol. Chem. 265: 5938-5941, 1990. PubMed: 1690718
27819: Goodrum FD, Ornelles DA. The early region 1B 55-kilodalton oncoprotein of adenovirus relieves growth restrictions imposed on viral replication by the cell cycle. J. Virol. 71: 548-561, 1997. PubMed: 8985383
28301: Loffler S, et al. CD9, a tetraspan transmembrane protein, renders cells susceptible to canine distemper virus. J. Virol. 71: 42-49, 1997. PubMed: 8985321
32283: Hu SX, et al. Development of an adenovirus vector with tetracycline-regulatable human tumor necrosis factor alpha gene expression. Cancer Res. 57: 3339-3343, 1997. PubMed: 9269991
32396: Kolanus W, et al. alphaLbeta2 integrin/LFA-1 binding to ICAM-1 induced by cytohesin-1 a cytoplasmic regulatory molecule. Cell 86: 233-242, 1996. PubMed: 8706128
32490: Stauderman KA, et al. Characterization of human recombinant neuronal nicotinic acetylcholine receptor subunit combinations alpha 2 beta 4, alpha 3 beta 4 and alpha 4 beta 4 stably expressed in HEK293 cells. J. Pharmacol. Exp. Ther. 284: 777-789, 1998. PubMed: 9454827
32514: Bartz SR, et al. Human immunodeficiency virus type 1 cell cycle control: Vpr is cytostatic and mediates G2 accumulation by a mechanism which differs from DNA damage checkpoint control. J. Virol. 70: 2324-2331, 1996. PubMed: 8642659
32726: Sandri-Goldin RM, Hibbard MK. The herpes simplex virus type 1 regulatory protein ICP27 coimmunoprecipitates with anti-sm antiserum, and the C terminus appears to be required for this interaction. J. Virol. 70: 108-118, 1996. PubMed: 8523514
32829: Ansieau S, et al. Tumor necrosis factor receptor-associated factor (TRAF)-1, TRAF-2, and TRAF-3 interact in vivo with the CD30 cytoplasmic domain; TRAF-2 mediates CD30-induced nuclear factor kappa B activation. Proc. Natl. Acad. Sci. USA 93: 14053-14058, 1996. PubMed: 8943059
32893: Zhang J, et al. Dynamin and beta-arrestin reveal distinct mechanisms for G protein-coupled receptor internalization. J. Biol. Chem. 271: 18302-18305, 1996. PubMed: 8702465
32914: Oppermann M, et al. Monoclonal antibodies reveal receptor specificity among G-protein-coupled receptor kinases. Proc. Natl. Acad. Sci. USA 93: 7649-7654, 1996. PubMed: 8755530
32921: Xia Y, et al. Nitric oxide synthase generates superoxide and nitric oxide in arginine-depleted cells leading to peroxynitrite-mediated cellular injury. Proc. Natl. Acad. Sci. USA 93: 6770-6774, 1996. PubMed: 8692893
32925: Zhu X, et al. Cell cycle-dependent modulation of telomerase activity in tumor cells. Proc. Natl. Acad. Sci. USA 93: 6091-6095, 1996. PubMed: 8650224
32971: Uebele VN, et al. Functional differences in Kv1.5 currents expressed in mammalian cell lines are due to the presence of endogenous Kvbeta2.1 subunits. J. Biol. Chem. 271: 2406-2412, 1996. PubMed: 8576199
33003: Abell A, et al. Deletions of portions of the extracellular loops of the lutropin/choriogonadotropin receptor decrease the binding affinity for ovine luteinizing hormone, but not human choriogonadotropin, by preventing the formation of mature cell surface receptor. J. Biol. Chem. 271: 4518-4527, 1996. PubMed: 8626807
33010: Tiberi M, et al. Differential regulation of dopamine D1A receptor responsiveness by various G protein-coupled receptor kinases. J. Biol. Chem. 271: 3771-3778, 1996. PubMed: 8631993
33022: Shahrestanifar M, et al. Studies on inhibition of mu and delta opioid receptor binding by dithiothreitol and N-ethylmaleimide. His223 is critical for mu opioid receptor binding and inactivation by N-ethylmaleimide. J. Biol. Chem. 271: 5505-5512, 1996. PubMed: 8621408
33035: Boring L, et al. Molecular cloning and functional expression of murine JE (monocyte chemoattractant protein 1) and murine macrophage inflammatory protein 1alpha receptors. J. Biol. Chem. 271: 7551-7558, 1996. PubMed: 8631787
33036: Noonberg SB, et al. Evidence of post-transcriptional regulation of U6 small nuclear RNA. J. Biol. Chem. 271: 10477-10481, 1996. PubMed: 8631843
33050: Fox JC, Shanley JR. Antisense inhibition of basic fibroblast growth

factor induces apoptosis in vascular smooth muscle cells. J. Biol. Chem. 271: 12578-12584, 1996. PubMed: 8647868
33056: Lee MJ, et al. The inducible G protein-coupled receptor edg-1 signals via the Gi/mitogen-activated protein kinase pathway. J. Biol. Chem. 271: 11272-11279, 1996. PubMed: 8626678
33123: Marchand P, et al. Cysteine mutations in the MAM domain result in monomeric meprin and alter stability and activity of the proteinase. J. Biol. Chem. 271: 24236-24241, 1996. PubMed: 8798668
33137: Arai H, Charo IF. Differential regulation of G-protein-mediated signaling by chemokine receptors. J. Biol. Chem. 271: 21814-21819, 1996. PubMed: 8702980
33138: Huang Q, et al. Substrate recognition by tissue factor-factor VIIa. J. Biol. Chem. 271: 21752-21757, 1996. PubMed: 8702971
33157: Monteclaro FS, Charo IF. The amino-terminal extracellular domain of the MCP-1 receptor, but not the RANTES/MIP-1alpha receptor, confers chemokine selectivity. J. Biol. Chem. 271: 19084-19092, 1996. PubMed: 8702581
33158: Keith DE, et al. Morphine activates opioid receptors without causing their rapid internalization. J. Biol. Chem. 271: 19021-19024, 1996. PubMed: 8702570
39768: Louis N, et al. Cloning and sequencing of the cellular-viral junctions from the human adenovirus type 5 transformed 293 cell line. Virology 233: 423-429, 1997. PubMed: 9217065
61259: Shaw G, et al. Preferential transformation of human neuronal cells by human adenoviruses and the origin of HEK 293 cells. FASEB J. 16: 869-871, 2002. PubMed: 11967234
92579: Standard Test Method for Determining the Virus-Eliminating Effectiveness of Liquid Hygienic Handwash and Handrub Agents Using the Fingerpads of Adult Volunteers. West Conshohocken, PA:ASTM International;ASTM Standard Test Method E 1838-02.
92587: Standard Quantitative Disk Carrier Test Method for Determining the Bactericidal, Virucidal, Fungicidal, Mycobactericidal and Sporicidal Activities of Liquid Chemical Germicides. West Conshohocken, PA:ASTM International;ASTM Standard Test Method E 2197-02.

Return to Top

Back to my Search

Cell Biology

ATCC® Number:	**CRL-11268™** Order this Item	Price:	**$272.00**
Designations:	293T/17 [HEK 293T/17]		
Depositors:	Rockefeller Univ.		
Biosafety Level:	2 [Cells contain Adeno and SV-40 viral DNA sequences]		
Shipped:	frozen		
Medium & Serum:	See Propagation		
Growth Properties:	adherent		
Organism:	*Homo sapiens* (human)		
Morphology:	epithelial		
Source:	**Organ:** kidney		
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:	The line is available with the following restriction: 1. The cell line was deposited at the ATCC by Rockefeller University and is provided for research purposes only. Neither the cell line nor the products derived from it may be sold or used for commercial purposes. Nor can the cells be distributed to third parties for purposes of sale, or producing for sale, cells or their products. The cells are provided as a service to the research community. They are provided without warranty of merchantability or fitness for a particular purpose or any other warranty, expressed or implied. 2. Any proposed commercial use of the cells, or their products, must first be negotiated with Cell Genesys, 500 Forbes Boulevard, South San Francisco, CA 94080 Attn: Robert H. Tidwell; Senior Vice President, Corporate Development.		
Antigen Expression:	SV40 T antigen [45408]		
Age:	fetus		

Related Links ▸

- NCBI Entrez Search
- Make a Deposit
- Frequently Asked Questions
- Material Transfer Agreement
- Technical Support
- Related Cell Culture Products

Comments:	The 293T/17 cell line is a derivative of the 293T (293tsA1609neo) cell line. 293T is a highly transfectable derivative of the 293 cell line into which the temperature sensitive gene for SV40 T-antigen was inserted. 293T cells were cloned and the clones tested with the pBND and pZAP vectors to obtain a line capable of producing high titers of infectious retrovirus, 293T/17. These cells constitutively express the simian virus 40 (SV40) large T antigen, and clone 17 was selected specifically for its high transfectability.293T/17 cells were cotransfected with the pCRIPenv- and the pCRIPgag-2 vectors to obtain the ANJOU 65 (see ATCC CRL-11269) cell line.ANJOU 65 cells were cotransfected with the pCRIPgag-2 and pGPT2E vectors to obtain the BOSC 23 (see ATCC CRL-11270) ecotropic envelope-expression packaging cell line.ANJOU 65 cells were also cotransfected with the pCRIPAMgag vector along with a plasmid expressing the gpt resistance gene to obtain the Bing (see ATCC CRL-11554) amphotropic envelope-expression packaging cell line.
Propagation:	**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%. **Temperature:** 37.0°C **Atmosphere:** air, 95%; carbon dioxide (CO2), 5%
Subculturing:	**Protocol:** 1. Remove and discard culture medium. 2. Briefly rinse the cell layer with 0.25% (w/v) Trypsin-0.53 mM EDTA solution to remove all traces of serum that contains trypsin inhibitor. 3. Add 2.0 to 3.0 ml of Trypsin-EDTA solution to flask and observe cells under an inverted microscope until cell layer is dispersed (usually within 5 to 15 minutes). Note: To avoid clumping do not agitate the cells by hitting or shaking the flask while waiting for the cells to detach. Cells that are difficult to detach may be placed at 37°C to facilitate dispersal. 4. Add 6.0 to 8.0 ml of complete growth medium and aspirate cells by gently pipetting. 5. Add appropriate aliquots of the cell suspension to new culture vessels. 6. Incubate cultures at 37°C. **Subcultivation Ratio:** A subcultivation ratio of 1:4 to 1:8 is recommended **Medium Renewal:** Every 2 to 3 days

Preservation:	**Freeze medium:** Complete growth medium supplemented with 5% (v/v) DMSO **Storage temperature:** liquid nitrogen vapor phase
Related Products:	Recommended medium (without the additional supplements or serum described under ATCC Medium):ATCC 30-2002 recommended serum:ATCC 30-2020 derivative:ATCC CRL-11269
References:	45408: Sena-Esteves M, et al. Single-step conversion of cells to retrovirus vector producers with herpes simplex virus-Epstein-Barr virus hybrid amplicons. J. Virol. 73: 10426-10439, 1999. PubMed: 10559361 57446: Pensiero M, et al. Retroviral vectors produced by producer cell lines resistant to lysis by human serum. US Patent 5,952,225 dated Sep 14 1999 57447: Pensiero M, et al. Retroviral vectors produced by producer cell lines resistant to lysis by human serum. US Patent 6,329,199 dated Dec 11 2001 57448: Pear WS, et al. Production of High-Titer Helper-Free Retroviruses by Transient Transfection. Proc. Natl. Acad. Sci. USA 90: 8392-8396, 1993. PubMed: 7690960

Return to Top

ATCC
The Global Bioresource Center™

Search Catalog
Select a Category
Go

Login Search Options

About | Cultures and Products | Science | Standards | Deposit Services | Custom Services | Product Use Policy

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: CCL-2™ Order this Item

Price: $256.00

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 FuGENE® Transfection Reagents)
screening for Escherichia coli strains with invasive potential [21447] [21491]

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
D5S818: 11,12
D7S820: 8,12
THO1: 7
TPOX: 8,12
vWA: 16,18

Cytogenetic Analysis:

Related Links
- NCBI Entrez Search
- Cell Micrograph
- Make a Deposit
- Frequently Asked Questions
- Material Transfer Agreement
- Technical Support
- Related Cell Culture Products

Modal number = 82; range = 70 to 164.
There is a small telocentric chromosome in 98% of the cells. 100% aneuploidy in 1385 cells examined. Four typical HeLa marker chromosomes have been reported in the literature.HeLa Marker Chromosomes: One copy of Ml, one copy of M2, four-five copies of M3, and two copies of M4 as revealed by G-banding patterns. M1 is a rearranged long arm and centromere of chromosome 1 and the long arm of chromosome 3. M2 is a combination of short arm of chromosome 3 and long arm of chromosome 5. M3 is an isochromosome of the short arm of chromosome 5. M4 consists of the long arm of chromosome 11 and an arm of chromosome 19.

Isoenzymes: G6PD, A

Age: 31 years adult

Gender: female

Ethnicity: Black

HeLa Markers: Y

Comments: The cells are positive for keratin by immunoperoxidase staining.
HeLa cells have been reported to contain human papilloma virus 18 (HPV-18) sequences.
P53 expression was reported to be low, and normal levels of pRB (retinoblastoma suppressor) were found.

Propagation: **ATCC complete growth medium:** The base medium for this cell line is ATCC-formulated Eagle's Minimum Essential Medium, Catalog No. 30-2003. 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:**

1. Remove and discard culture medium.
2. Briefly rinse the cell layer with 0.25% (w/v) Trypsin- 0.53 mM EDTA solution to remove all traces of serum which contains trypsin inhibitor.
3. Add 2.0 to 3.0 ml of Trypsin-EDTA solution to flask and observe cells under an inverted microscope until cell layer is dispersed (usually within 5 to 15 minutes).
   Note: To avoid clumping do not agitate the cells by hitting or shaking the flask while waiting for the cells to detach. Cells that are difficult to detach may be placed at 37°C to facilitate dispersal.
4. Add 6.0 to 8.0 ml of complete growth medium and aspirate cells by gently pipetting.
5. Add appropriate aliquots of the cell suspension to new culture vessels.
6. Incubate cultures at 37°C.

Subcultivation Ratio: A subcultivation ratio of 1:2 to 1:6 is recommended
Medium Renewal: 2 to 3 times per week

Preservation: **Freeze medium:** Complete growth medium supplemented with 5% (v/v) DMSO
Storage temperature: liquid nitrogen vapor phase

Related Products: Recommended medium (without the additional supplements or serum described under ATCC Medium):ATCC 30-2003
recommended serum:ATCC 30-2020
derivative:ATCC CCL-2.1
derivative:ATCC CCL-2.2
derivative:ATCC CCL-2.3

References:

21447: American Public Health Association. Compendium of methods for the microbiological examination of foods. 3rd ed.Washington, DC: American Public Health Association; 1992.
21491: AOAC International Invasiveness by Escherichia coli of mammalian cells, microbiological method. Gaithersburg, MD:AOAC International;AOAC "Official Methods of Analysis of the AOAC International" 982.36.
21626: Baldi A, et al. Genomic structure of the human retinoblastoma-related Rb2/p130 gene. Proc. Natl. Acad. Sci. USA 93: 4629-4632, 1996. PubMed: 8643454
22148: Gey GO, et al. Tissue culture studies of the proliferative capacity of cervical carcinoma and normal epithelium. Cancer Res. 12: 264-265, 1952.
22263: Chen TR. Re-evaluation of HeLa, HeLa S3, and HEp-2 karyotypes. Cytogenet. Cell Genet. 48: 19-24, 1988. PubMed: 3180844
22766: Boshart M, et al. A new type of papillomavirus DNA, its presence in genital cancer biopsies and in cell lines derived from cervical cancer. EMBO J. 3: 1151-1157, 1984. PubMed: 6329740
22767: Schneider-Gadicke A, Schwarz E. Different human cervical carcinoma cell lines show similar transcription patterns of human papillomavirus type 18 early genes. EMBO J. 5: 2285-2292, 1986. PubMed: 3023067
22919: Schwarz E, et al. Structure and transcription of human papillomavirus sequences in cervical carcinoma cells. Nature 314: 111-114, 1985. PubMed: 2983228
22995: Pater MM, Pater A. Human papillomavirus types 16 and 18 sequences in carcinoma cell lines of the cervix. Virology 145: 313-318, 1985. PubMed: 2992153
23180: Yee C, et al. Presence and expression of human papillomavirus sequences in human cervical carcinoma cell lines. Am. J. Pathol. 119: 361-366, 1985. PubMed: 2990217
23324: Scheffner M, et al. The state of the p53 and retinoblastoma genes in human cervical carcinoma cell lines. Proc. Natl. Acad. Sci. USA 88: 5523-5527, 1991. PubMed: 1648218
25915: Jones HW Jr., et al. George Otto Gey. (1899-1970). The HeLa cell and a reappraisal of its origin. Obstet. Gynecol. 38: 945-949, 1971. PubMed: 4942173
25919: Scherer WF, Hoogasian AF. Preservation at subzero temperatures of mouse fibroblasts (strain L) and human epithelial cells (strain HeLa). Proc. Soc. Exp. Biol. Med. 87: 480-487, 1954. PubMed: 13237281
25921: Scherer WF, et al. Studies on the propagation in vitro of poliomyelitis viruses. IV. Viral multiplication in a stable strain of human malignant epithelial cells (strain HeLa) derived from an epidermoid carcinoma of the cervix. J. Exp. Med. 97: 695-710, 1953. PubMed: 13052828
26623: Fang X, et al. Lysophosphatidylcholine stimulates activator protein 1 and the c-Jun N-terminal kinase activity. J. Biol. Chem. 272: 13683-13689, 1997. PubMed: 9153219
27094: Bruder JT, Kovesdi I. Adenovirus infection stimulates the Raf/MAPK signaling pathway and induces interleukin-8 expression. J. Virol. 71: 398-404, 1997. PubMed: 8985363
27345: Huber M, et al. Tyrosine phosphorylation events during coxsackievirus B3 replication. J. Virol. 71: 595-600, 1997. PubMed: 8985388
27814: Olson JK, et al. Varicella-zoster virus Fc receptor gE glycoprotein: serine/threonine and tyrosine phosphorylation of monomeric and dimeric forms. J. Virol. 71: 110-119, 1997. PubMed: 8985329
27819: Goodrum FD, Ornelles DA. The early region 1B 55-kilodalton oncoprotein of adenovirus relieves growth restrictions imposed on viral replication by the cell cycle. J. Virol. 71: 548-561, 1997. PubMed: 8985383
28301: Loffler S, et al. CD9, a tetraspan transmembrane protein, renders cells susceptible to canine distemper virus. J. Virol. 71: 42-49, 1997. PubMed: 8985321
29988: Hendricks DT, et al. FHIT gene expression in human ovarian, endometrial, and cervical cancer cell lines. Cancer Res. 57: 2112-2115, 1997. PubMed: 9187105
32244: Hoppe HC, et al. Identification of phosphatidylinositol mannoside as a mycobacterial adhesin mediating both direct and opsonic binding to nonphagocytic mammalian cells. Infect. Immun. 65: 3896-3905, 1997. PubMed: 9284169
32252: Rieder G, et al. Role of adherence in Interleukin-8 induction in Helicobacter pylori-associated gastritis. Infect. Immun. 65: 3622-3630, 1997. PubMed: 9284128
32299: St. Geme JW, et al. Characterization of the genetic locus encoding Haemophilus influenzae type b surface fibrils. J. Bacteriol. 178: 6281-6287, 1996. PubMed: 8892830
32348: Mansky LM. The mutation rate of human immunodeficiency virus type 1 is influenced by the vpr gene. Virology 222: 391-400, 1996. PubMed: 8806523
32362: Dobbelstein M, Shenk T. Protection against apoptosis by the vaccinia virus SPI-2 (B13R) gene product. J. Virol. 70: 6479-6485, 1996. PubMed: 8709286

32368: Churchill MJ, et al. The rev-responsive element negatively regulates human immunodeficiency virus type 1 env mRNA expression in primate cells. J. Virol. 70: 5786-5790, 1996. PubMed: 8709194
32373: Goodrum FD, et al. Adenovirus early region 4 34-kilodalton protein directs the nuclear localization of the early region 1B 55-kilodalton protein in primate cells. J. Virol. 70: 6323-6335, 1996. PubMed: 8709260
32396: Kolanus W, et al. alphaLbeta2 integrin/LFA-1 binding to ICAM-1 induced by cytohesin-1 a cytoplasmic regulatory molecule. Cell 86: 233-242, 1996. PubMed: 8706128
32446: Gan W, Rhoads RE. Internal initiation of translation directed by the 5'-untranslated region of the mRNA for eIF4G, a factor involved in the picornavirus-induced switch from cap-dependent to internal initiation. J. Biol. Chem. 271: 623-626, 1996. PubMed: 8557663
32474: Koumenis C, Giaccia A. Tranformed cells require continuous activity of RNA polymerase II to resist oncogene-induced apoptosis. Mol. Cell. Biol. 17: 7306-7316, 1997. PubMed: 9372962
32475: You M, et al. ch-IAp1, a member of the inhibitor-of-apoptosis protein family, is a mediator of the antiapoptotic activity of the v-Rel oncoprotein. Mol. Cell. Biol. 17: 7328-7341, 1997. PubMed: 9372964
32476: Hess MT, et al. Base pair conformation-dependent excision of benzo{a}pyrene diol epoxide-guanine adducts by human nucleotide excision repair enzymes. Mol. Cell. Biol. 17: 7069-7076, 1997. PubMed: 9372938
32514: Bartz SR, et al. Human immunodeficiency virus type 1 cell cycle control: Vpr is cytostatic and mediates G2 accumulation by a mechanism which differs from DNA damage checkpoint control. J. Virol. 70: 2324-2331, 1996. PubMed: 8642659
32519: Roller RJ, et al. Structure and function in the herpes simplex virus 1 RNA-binding protein US11: mapping of the domain required for ribosomal and nucleolar association and RNA binding in vitro. J. Virol. 70: 2842-2851, 1996. PubMed: 8627758
32547: Jang SI, et al. Activator protein 1 activity is involved in the regulation of the cell type-specific expression from the proximal promoter of the human profilaggrin gene. J. Biol. Chem. 271: 24105-24114, 1996. PubMed: 8798649
32558: Anderson SM, et al. Intercellular transfer of a glycoslphosphatidylinositol (GPI)-linked protein: release and uptake of CD4-GPI from recombinant adeno-associated virus-transducted HeLa cells. Proc. Natl. Acad. Sci. USA 93: 5894-5898, 1996. PubMed: 8650189
32566: Dittrich E, et al. A di-leucine motif and an upstream serine in the interleukin-6 (IL-6) signal transducer gp130 mediate ligand-induced endocytosis and down-regulation of the IL-6 receptor. J. Biol. Chem. 271: 5487-5494, 1996. PubMed: 8621406
32568: Lee JH, et al. The proximal promoter of the human transglutaminase 3 gene. J. Biol. Chem. 271: 4561-4568, 1996. PubMed: 8626812
32719: Duus KM, Grose C. Multiple regulatory effects of varicella-zoster virus (VZV) gL on trafficking patterns and fusogenic properties of VZV gH. J. Virol. 70: 8961-8971, 1996. PubMed: 8971025
32723: Lieber A, et al. Recombinant adenoviruses with large deletions geneerated by cre-mediated excision exhibit different biological properties compared with first-generation vectors in vitro and in vivo. J. Virol. 70: 8944-8960, 1996. PubMed: 8971024
32730: Yang C, Compans RW. Analysis of the cell fusion activities of chimeric simian immunodeficiency virus-murine leukemia virus envelope proteins: inhibitory effects of the R peptide. J. Virol. 70: 248-254, 1996. PubMed: 8523533
32753: Schubert U, et al. The two biological activities of human immunodeficiency virus type 1 Vpu protein involve two separable structural domains. J. Virol. 70: 809-819, 1996. PubMed: 8551619
32764: McKnight KL, Lemon SM. Capsid coding sequence is required for efficient replication of human rhinovirus 14 RNA. J. Virol. 70: 1941-1952, 1996. PubMed: 8627720
32788: Lu FM, Lux SE. Constitutively active human notch 1 binds to the transcription factor CBF1 and stimulates transcription through a promoter containing a CBF1-responsive element. Proc. Natl. Acad. Sci. USA 93: 5663-5667, 1996. PubMed: 8643633
32830: Yamaguchi Y, et al. Biochemical characterization and intracellular localization of the Menkes disease protein. Proc. Natl. Acad. Sci. USA 93: 14030-14035, 1996. PubMed: 8943055
33027: Hewitt SM, et al. Differential function of Wilms' tumor gene WT1 splice isoforms in transcriptional regulation. J. Biol. Chem. 271: 8588-8592, 1996. PubMed: 8621487
33122: Kotanides H, Reich NC. Interleukin-4-induced STAT6 recognizes and activates a target site in the promoter of the interleukin-4 receptor gene. J. Biol. Chem. 271: 25555-25561, 1996. PubMed: 8810328
33131: Zhao Z, et al. Activation of mitogen-activated protein (MAP) kinase pathway by pervanadate, a potent inhibitor of tyrosine phosphatases. J. Biol. Chem. 271: 22251-22255, 1996. PubMed: 8703041
33133: Quitschke WW, et al. The initator element and proximal upstream sequences affect transcriptional activity and start site selection in the amyloid beta-protein precursor promoter. J. Biol. Chem. 271: 22231-22239, 1996. PubMed: 8703038

33152: Hocking AM, et al. Eukaryotic expression of recombinant biglycan. J. Biol. Chem. 271: 19571-19577, 1996. PubMed: 8702651
33167: Chen H, et al. Octamer binding factors and their coactivator can activate the murine PU.1 (spi-1) promoter. J. Biol. Chem. 271: 15743-15752, 1996. PubMed: 8663022
40181: Macville M, et al. Comprehensive and definitive molecular cytogenetic characterization of HeLa cells by spectral karyotyping. Cancer Res. 59: 141-150, 1999. PubMed: 9892199
92382: Dentistry--Preclinical evaluation of biocompatibility of medical devices used in dentistry--Test methods for dental materials. Geneva (Switzerland):International Organization for Standardization/ANSI;ISO ISO 7405:1997.

Return to Top

Back to my Search

ATCC
The Global Bioresource Center™

Search Catalog

Select a Category

Go

Login Search Options

About | Cultures and Products | Science | Standards | Deposit Services | Custom Services | Product Use Policy

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-1593.2™ Order this Item **Price:** $272.00

Designations:	U-937
Depositors:	H Koren
Biosafety Level:	1
Shipped:	frozen
Medium & Serum:	See Propagation
Growth Properties:	suspension
Organism:	*Homo sapiens* (human)
Morphology:	monocyte
Source:	**Disease:** histiocytic lymphoma
Cellular Products:	lysozyme; beta-2-microglobulin (beta 2 microglobulin); tumor necrosis factor (TNF), also known as tumor necrosis factor alpha (TNF-alpha, TNF alpha), after stimulation with phorbol myristic acid (PMA)
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:	The original U-937 cell line was established by Dr. K. Nilsson's laboratory in 1974 and he has requested the following: (1) In all papers reporting any use of this cell line or any derivatives thereof a direct reference should be made to Sundstrom and Nilsson (Int. J. Cancer 17: 565-577, 1976). (2) Any proposed commercial use of the cells should be negotiated with Professor Kenneth Nilsson, Rudbeck Laboratory, SE-751 85 Uppsala, Sweden. (3) No distribution of any of the cells or sublines derived therefrom should be made to third parties; (4) The cells should be used for non-clinical, non-commercial research only.
Isolation:	**Isolation date:** 1974
Applications:	transfection host (Nucleofection technology from Lonza Roche FuGENE® Transfection Reagents)
Receptors:	complement (C3)
DNA Profile (STR):	Amelogenin: X CSF1PO: 12 D13S317: 10,12 D16S539: 12 D5S818: 12 D7S820: 9,11 THO1: 6, 9.3 TPOX: 8,11 vWA: 14, 15

Related Links

- NCBI Entrez Search
- Make a Deposit
- Frequently Asked Questions
- Material Transfer Agreement
- Technical Support
- Related Cell Culture Products

Age:	37 years
Gender:	male
Ethnicity:	Caucasian
Comments:	The U-937 cell line was derived by Sundstrom and Nilsson in 1974 from malignant cells obtained from the pleural effusion of a patient with histiocytic lymphoma. Studies since 1979 have shown that U-937 cells can be induced to terminal monocytic differentiation by supernatants from human mixed lymphocyte cultures, phorbol esters, vitamin D3, gamma interferon, tumor necrosis factor (TNF) and, retinoic acid. The cells are negative for immunoglobulin production and Epstein-Barr virus expression. The cells express the Fas antigen, and are sensitive to TNF and anti-Fas antibodies. In 1994, PCR and cytogenetic analyses showed that a number of stocks of U-937 were contaminated with the human myeloid leukemia cell line, K-562. In the earliest stocks available, the level of contamination was 0.6%. [40484] Distribution was discontinued in March 1994, except if required for patent purposes. Anyone who wishes to receive a sample of this original material should contact the Head of the ATCC Patent Depository. A stock of CRL-1593 found to be free of K-562 was propagated continuously for 8 weeks and tested weekly by PCR. Distribution and seed stocks give DNA profiles characteristic of U-937 only. Such preparations are now offered as authentic U-937 (ATCC CRL-1593.2) and are believed to be free of second subpopulations.
Propagation:	**ATCC complete growth medium:** The base medium for this cell line is ATCC-formulated RPMI-1640 Medium, Catalog No. 30-2001. 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:** Cultures can be maintained by the addition of fresh medium or replacement of medium. Alternatively, cultures can be established by centrifugation with subsequent resuspension at 1 to 2 X 10(5) viable cells/ml. **Interval:** Maintain cell density between 1 X 10(5) and 2 X 10(6) viable cells/ml. **Medium Renewal:** Add fresh medium every 3 to 4 days (depending on cell density)
Preservation:	**Freeze medium:** Complete growth medium supplemented with 5% (v/v) DMSO **Storage temperature:** liquid nitrogen vapor phase
Related Products:	Recommended medium (without the additional supplements or serum described under ATCC Medium):ATCC 30-2001 recommended serum:ATCC 30-2020
References:	1080: Ralph P, et al. Lysozyme synthesis by established human and murine histiocytic lymphoma cell lines. J. Exp. Med. 143: 1528-1533, 1976. PubMed: 1083890 21866: . Gene expression during normal and malignant differentiation. London: Academic Press; 1985. 21876: . International symposium on new trends in human immunology and cancer immunotherapy. Paris: Doin Editeurs; 1980. 22906: Koren HS, et al. In vitro activation of a human macrophage-like cell line. Nature 279: 328-331, 1979. PubMed: 450085 22912: Gidlund M, et al. Natural killer cells kill tumour cells at a given stage of differentiation. Nature 292: 848-850, 1981. PubMed: 7266653 23049: Olsson I, et al. Induction of differentiation of the human histiocytic lymphoma cell line U-937 by 1 alpha,25-dihydroxycholecalciferol. Cancer Res. 43: 5862-5867, 1983. PubMed: 6315218 23103: Morimoto H, et al. Overcoming tumor necrosis factor and drug resistance of human tumor cell lines by combination treatment with anti-Fas antibody and drugs or toxins. Cancer Res. 53: 2591-2596, 1993. PubMed: 7684321 29094: Giovannangeli C, et al. Accessibility of nuclear DNA to triplex-forming oligonucleotides: The integrated HIV-1 provirus as a target. Proc. Natl. Acad. Sci. USA 94: 79-84, 1997. PubMed: 8990164 29139: Brigino E, et al. Interleukin 10 is induced by recombinant HIV-1 Nef protein involving the calcium/calmodulin-dependent phosphodiesterase signal transduction pathway. Proc. Natl. Acad. Sci. USA 94: 3178-3182, 1997. PubMed: 9096366 40484: Reid YA, et al. Cell Line Cross-contamination of U-937. J. Leukocyte Biol. 57: 804, 1995. PubMed: 7759961 58042: Sundstrom C, Nilsson K. Establishment and characterization of a human histiocytic lymphoma cell line (U-937). Int. J. Cancer 17: 565-577, 1976. PubMed: 178611

Return to Top

Notices and Disclaimers

ATCC products are intended for laboratory research purposes only, unless noted otherwise. They are not intended for use in humans.

While ATCC uses reasonable efforts to include accurate and up-to-date information on this site, ATCC makes no warranties or representations as to its accuracy. Citations from scientific literature and patents are provided for informational purposes only. ATCC does not warrant that such information has been confirmed to be accurate.

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

Back to my Search

Login ▸ To customize your ATCC web experience: Create a Profile

Site Search

Go

Home | Site Map | FAQ | Privacy Policy | Careers | Contact Us

ATCC
The Global Bioresource Center™

Search Catalog
Select a Category
Go

Login Search Options

About | Cultures and Products | Science | Standards | Deposit Services | Custom Services | Product Use Policy

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: TIB-202™ Order this Item

Price: $272.00

Designations: THP-1

Depositors: S Tsuchiya

Biosafety Level: 1

Shipped: frozen

Medium & Serum: See Propagation

Growth Properties: suspension

Organism: *Homo sapiens* (human)

Morphology: monocyte

PHOTO

Source:
Organ: peripheral blood
Disease: acute monocytic leukemia
Cell Type: monocyte;

Cellular Products: lysozyme [58053]

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 (Nucleofection technology from Lonza
Roche FuGENE® Transfection Reagents)

Receptors: complement (C3), expressed [58053]
Fc, expressed

Antigen Expression: HLA A2, A9, B5, DRw1, DRw2 [58053]

DNA Profile (STR):
Amelogenin: X,Y
CSF1PO: 11,13
D13S317: 13
D16S539: 11,12
D5S818: 11,12
D7S820: 10
THO1: 8,9.3
TPOX: 8,11
vWA: 16

Age: 1 year infant

Gender: male

Comments:

Related Links

NCBI Entrez Search
Cell Micrograph
Make a Deposit
Frequently Asked Questions
Material Transfer Agreement
Technical Support
Related Cell Culture Products

	The cells are phagocytic (for both latex beads and sensitized erythrocytes) and lack surface and cytoplasmic immunoglobulin. [58053] Monocytic differentiation can be induced with the phorbol ester 12-O-tetradecanoylphorbol-13-acetate (TPA). [22193]
Propagation:	**ATCC complete growth medium:** The base medium for this cell line is ATCC-formulated RPMI-1640 Medium, Catalog No. 30-2001. To make the complete growth medium, add the following components to the base medium: 2-mercaptoethanol to a final concentration of 0.05 mM; fetal bovine serum to a final concentration of 10%. **Atmosphere:** air, 95%; carbon dioxide (CO2), 5% **Temperature:** 37.0°C
Subculturing:	**Protocol:** Cultures can be maintained by the addition of fresh medium or replacement of medium. Alternatively, cultures can be established by centrifugation with subsequent resuspension at 2-4 X 10(5) viable cells/ml. Subcultutre when cell concentration reaches 8X105) cells/ml.Do not allow the cell concentration to exceed 1 X 10(6) cells/ml. **Medium Renewal:** Every 2 to 3 days
Preservation:	**Freeze medium:** Complete growth medium supplemented with 5% (v/v) DMSO **Storage temperature:** liquid nitrogen vapor phase
Doubling Time:	approximately 26 hrs
Related Products:	purified RNA:ATCC TIB-202R purified DNA:ATCC TIB-202D
References:	22193: Tsuchiya S, et al. Induction of maturation in cultured human monocytic leukemia cells by a phorbol diester. Cancer Res. 42: 1530-1536, 1982. PubMed: 6949641 22285: Skubitz KM, et al. Human granulocyte surface molecules identified by murine monoclonal antibodies. J. Immunol. 131: 1882-1888, 1983. PubMed: 6619543 32286: Cuthbert JA, Lipsky PE. Regulation of proliferation and Ras localization in transformed cells by products of mevalonate metabolism. Cancer Res. 57: 3498-3504, 1997. PubMed: 9270019 32351: Huang S, et al. Adenovirus interaction with distinct integrins mediates separate events in cell entry and gene delivery to hematopoietic cells. J. Virol. 70: 4502-4508, 1996. PubMed: 8676475 32395: Clark RA, et al. Tenascin supports lymphocyte rolling. J. Cell Biol. 137: 755-765, 1997. PubMed: 9151679 32466: Hambleton J, et al. Activation of c-Jun N-terminal kinase in bacterial lipopolysaccharide-stimulated macrophages. Proc. Natl. Acad. Sci. USA 93: 2774-2778, 1996. PubMed: 8610116 33031: Hsu HY, et al. Inhibition of macrophage scavenger receptor activity by tumor necrosis factor-alpha is transcriptionally and post-transcriptionally regulated. J. Biol. Chem. 271: 7767-7773, 1996. PubMed: 8631819 33088: Lucas M, Mazzone T. Cell surface proteoglycans modulate net synthesis and secretion of macrophage apolipoprotein E. J. Biol. Chem. 271: 13454-13460, 1996. PubMed: 8662812 33134: Sando GN, et al. Induction of ceramide glucosyltransferase activity in cultured human keratinocytes. J. Biol. Chem. 271: 22044-22051, 1996. PubMed: 8703011 33141: Ollivier V, et al. Elevated cyclic AMP inhibits NF-kappaB-mediated transcription in human monocytic cells and endothelial cells. J. Biol. Chem. 271: 20828-20835, 1996. PubMed: 8702838 58053: Tsuchiya S, et al. Establishment and characterization of a human acute monocytic leukemia cell line (THP-1). Int. J. Cancer 26: 171-176, 1980. PubMed: 6970727

Return to Top

Back to my Search

Login ▸ To customize your ATCC web experience: Create a Profile

Site Search

Go

Home | Site Map | FAQ | Privacy Policy | Careers | Contact Us

Cell Biology

ATCC® Number:	**CRL-2648™**	Order this Item	Price:	**$289.00**

Designations:	L Cells
Depositors:	R Nusse
Biosafety Level:	1
Shipped:	frozen
Medium & Serum:	See Propagation
Growth Properties:	adherent
Organism:	*Mus musculus* (mouse)
Morphology:	fibroblast
Source:	**Strain:** C3H/An **Tissue:** subcutaneous connective tissue; areolar and adipose **Cell Type:** fibroblast fibroblast;
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 FuGENE® Transfection Reagents)
Age:	100 days
Gender:	male
Comments:	It is the parental line for the L Wnt-3A cell line (ATCC CRL-2647) and the L Wnt-5A cell line (ATCC CRL-2814). It is used to obtain control conditioned medium for comparison to Wnt-3A or Wnt-5A conditioned medium from L Wnt-3A cells or L Wnt-5A cells. The cell line named L Cells is closely related or identical to L-M(TK-) cells (ATCC CCL-1.3). Protocol for control conditioned medium: 1. Split the cells 1:10 in 10 ml culture medium without G418 in 10 cm2 petri dishes and let the cells grow for 4 days (approximately to confluency). 3. Add 10 ml fresh culture medium without G418 and culture for another 3 days.

Related Links

NCBI Entrez Search
Make a Deposit
Frequently Asked Questions
Material Transfer Agreement
Technical Support
Related Cell Culture Products

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%.

Propagation:

Atmosphere: air, 95%; carbon dioxide (CO2), 5%
Temperature: 37.0°C

Protocol:

Subculturing:

1. Remove and discard culture medium.
2. Briefly rinse the cell layer with 0.25% (w/v) Trypsin- 0.53 mM EDTA solution to remove all traces of serum that contains trypsin inhibitor.
3. Add 2.0 to 3.0 ml of Trypsin-EDTA solution to flask and observe cells under an inverted microscope until cell layer is dispersed (usually within 5 to 15 minutes).
   Note: To avoid clumping do not agitate the cells by hitting or shaking the flask while waiting for the cells to detach. Cells that are difficult to detach may be placed at 37°C to facilitate dispersal.
4. Add 6.0 to 8.0 ml of complete growth medium and aspirate cells by gently pipetting.
5. Add appropriate aliquots of the cell suspension to new culture vessels.
6. Incubate cultures at 37°C.

Protocol for control conditioned medium:
1. Split the cells 1:10 in 10 ml culture medium in 10 cm petri dishes and let the cells grow for 4 days (approximately to confluency). 2. Take off the medium and sterile filter. This is the first batch of medium. 3. Add 10 ml fresh culture medium and culture for another 3 days. 4. Take off the medium and sterile filter. This is the second batch of medium. Discard the cells, because they will be overgrown. 5. Mix the first batch and second batch of medium 1:1. This is the L Cell conditioned medium. It is stable at 4 degrees C and can be frozen.

Subcultivation Ratio: A subcultivation ratio of 1:4 to 1:10 is recommended
Medium Renewal: Every 2 to 3 days

Preservation:

Freeze medium: Complete growth medium supplemented with 5% (v/v) DMSO
Storage temperature: liquid nitrogen vapor phase

Related Products:

Recommended medium (without the additional supplements or serum described under ATCC Medium):ATCC 30-2002
recommended serum:ATCC 30-2020
derivative:ATCC CRL-2647
derivative:ATCC CRL-2814

References:

90267: Willert K, et al. Wnt proteins are lipid-modified and can act as stem cell growth factors. Nature 423: 448-452, 2003. PubMed: 12717451

Return to Top

Cell Biology

ATCC® Number:	**TIB-186™** Order this Item	Price:	**$355.00**
Designations:	IC-21 (mouse macrophages)		
Depositors:	WS Walker		
Biosafety Level:	2 [Cells Contain PAPOVAVIRUS]		
Shipped:	frozen		
Medium & Serum:	See Propagation		
Growth Properties:	adherent		
Organism:	*Mus musculus* (mouse)		
Morphology:			
Source:	**Cell Type:** peritoneal macrophage; SV40 transformed **Strain:** C57BL/6		
Cellular Products:	lysozyme		
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:	Biological response [92560] transfection host (Roche FuGENE® Transfection Reagents)		
Receptors:	Fc [1144] complement (C3) [1231]		

Related Links ▸

NCBI Entrez Search
Make a Deposit
Frequently Asked Questions
Material Transfer Agreement
Technical Support
Related Cell Culture Products

Comments:	The IC-21 cell line was derived by transformation of normal C57BL/6 mouse peritoneal macrophages with SV40. [22225] This line shares many properties with normal mouse macrophages and display macrophage specific antigens. They have phagocytic and cytolytic properties, can lyse tumor targets in vitro and appear to be more differentiated than cells of the P388D1 macrophage line. [1231] [22279] Trypsin is toxic to this line. The cells produce large quantities of acid and the medium should be changed frequently. Tested and found negative for ectromelia virus (mousepox).
Propagation:	**ATCC complete growth medium:** The base medium for this cell line is ATCC-formulated RPMI-1640 Medium, Catalog No. 30-2001. 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 **Atmosphere:** air, 95%; carbon dioxide (CO2), 5% **Subcultivation Ratio:** A subcultivation ratio of 1:2 to 1:4 is recommended **Medium Renewal:** 3 times per week Rinse the monolayer with 10 to 15 ml of calcium, magnesium free PBS, then add an additional 10 to 15 ml of the same solution.
Subculturing:	Let the culture stand for 5 to 10 minutes at room temperature, strike the flask to dislodge cells, add 5 to 7 ml of the cell suspension to a flask containing less than 10 ml of growth medium. Add additional medium once the cells have attached (one to two days). Subculture when confluent.
Preservation:	culture medium 95%; DMSO, 5%
Related Products:	Recommended medium (without the additional supplements or serum described under ATCC Medium):ATCC 30-2001 recommended serum:ATCC 30-2020

References:

1144: Walker WS. Separate Fc-receptors for immunoglobulins IgG2a and IgG2b on an established cell line of mouse macrophages. J. Immunol. 116: 911-914, 1976. PubMed: 1254971
1231: Walker WS, Gandour DM. Detection and functional assessment of complement receptors on two murine macrophage-like cell lines. Exp. Cell Res. 129: 15-21, 1980. PubMed: 7428810
1233: Walker WS. Mediation of macrophage cytolytic and phagocytic activities by antibodies of different classes and class-specific Fc-receptors. J. Immunol. 119: 367-373, 1977. PubMed: 886183
22203: Mocarelli P, et al. A permanent line of macrophages with normal activity in a primary antibody response in vitro. Immunol. Commun. 2: 441-447, 1973. PubMed: 4357034
22225: Mauel J, Defendi V. Infection and transformation of mouse peritoneal macrophages by simian virus 40. J. Exp. Med. 134: 335-350, 1971. PubMed: 4326994
22279: Holden HT, et al. . Fed. Proc. 38: 1093 (abstract 4582), 1979.
22826: Walker WS, Demus A. Antibody-dependent cytolysis of chicken erythrocytes by an in vitro- established line of mouse peritoneal macrophages. J. Immunol. 114: 765-769, 1975. PubMed: 1167563
22967: Singer JA, et al. Interaction of a mouse macrophage cell line with homologous erythrocytes. J. Reticuloendothel. Soc. 31: 489-499, 1982. PubMed: 7120230
32968: Takao S, et al. Role of reactive oxygen metabolites in murine peritoneal macrophage phagocytosis and phagocytic killing. Am. J. Physiol. 271: C1278-C1284, 1996. PubMed: 8897835
58080: Serio C, et al. Macrophage functional heterogeneity: evidence for different antibody-dependent effector cell activities and expression of Fc-receptors among macrophage subpopulations. J. Reticuloendothel. Soc. 25: 197-206, 1979. PubMed: 439098
92560: Standard Practice for Testing for Biological Responses

Return to Top

Cell Biology

ATCC® Number:	**CRL-1658™**	Order this Item	Price:	**$256.00**

Designations:	NIH/3T3
Biosafety Level:	1
Shipped:	frozen
Medium & Serum:	See Propagation
Growth Properties:	adherent
Organism:	*Mus musculus* (mouse)
Morphology:	fibroblast 
Source:	**Organ:** embryo **Strain:** NIH/Swiss **Cell Type:** fibroblast fibroblast;
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 (Nucleofection technology from Lonza Roche FuGENE® Transfection Reagents)
Virus Susceptibility:	Murine leukemia virus
Age:	embryo
Comments:	The NIH/3T3 is highly sensitive to sarcoma virus focus formation and leukemia virus propagation and has proven to be very useful in DNA transfection studies [PubMed ID: 222457]. Tested and found negative for ectromelia virus (mousepox).
Propagation:	**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: bovine calf serum to a final concentration of 10%. **Atmosphere:** air, 95%; carbon dioxide (CO2), 5% **Temperature:** 37.0°C **Growth Conditions:** The serum used is important in culturing this line. Calf serum is recommended and not fetal bovine serum. The calf serum initially employed and found to be satisfactory was from the Colorado Serum Co. Denver.

Related Links ▸
NCBI Entrez Search
Cell Micrograph
Make a Deposit
Frequently Asked Questions
Material Transfer Agreement
Technical Support
Related Cell Culture Products

Subculturing:	**Protocol:** 1. Remove and discard culture medium. 2. Briefly rinse the cell layer with 0.25% (w/v) Trypsin - 0.53 mM EDTA solution to remove all traces of serum which contains trypsin inhibitor. 3. Add 2.0 to 3.0 ml of Trypsin-EDTA solution to flask and observe cells under an inverted microscope until cell layer is dispersed (usually within 5 to 15 minutes). Note: To avoid clumping do not agitate the cells by hitting or shaking the flask while waiting for the cells to detach. Cells that are difficult to detach may be placed at 37C to facilitate dispersal. 4. Add 6.0 to 8.0 ml of complete growth medium and aspirate cells by gently pipetting. 5. Add appropriate aliquots of the cell suspension to new culture vessels. 6. Incubate cultures at 37C. . DO NOT ALLOW THE CELLS TO BECOME CONFLUENT! Subculture at least twice per week at 80% confluence or less. **Subcultivation Ratio:** Inoculate 3 to 5 X 10(3) cells/cm2 **Medium Renewal:** Twice per week
Preservation:	**Freeze medium:** Complete growth medium supplemented with 5% (v/v) DMSO **Storage temperature:** liquid nitrogen vapor phase
Related Products:	Recommended medium (without the additional supplements or serum described under ATCC Medium):ATCC 30-2002

References:

22370: Jainchill JL, et al. Murine sarcoma and leukemia viruses: assay using clonal lines of contact-inhibited mouse cells. J. Virol. 4: 549-553, 1969. PubMed: 4311790
26133: Andersson P, et al. A defined subgenomic fragment of in vitro synthesized Moloney sarcoma virus DNA can induce cell transformation upon transfection. Cell 16: 63-75, 1979. PubMed: 84715
26134: Copeland NG, Cooper GM. Transfection by exogenous and endogenous murine retrovirus DNAs. Cell 16: 347-356, 1979. PubMed: 222457
28301: Loffler S, et al. CD9, a tetraspan transmembrane protein, renders cells susceptible to canine distemper virus. J. Virol. 71: 42-49, 1997. PubMed: 8985321
32372: Berson JF, et al. A seven-transmembrane domain receptor involved in fusion and entry of T-cell-tropic human immunodeficiency virus tyep 1 strains. J. Virol. 70: 6288-6295, 1996. PubMed: 8709256
32478: Jones PL, et al. Tumor necrosis factor alpha and interleukin-1beta regulate the murine manganese superoxide dismutase gene through a complex intronic enhancer involving C/EBP-beta and NF-kappaB. Mol. Cell. Biol. 17: 6970-6981, 1997. PubMed: 9372929
32502: Gonzalez Armas JC, et al. DNA immunization confers protection against murine cytomegalovirus infection. J. Virol. 70: 7921-7928, 1996. PubMed: 8892915
32522: Siess DC, et al. Exceptional fusogenicity of chinese hamster ovary cells with murine retrovirus suggests roles for cellular factor(s) and receptor clusters in the membrane fusion process. J. Virol. 70: 3432-439, 1996. PubMed: 8648675
32547: Jang SI, et al. Activator protein 1 activity is involved in the regulation of the cell type-specific expression from the proximal promoter of the human profilaggrin gene. J. Biol. Chem. 271: 24105-24114, 1996. PubMed: 8798649
32557: Medin JA, et al. Correction in trans for Fabry disease: expression, secretion, and uptake of alpha-galactosidase A in patient-derived cells driven by a high-titer recombinant retroviral vector. Proc. Natl. Acad. Sci. USA 93: 7917-7922, 1996. PubMed: 8755577
32568: Lee JH, et al. The proximal promoter of the human transglutaminase 3 gene. J. Biol. Chem. 271: 4561-4568, 1996. PubMed: 8626812
32582: Chang K, Pastan I. Molecular cloning of mesothelin, a differentiation antigen present on mesothelium, mesotheliomas, and ovarian cancers. Proc. Natl. Acad. Sci. USA 93: 136-140, 1996. PubMed: 8552591
32702: Cranmer LD, et al. Identification, analysis, and evolutionary relationships of the putative murine cytomegalovirus homologs of the human cytomegalovirus UL82 (pp71) and UL83 (pp65) matrix phosphoproteins. J. Virol. 70:

ATCC
The Global Bioresource Center™

Search Catalog
Select a Category
Go

Login Search Options

About | Cultures and Products | Science | Standards | Deposit Services | Custom Services | Product Use Policy

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-1650™ Order this Item

Price: $275.00

Related Links
- NCBI Entrez Search
- Make a Deposit
- Frequently Asked Questions
- Material Transfer Agreement
- Technical Support
- Related Cell Culture Products

Designations:	COS-1
Depositors:	Y Gluzman
Biosafety Level:	2 [Cells Contain PAPOVAVIRUS]
Shipped:	frozen
Medium & Serum:	See Propagation
Growth Properties:	adherent
Organism:	*Cercopithecus aethiops*
Morphology:	fibroblast
Source:	**Organ:** kidney **Cell Type:** SV40 transformed
Cellular Products:	T antigen
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 (Nucleofection technology from Lonza Roche FuGENE® Transfection Reagents)
Comments:	This is an African green monkey kidney fibroblast-like cell line suitable for transfection by vectors requiring expression of SV40 T antigen. This line contains T antigen, retains complete permissiveness for lytic growth of SV40, supports the replication of ts A209 virus at 40C, and supports the replication of pure populations of SV40 mutants with deletions in the early region.The line was derived from the CV-1 cell line (ATCC ® CCL-70) by transformation with an origin defective mutant of SV40 which codes for wild type T antigen. The cells contain a single integrated copy of the complete early region of the SV40 genome.
Propagation:	**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:

1. Remove and discard medium.
2. Briefly rinse the cell layer with 0.25% (w/v) Trypsin - 0.53 mM EDTA solution to remove all traces of serum which contains trypsin inhibitor.
3. Add 2.0 to 3.0 ml of Trypsin-EDTA solution to flask and observe cells under an inverted microscope until cell layer is dispersed (usually 5 to 10 min).
   Note: To avoid clumping do not agitate the cells by hitting or shaking the flask while waiting for the cells to detatch. Cells that are difficult to detatch may be placed at 37C to facilitate dispersal.
4. Add 6.0 to 8.0 ml of complete growth medium and aspirate cells by gently pipetting.
5. Add appropriate aliquots of the cell suspension to new culture vessels.
6. Incubate cultures at 37C.
   Subcultivation Ratio: A subcultivation ratio of 1:4 to 1:8 is recommended
   Medium Renewal: 2 to 3 times per week

Preservation:
Freeze medium: Complete growth medium 95%; DMSO, 5%
Storage temperature: liquid nitrogen vapor temperature

Related Products:
Recommended medium (without the additional supplements or serum described under ATCC Medium):ATCC 30-2002
recommended serum:ATCC 30-2020
parental cell line:ATCC CCL-70
0.25% (w/v) Trypsin - 0.53 mM EDTA in Hank' BSS (w/o Ca++, Mg++):ATCC 30-2101
Cell culture tested DMSO:ATCC 4-X

References:
1822: Gluzman Y. SV40-transformed simian cells support the replication of early SV40 mutants. Cell 23: 175-182, 1981. PubMed: 6260373
32348: Mansky LM. The mutation rate of human immunodeficiency virus type 1 is influenced by the vpr gene. Virology 222: 391-400, 1996. PubMed: 8806523
32368: Churchill MJ, et al. The rev-responsive element negatively regulates human immunodeficiency virus type 1 env mRNA expression in primate cells. J. Virol. 70: 5786-5790, 1996. PubMed: 8709194
32373: Goodrum FD, et al. Adenovirus early region 4 34-kilodalton protein directs the nuclear localization of the early region 1B 55-kilodalton protein in primate cells. J. Virol. 70: 6323-6335, 1996. PubMed: 8709260
32555: Suss-Toby E, et al. Toxoplasma invasion: the parasitophorous vacuole is formed from host cell plasma membrane and pinches off via a fission pore. Proc. Natl. Acad. Sci. USA 93: 8413-8418, 1996. PubMed: 8710885
32582: Chang K, Pastan I. Molecular cloning of mesothelin, a differentiation antigen present on mesothelium, mesotheliomas, and ovarian cancers. Proc. Natl. Acad. Sci. USA 93: 136-140, 1996. PubMed: 8552591
32788: Lu FM, Lux SE. Constitutively active human notch 1 binds to the transcription factor CBF1 and stimulates transcription through a promoter containing a CBF1-responsive element. Proc. Natl. Acad. Sci. USA 93: 5663-5667, 1996. PubMed: 8643633
32972: Bhattacharyya DK, et al. Involvement of arginine 120, glutamate 524, and tyrosine 355 in the binding of arachidonate and 2-phenylpropionic acid inhibitors to the cyclooxygenase active site of ovine prostaglandin endoperoxide H synthase-1. J. Biol. Chem. 271: 2179-2184, 1996. PubMed: 8567676
33048: Feng XH, Derynck R. Ligand-independent activation of transforming growth factor (TGF) beta-signaling pathways by heteromeric cytoplasmic domains of TGF-beta receptors. J. Biol. Chem. 271: 13123-13129, 1996. PubMed: 8662796
33149: Wang LH, et al. Identification of thromboxane A2 synthase active site residues by molecular modeling-guided site-directed mutagenesis. J. Biol. Chem. 271: 19970-19975, 1996. PubMed: 8702713
33176: Almaula N, et al. Mapping the binding site pocket of the serotonin 5-hydroxytryptamine 2A receptor. J. Biol. Chem. 271: 14672-14675, 1996. PubMed: 8663249

Return to Top

ATCC
The Global Bioresource Center

Search Catalog
Select a Category
Go

Login Search Options

About | Cultures and Products | Science | Standards | Deposit Services | Custom Services | Product Use Policy

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-1651™ Order this Item

Price: $269.00

Designations: COS-7

Depositors: Y Gluzman

Biosafety Level: 2 [Cells Contain SV-40 viral DNA sequences]

Shipped: frozen

Medium & Serum: See Propagation

Growth Properties: adherent

Organism: *Cercopithecus aethiops*

Morphology: fibroblast

PHOTO

Source: **Organ:** kidney
Cell Type: SV40 transformed

Cellular Products: T antigen

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 (Nucleofection technology from Lonza
Roche FuGENE® Transfection Reagents)

Comments: This is an African green monkey kidney fibroblast-like cell line suitable for transfection by vectors requiring expression of SV40 T antigen. This line contains T antigen, retains complete permissiveness for lytic growth of SV40, supports the replication of ts A209 virus at 40C, and supports the replication of pure populations of SV40 mutants with deletions in the early region.The line was derived from the CV-1 cell line (ATCC ® CCL-70?) by transformation with an origin defective mutant of SV40 which codes for wild type T antigen.

Propagation: **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

Related Links ▸

NCBI Entrez Search
Cell Micrograph
Make a Deposit
Frequently Asked Questions
Material Transfer Agreement
Technical Support
Related Cell Culture Products

Subculturing:

Protocol:

1. Remove and discard culture medium.
2. Briefly rinse the cell layer with 0.25% (w/v) Trypsin- 0.53 mM EDTA solution to remove all traces of serum that contains trypsin inhibitor.
3. Add 2.0 to 3.0 ml of Trypsin-EDTA solution to flask and observe cells under an inverted microscope until cell layer is dispersed (usually within 5 to 15 minutes).
   Note: To avoid clumping do not agitate the cells by hitting or shaking the flask while waiting for the cells to detach. Cells that are difficult to detach may be placed at 37°C to facilitate dispersal.
4. Add 6.0 to 8.0 ml of complete growth medium and aspirate cells by gently pipetting.
5. Add appropriate aliquots of the cell suspension to new culture vessels.
6. Incubate cultures at 37°C.

Subcultivation Ratio: A subcultivation ratio of 1:4 to 1:8 is recommended
Medium Renewal: 2 to 3 times per week

Preservation:

Freeze medium: Complete growth medium supplemented with 5% (v/v) DMSO
Storage temperature: liquid nitrogen vapor phase

Related Products:

Recommended medium (without the additional supplements or serum described under ATCC Medium):ATCC 30-2002
recommended serum:ATCC 30-2020
parental cell line:ATCC CCL-70
0.25% (w/v) Trypsin - 0.53 mM EDTA in Hank' BSS (w/o Ca++, Mg++):ATCC 30-2101
Cell culture tested DMSO:ATCC 4-X

References:

1822: Gluzman Y. SV40-transformed simian cells support the replication of early SV40 mutants. Cell 23: 175-182, 1981. PubMed: 6260373
32447: Fernandez LM, Puett D. Lys583 in the third extracellular loop of the lutropin/choriogonadotropin receptor is critical for signaling. J. Biol. Chem. 271: 925-930, 1996. PubMed: 8557706
32459: Maestrini E, et al. A family of transmembrane proteins with homology to the MET-hepatocyte growth factor receptor. Proc. Natl. Acad. Sci. USA 93: 674-678, 1996. PubMed: 8570614
32500: Campbell M, et al. The simian foamy virus type 1 transcriptional transactivator (Tas) binds and activates an enhancer element in the gag gene. J. Virol. 70: 6847-6855, 1996. PubMed: 8794326
32502: Gonzalez Arnas JC, et al. DNA immunization confers protection against murine cytomegalovirus infection. J. Virol. 70: 7921-7928, 1996. PubMed: 8892915
32547: Jang SI, et al. Activator protein 1 activity is involved in the regulation of the cell type-specific expression from the proximal promoter of the human profilaggrin gene. J. Biol. Chem. 271: 24105-24114, 1996. PubMed: 8798649
32566: Dittrich E, et al. A di-leucine motif and an upstream serine in the interleukin-6 (IL-6) signal transducer gp130 mediate ligand-induced endocytosis and down-regulation of the IL-6 receptor. J. Biol. Chem. 271: 5487-5494, 1996. PubMed: 8621406
32568: Lee JH, et al. The proximal promoter of the human transglutaminase 3 gene. J. Biol. Chem. 271: 4561-4568, 1996. PubMed: 8626812
32720: Chen Y, et al. Demonstration of binding of dengue virus envelope protein to target cells. J. Virol. 70: 8765-8772, 1996. PubMed: 8971005
32728: Russell DW, Miller AD. Foamy virus vectors. J. Virol. 70: 217-222, 1996. PubMed: 8523528
32861: Wright DA, et al. Association of human fas (CD95) with a ubiquitin-conjugating enzyme (UBC-FAP). J. Biol. Chem. 49: 31037-31043, 1996. PubMed: 8940097
32893: Zhang J, et al. Dynamin and beta-arrestin reveal distinct mechanisms for G protein-coupled receptor internalization. J. Biol. Chem. 271: 18302-18305, 1996. PubMed: 8702465
33011: Ozcelebi F, et al. Phosphorylation of cholecystokinin receptors expressed on chinese hamster ovary cells. J. Biol. Chem. 271: 3750-3755, 1996. PubMed: 8631990
33013: Gibson S, et al. Functional LCK is required for optimal CD28-mediated activation of the TEC family tyrosine kinase EMT/ITK. J. Biol. Chem. 271: 7079-7083, 1996. PubMed: 8636141
33016: Shaul PW, et al. Acylation targets endothelial nitric-oxide synthase to plasmalemmal caveolae. J. Biol. Chem. 271: 6518-6522, 1996. PubMed: 8626455
33032: Ladner RD, et al. Identification of a consensus cyclin-dependent kinase phosphorylation site unique to the nuclear form of human deoxyuridine triphosphate nucleotidohydrolase. J. Biol. Chem. 271: 7752-7757, 1996. PubMed: 8631817
33038: Wu X, et al. Demonstration of a physical interaction between microsomal triglyceride transfer protein and apolipoprotein B during the assembly of ApoB-containing lipoproteins. J. Biol. Chem. 271: 10277-10281, 1996. PubMed: 8626595
33052: Hawes BE, et al. Phosphatidylinositol 3-kinase is an early intermediate in the G beta gamma-mediated mitogen-activated protein kinase signaling pathway. J. Biol. Chem. 271: 12133-12136, 1996. PubMed: 8647803
33137: Arai H, Charo IF. Differential regulation of G-protein-mediated signaling by chemokine receptors. J. Biol. Chem. 271: 21814-21819, 1996. PubMed: 8702980
33163: Hsieh CM, et al. APEG-1, a novel gene preferentially expressed in aortic smooth muscle cells, is down-regulated by vascular injury. J. Biol. Chem. 271: 17354-17359, 1996. PubMed: 8663449
33175: Holtmann MH, et al. Multiple extracellular loop domains contribute critical determinants for agonist binding and activation of the secretin receptor. J. Biol. Chem. 271: 14944-14949, 1996. PubMed: 8663151

Return to Top

Notices and Disclaimers

ATCC products are intended for laboratory research purposes only, unless noted otherwise. They are not intended for use in humans.

While ATCC uses reasonable efforts to include accurate and up-to-date information on this site, ATCC makes no warranties or representations as to its accuracy. Citations from scientific literature and patents are provided for informational purposes only. ATCC does not warrant that such information has been confirmed to be accurate.

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

Back to my Search

ATCC
The Global Bioresource Center™

Search Catalog
Select a Category
Go

Login Search Options

About | Cultures and Products | Science | Standards | Deposit Services | Custom Services | Product Use Policy

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: CCL-81™ Order this Item

Price: $256.00

Designations: Vero

Depositors: W Hann, JS Rhim

Biosafety Level: 1

Shipped: frozen

Medium & Serum: See Propagation

Growth Properties: adherent

Organism: *Cercopithecus aethiops*

Morphology: epithelial

PHOTO

Source: **Organ:** kidney
Disease: normal

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:** March 27, 1962

Applications:
detection of verotoxin [21447]
efficacy testing [92579] [92587]
malaria biology
media testing [11019]
mycoplasma testing [92577]
substrate [92447]
testing [34219] [92309] [92319] [92320] [92321] [92322] [92324] [92346] [92389]
transfection host (Nucleofection technology from Lonza
Roche FuGENE® Transfection Reagents)
detection of virus in ground beef [34219]

Virus Resistance: Stratford; Apeu; Caraparu; Madrid; Nepuyo; Ossa

Cytogenetic Analysis: This is a cell line with the hypodiploid chromosome count. The modal chromosome number was 58 occurring in 66% of cells. In most cells, over 50% of the chromosomes in each cell complement belonged to structurally altered marker chromosomes. Normal A3, A4, B4, and B5 were absent; B2, B3 and B7 were occasionally paired; and B9, C1 and C5 were mostly paired. The rate of cells with higher ploidies was 1.7%. Other chromosomes were mostly present in single copy.

Age: adult

Comments:

Related Links
- NCBI Entrez Search
- Cell Micrograph
- Make a Deposit
- Frequently Asked Questions
- Material Transfer Agreement
- Technical Support
- Related Cell Culture Products

The Vero cell line was initiated from the kidney of a normal adult African green monkey on March 27, 1962, by Y. Yasumura and Y. Kawakita at the Chiba University in Chiba, Japan. [21447]
The cell line was brought to the Laboratory of Tropical Virology, National Institute of Allergy and Infectious Diseases, National Institutes of Health in the 93rd passage from Chiba University by B. Simizu on June 15, 1964.

Propagation:

ATCC complete growth medium: The base medium for this cell line is ATCC-formulated Eagle's Minimum Essential Medium, Catalog No. 30-2003. 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:

1. Remove and discard culture medium.
2. Briefly rinse the cell layer with 0.25% (w/v) Trypsin- 0.53 mM EDTA solution to remove all traces of serum that contains trypsin inhibitor.
3. Add 2.0 to 3.0 ml of Trypsin-EDTA solution to flask and observe cells under an inverted microscope until cell layer is dispersed (usually within 5 to 15 minutes).
   Note: To avoid clumping do not agitate the cells by hitting or shaking the flask while waiting for the cells to detach. Cells that are difficult to detach may be placed at 37°C to facilitate dispersal.
4. Add 6.0 to 8.0 ml of complete growth medium and aspirate cells by gently pipetting.
5. Add appropriate aliquots of the cell suspension to new culture vessels.
6. Incubate cultures at 37°C.

Subcultivation Ratio: A subcultivation ratio of 1:3 to 1:6 is recommended
Medium Renewal: 2 to 3 times per week

Preservation:

Freeze medium: Complete growth medium supplemented with 5% (v/v) DMSO
Storage temperature: liquid nitrogen vapor phase

Related Products:

Recommended medium (without the additional supplements or serum described under ATCC Medium):ATCC 30-2003
recommended serum:ATCC 30-2020
derivative:ATCC CRL-1587

References:

11019: British Pharmacopoeia Commission Tests for microbial contamination. London, UK:British Pharmacopoeia Commission;British Pharmacopoeia Appendix XVI B, 2003
18385: Didier ES, et al. Characterization of Encephalitozoon (Septata) intestinailis isolates cultured from nasal mucosa and bronchoalveolar lavage fluids of two AIDS patients. J. Eukaryot. Microbiol. 43: 34-43, 1996. PubMed: 8563708
21447: American Public Health Association. Compendium of methods for the microbiological examination of foods. 3rd ed.Washington, DC: American Public Health Association; 1992.
22338: Yasumura Y, Kawakita Y. Studies on SV40 in tissue culture - preliminary step for cancer research in vitro. Nihon Rinsho 21: 1201-1215, 1963.
26240: Simizu B, et al. Characterization of the Tacaribe group of arboviruses. I. Propagation and plaque assay of Tacaribe virus in a line of African green monkey kidney cells (Vero). Proc. Soc. Exp. Biol. Med. 125: 119-123, 1967. PubMed: 6027511
26241: Rhim JS, Schell K. Cytopathic and plaque assay of rubella virus in a line of African green monkey kiency cells (Vero). Proc. Soc. Exp. Biol. Med. 125: 602-606, 1967. PubMed: 4961492
26242: Liebhaber H, et al. Replication of rubella virus in a continuous line of African green monkey kidney cells (Vero). Proc. Soc. Exp. Biol. Med. 125: 636-643, 1967. PubMed: 4961494
26243: Sasaki K, et al. Studies on measles virus. II. Propagation in two established simian renal cell lines and development of a plaque assay. Kitasato Arch. Exp. Med. 37: 27-42, 1964. PubMed: 5833688
26244: . . Proc. Soc. Exp. Biol. Med. 125: 741, 1967.
26245: Rhim JS, et al. Temperature dependence of the synthesis of adenovirus tumor and viral antigens. Proc. Soc. Exp. Biol. Med. 127: 642-646, 1968. PubMed: 5689485
26246: Rhim JS, Schell K. Cytopathic effects of the parainfluenza virus SV5 in Vero cells. Nature 216: 271-272, 1967. PubMed: 4293683
26247: Ozawa Y. Studies on the replication of African horse-sickness virus in two different cell line cultures. Arch. Gesamte Virusforsch. 21: 155-169, 1967. PubMed: 4232530
26248: Rhim JS, et al. Growth of Junin virus, the etiological agent of Argentinian hemorrhagic fever, in cell cultures. Arch. Gesamte Virusforsch. 21: 243-252, 1967. PubMed: 5591575
27345: Huber M, et al. Tyrosine phosphorylation events during coxsackievirus B3 replication. J. Virol. 71: 595-600, 1997. PubMed: 8985388
28239: Pugachev KV, et al. Improvement of the specific infectivity of the rubella virus (RUB) infectious clone: determinants of cytopathogenicity induced by RUB map to the nonstructural proteins. J. Virol. 71: 562-568, 1997. PubMed: 8985384
32175: Mundt W, et al. Perfusion system and a method for the large scale production of virus or virus antigen. US Patent 5,719,051 dated Feb 17 1998
32360: Nichol PF, et al. Herpes simplex virus gene expression in neurons: viral DNA synthesis is a critical regulatory event in the branch point between the lytic and latent pathways. J. Virol. 70: 5476-5486, 1996. PubMed: 8764059
32363: Govorkova EA, et al. African green monkey kidney (Vero) cells provide an alternative host cell system for influenza A and B viruses. J. Virol. 70: 5519-5524, 1996. PubMed: 8764064
32376: White LJ, et al. Attachment and entry of recombinant norwalk virus capsids to cultured human and animal cell lines. J. Virol. 70: 6589-6597, 1996. PubMed: 8794293
32506: Martinez R, et al. Herpes simplex virus type 1 alkaline nuclease is required for efficient processing of viral DNA replication intermediates. J. Virol. 70: 2075-2085, 1996. PubMed: 8642627
32521: Zeng L, et al. Identification of amino acids involved in a recognition by dengue virus NS3-specific, HLA-DR15-restricted cytotoxic CD4+ T-cell clones. J. Virol. 70: 3108-3117, 1996. PubMed: 8627790
32692: Hill JM, et al. In vivo epinephrine reactivation of ocular herpes simplex virus type 1 in the rabbit is correlated to a 370-base-pair region located between the promoter and the 5' end of the 2.0-kilobase latency-associated transcript. J. Virol. 70: 7270-7274, 1996. PubMed: 8794381
32695: Carter KL, et al. Characterization of the products of the UL43 gene of herpes simplex virus 1: potential implications for regulation of gene expression by antisense transcription. J. Virol. 70: 7663-7668, 1996. PubMed: 8892886
32698: Malik AK, Weller SK. Use of transdominant mutants of the origin-binding protein (UL9) of herpes simplex virus type 1 to define functional domains. J. Virol. 70: 7859-7866, 1996. PubMed: 8892908
32720: Chen Y, et al. Demonstration of binding of dengue virus envelope protein to target cells. J. Virol. 70: 8765-8772, 1996. PubMed: 8971005
32726: Sandri-Goldin RM, Hibbard MK. The herpes simplex virus type 1 regulatory protein ICP27 coimmunoprecipitates with anti-sm antiserum, and the C terminus appears to be required for this interaction. J. Virol. 70: 108-118, 1996. PubMed: 8523514
32727: Carter KL, Roizman B. The promoter and transcriptional unit of a

novel herpes simplex virus 1 alpha gene are contained in, and encode a protein in frame with, the open reading frame of the alpha22 gene. J. Virol. 70: 172-178, 1996. PubMed: 8523523
32728: Russell DW, Miller AD. Foamy virus vectors. J. Virol. 70: 217-222, 1996. PubMed: 8523528
32762: Lukonis CJ, Weller SK. Characterization of nuclear structures in cells infected with herpes simplex virus type 1 in the absence of viral DNA replication. J. Virol. 70: 1751-1758, 1996. PubMed: 8627697
32763: Lagunoff M, et al. Phenotypic properties of herpes simplex virus 1 containing a derepressed open reading frame P gene. J. Virol. 70: 1810-1817, 1996. PubMed: 8627705
32765: Uprichard SL, Knipe DM. Herpes simplex ICP27 mutant viruses exhibit reduced expression of specific DNA replication genes. J. Virol. 70: 1969-1980, 1996. PubMed: 8627723
32903: Leopardi R, Roizman B. The herpes simplex virus major regulatory protein ICP4 blocks apoptosis induced by the virus or by hyperthermia. Proc. Natl. Acad. Sci. USA 93: 9583-9587, 1996. PubMed: 8790373
32958: Pereira ME, et al. Invasive phenotype of Trypanosoma cruzi restricted to a population expressing trans-sialidase. Infect. Immun. 64: 3884-3892, 1996. PubMed: 8751943
34219: AOAC International Virus in beef (ground), microbiological method. Gaithersburg, MD:AOAC International;AOAC "Official Methods of Analysis of the AOAC International" 975.56.
92309: Single-use syringes (sterile) for the injection of 100 units per millilitre insulin (U-100), Appendix O. Sydney, NSW, Australia:Standards Australia;Standards Australia AS 1077-1992.
92319: Single-use(sterile) infusion sets for general medical use. Appendix F, Method of test for cytotoxicity. Sydney, NSW, Australia:Standards Australia;Standards Australia AS 2385-1990.
92320: Medical equipment--Single-use winged intravenous devices (sterile) for general medical use. Appendix J. Method of test for cytotoxicity. Sydney, NSW, Australia:Standards Australia;Standards Australia AS/NZS 2485:1995.
92321: Medical devices--Polymer urethral catherters for general medical use. Appendix B. Method of testing catheters for cytotoxicity. Sydney, NSW, Australia:Standards Australia;Standards Australia AS/NZS 2696:1996.
92322: General requirements for single-use, sterile, plasticized polyvinyl chloride (PVC) packs for human blood. Part2: Multiple blood pack systems. Appendix Q. Method of test for Cytotoxicity. Sydney, NSW, Australia:Standards Australia;Standards Australia AS 3787.2-1997.
92324: Testing of products for use in contact with drinking water. Sydney, NSW, Australia:Standards Australia;Standards Australia AS/NZS 4020:2002.
92346: Biological evaluation of medical devices. Part 5: Tests for in vitro cytotoxicity. Sydney, NSW, Australia:Standards Australia;Standards Australia AS ISO 10993.5-2002.
92389: Biological evaluation of medical devices--Part 5: Tests for in vitro cytotoxicity. Geneva (Switzerland):International Organization for Standardization/ANSI;ISO ISO 10993-5:1999.
92447: Test for absence of mycoplasmas. London, UK:British Pharmacopoeia Commission;British Pharmacopoeia Appendix XVI (Vet) 3, 2003
92577: Standard Practice for Indirect Detection of Mycoplasma in Cell Culture by 4-6-Diamidino-2-2 Phenylindole (DAPI) Staining. West Conshohocken, PA:ASTM International;ASTM Standard Test Method E 1533-00 (Reapproved 2006).
92579: Standard Test Method for Determining the Virus-Eliminating Effectiveness of Liquid Hygienic Handwash and Handrub Agents Using the Fingerpads of Adult Volunteers. West Conshohocken, PA:ASTM International;ASTM Standard Test Method E 1838-02.
92587: Standard Quantitative Disk Carrier Test Method for Determining the Bactericidal, Virucidal, Fungicidal, Mycobactericidal and Sporicidal Activities of Liquid Chemical Germicides. West Conshohocken, PA:ASTM International;ASTM Standard Test Method E 2197-02.

Return to Top

Back to my Search

Appendix III
Plasmids:

pHR: cPPT-EF-GW-SIN vector cloning backbone	Jeffrey Medin	University of Toronto
HIV packaging plasmids for gag/pol and VSV envelope (pCMVdR8.91 and pMD.G)	Jeffrey Medin	University of Toronto
Lenitvirus vector backbone plus transgene	Jeffrey Medin	University of Toronto
pCCL.sin.gfp/luc	expresses GFP and luciferase	
pCCL.sin.cPPT.EF/x.NTOO.WPre	expresses mutant rat her2/neu fused to ovalbumin epitopes OT-1 and OT-2	
pCCL.sin.cPPT.EF/x.rHer2.WPre	expresses mutant rat her2/neu	
Lentiviral vector backbones plus transgene	Created in Dr. Dekaban's lab using vectors from Jeffrey Medin	
pCCL.sin.HIVgp140	expresses HIV gp140	
pCCL.sin.HIVgp140.M11L	expresses HIV gp140 and Myxoma virus M11L (inhibits some forms of apoptosis)	
pCCL.sin.GFP.M11L	expresses eGFP and Myxoma virus M11L	

Eukaryotic expression vectors:

pHERO *	from Dr. Craig Strathedee	Cloning backbone

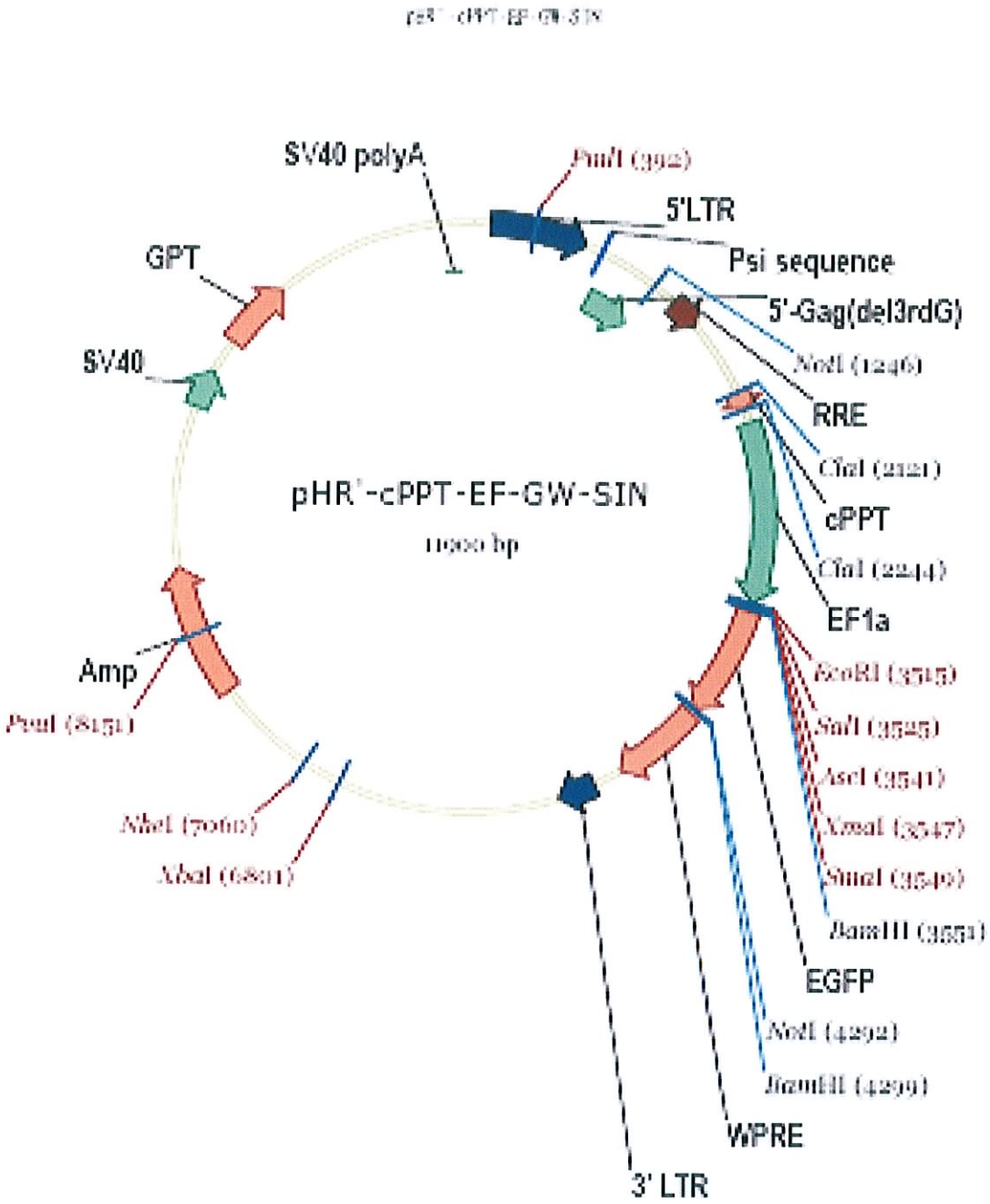
Constructs created in Dr. Dekaban's Lab:

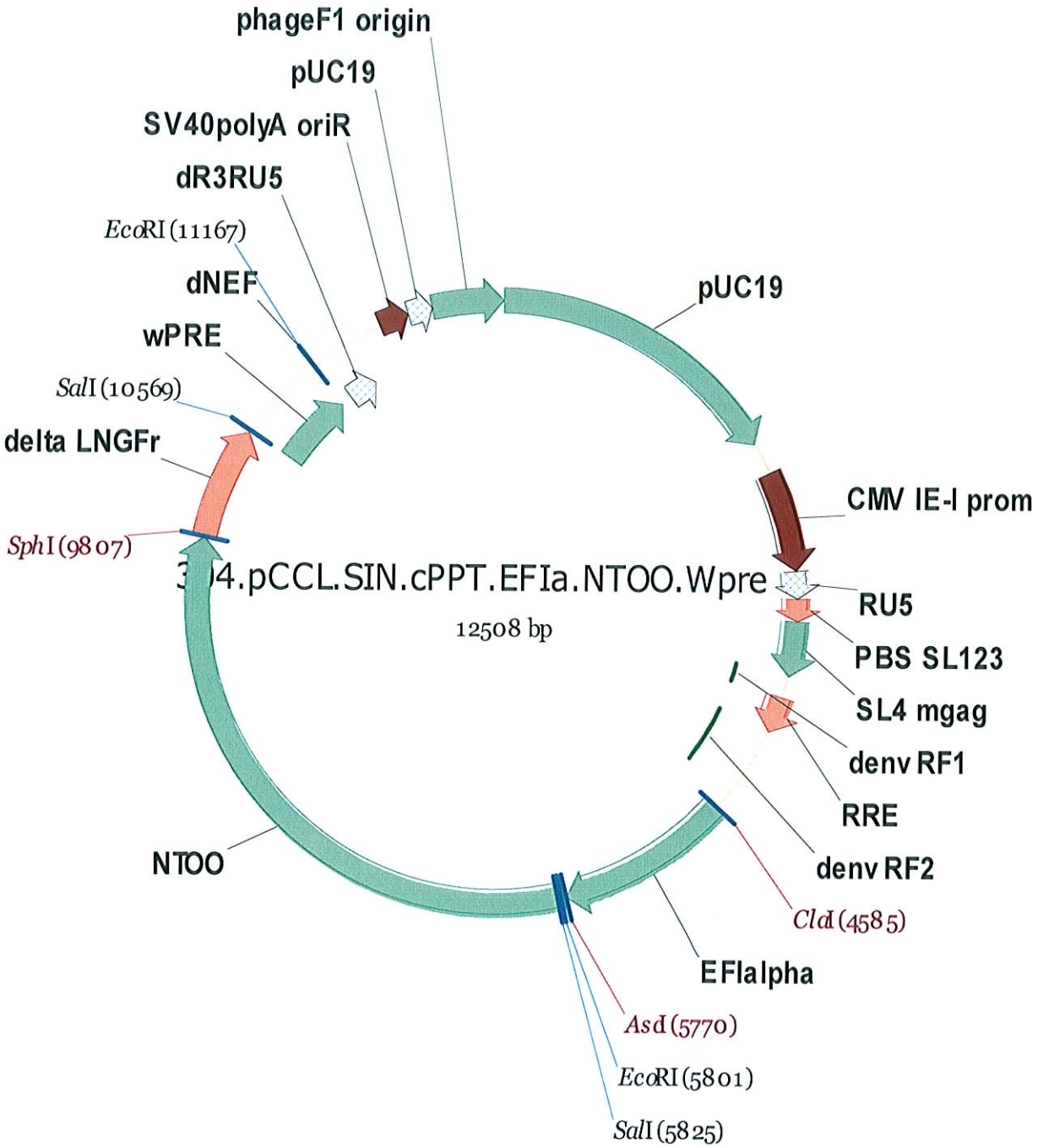
pHERO GFP *	expresses GFP
pHERO MIIL *	inhibits some forms of apoptosis
pHERO HIV gp140 *	expresses HIV envelope protein gpl140
pHERO HIV gp140 + MIIL *	expresses HIV envelope protein gp140 together with MIIL. The latter inhibits cell toxicity due to over-expression of HIV gp140.

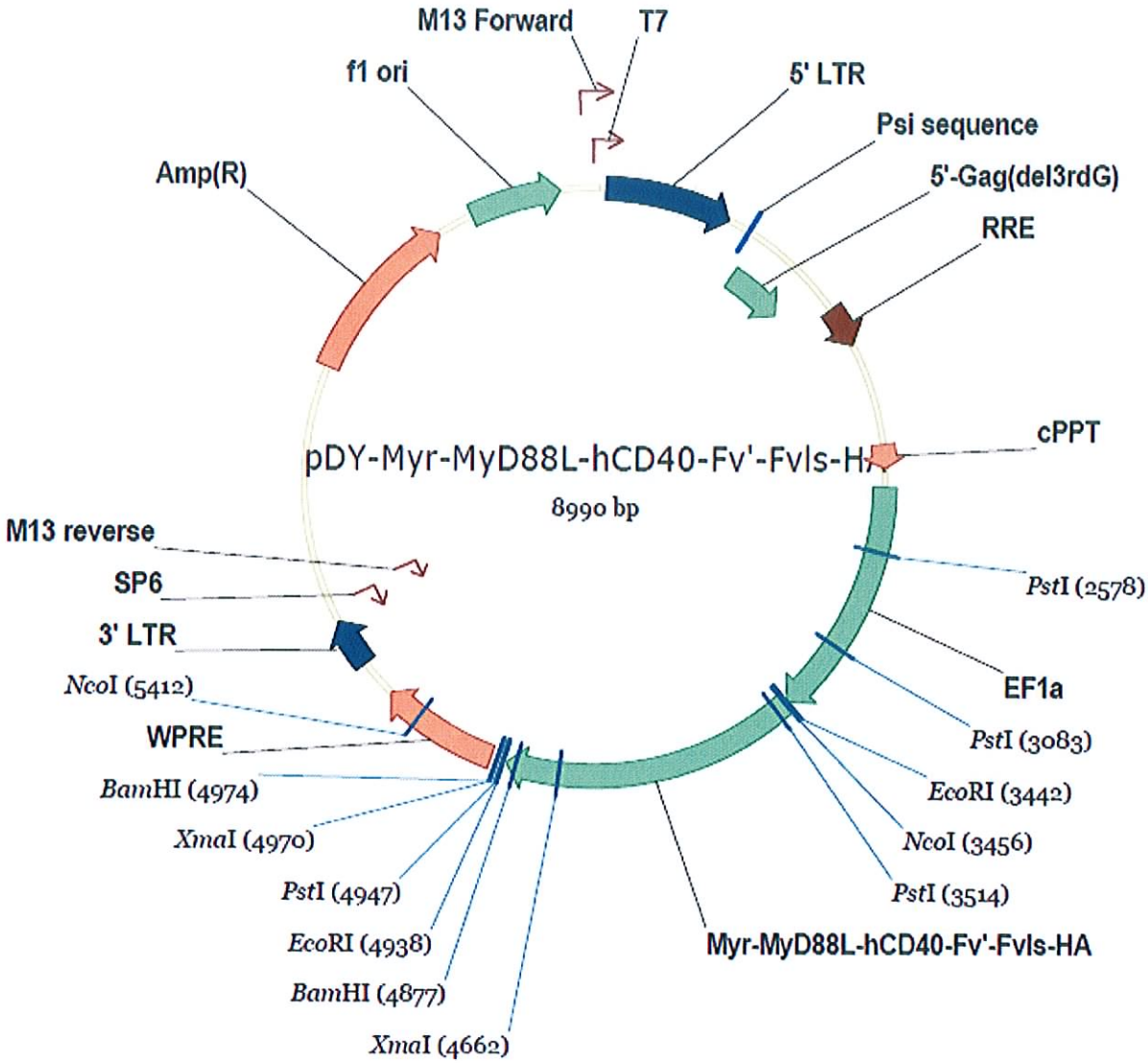
* only used for cell culture transfections or direct DNA immunizations.

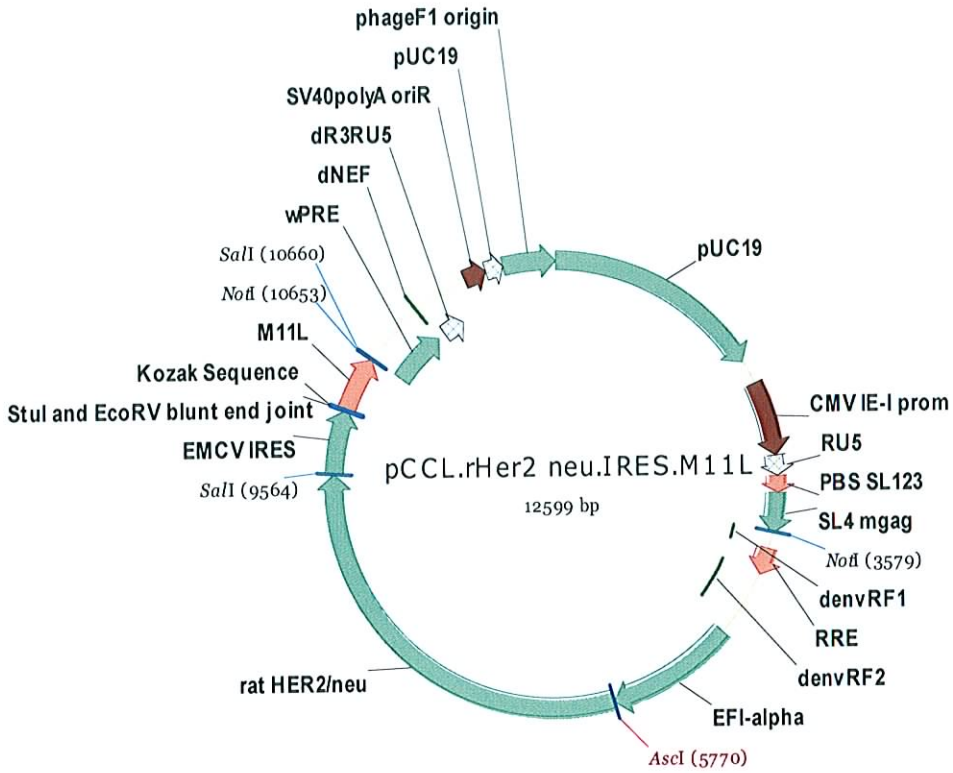
Appendix II

Plasmid maps




phageF1 origin
pUC19
SV40polyA oriR
dR3RU5
EcoRI (11167)
dNEF
wPRE
SalI (10569)
delta LNGFr
SphI (9807)
4.pCCL.SIN.cPPT.EFIa.NTOO.Wpre
12508 bp
pUC19
CMV IE-I prom
RU5
PBS SL123
SL4 mgag
denv RF1
RRE
denv RF2
ClaI (4585)
EFIalpha
AsdI (5770)
EcoRI (5801)
SalI (5825)
NTOO


M13 Forward
T7
f1 ori
5' LTR
Psi sequence
Amp(R)
5'-Gag(del3rdG)
RRE
cPPT
pDY-Myr-MyD88L-hCD40-Fv'-Fvls-H
8990 bp
M13 reverse
PstI (2578)
SP6
3' LTR
EF1a
NcoI (5412)
PstI (3083)
WPRE
EcoRI (3442)
BamHI (4974)
NcoI (3456)
XmaI (4970)
PstI (3514)
PstI (4947)
Myr-MyD88L-hCD40-Fv'-Fvls-HA
EcoRI (4938)
BamHI (4877)
XmaI (4662)

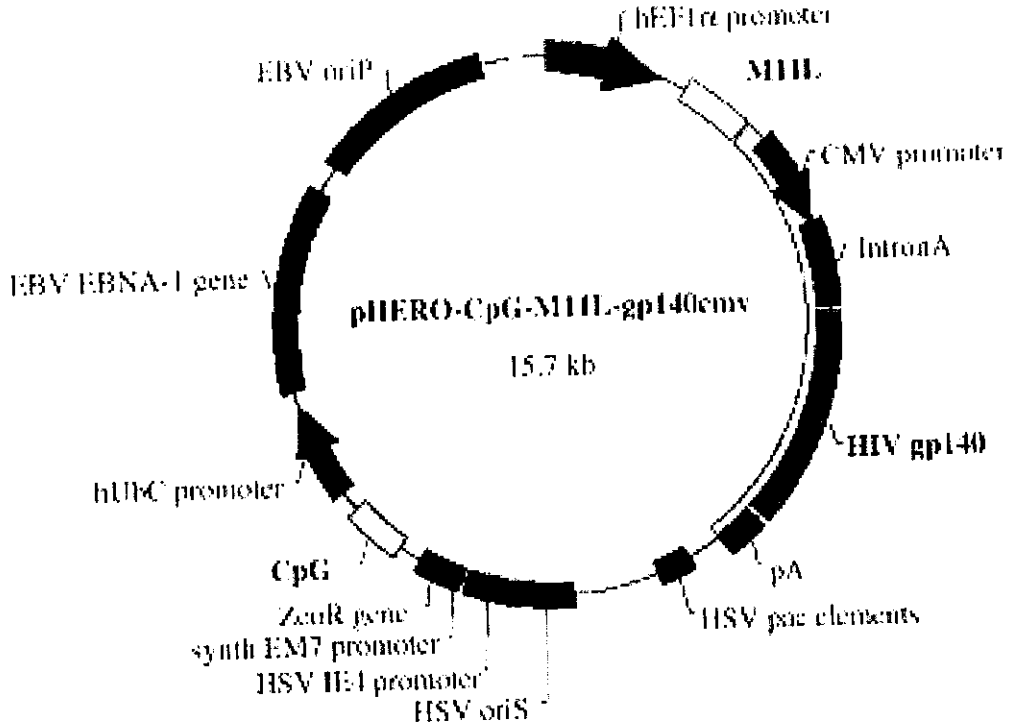


pCCL-rHer2/neu-IRES-M11L

pCCL backbone

Modifications:

- pCCL-EGFP
  - rHer2/neu-IRES-M11L Fragment removed by AscI and SalI digest
  - EGFP fragment PCR generated with 5'AscI site and 3'SalI site
- pCCL-EGFP-IRES-M11L
  - pCCL-EGFP linearized with SalI and treated with Alkaline Phosphatase
  - IRES-M11L Fragment generated with 5' and 3' SalI site
- pCCL-gp140
  - Same as pCCL-EGFP, but using gp140



pHERO-CpG-M11L-gp140-env

Other pHERO Backbone based

- pHERO-CpG-M11L-gp140-EGFP
- pHERO-CpG-gp140-EGFP

SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 05/11/2010
Date Updated: 12/16/2009
Version 1.5

Section 1 - Product and Company Information

Product Name	LIPOPOLYSACCHARIDES FROM ESCHERICHIA COLI 026:B6, PURIFIED BY GEL FILTRATION CHROMATOGRAPHY, G—IRRADIATED
Product Number	L2654
Brand	SIGMA
Company	Sigma-Aldrich Canada, Ltd
Address	2149 Winston Park Drive Oakville ON L6H 6J8 CA
Technical Phone:	9058299500
Fax:	9058299292
Emergency Phone:	800-424-9300

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
LIPOPOLYSACCHARIDE FROM E. COLI 026:B6, CELL CULTURE TESTED	None	No

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Harmful.
Pyrogen. May cause fever. Do not use if skin is cut or scratched. Wash thoroughly after handling.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

INHALATION EXPOSURE

If inhaled, remove to fresh air. If breathing becomes difficult, call a physician.

DERMAL EXPOSURE

In case of skin contact, flush with copious amounts of water for at least 15 minutes. Remove contaminated clothing and shoes. Call a physician.

EYE EXPOSURE

In case of contact with eyes, flush with copious amounts of water for at least 15 minutes. Assure adequate flushing by separating the eyelids with fingers. Call a physician.

Section 5 - Fire Fighting Measures

FLASH POINT
N/A

AUTOIGNITION TEMP
N/A

FLAMMABILITY
N/A

EXTINGUISHING MEDIA
Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

FIREFIGHTING
Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

Section 6 - Accidental Release Measures

PROCEDURE(S) OF PERSONAL PRECAUTION(S)
Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP
Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

STORAGE
Store at 2-8°C

Section 8 - Exposure Controls / PPE

PERSONAL PROTECTIVE EQUIPMENT
Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a dust mask type N95 (US) or type P1 (EN 143) respirator.
Other: Wear appropriate government approved respirator, chemical-resistant gloves, safety goggles, other protective clothing.

Section 9 - Physical/Chemical Properties

Appearance — Physical State: Solid

Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	N/A	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	

Water Content	N/A
Solvent Content	N/A
Evaporation Rate	N/A
Viscosity	N/A
Surface Tension	N/A
Partition Coefficient	N/A
Decomposition Temp.	N/A
Flash Point	N/A
Explosion Limits	N/A
Flammability	N/A
Autoignition Temp	N/A
Refractive Index	N/A
Optical Rotation	N/A
Miscellaneous Data	N/A
Solubility	N/A

N/A = not available

Section 10 - Stability and Reactivity

STABILITY
Stable: Stable.

HAZARDOUS DECOMPOSITION PRODUCTS
Hazardous Decomposition Products: Nature of decomposition products not known.

HAZARDOUS POLYMERIZATION
Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE
Multiple Routes: May be harmful by inhalation, ingestion, or skin absorption.

CONDITIONS AGGRAVATED BY EXPOSURE
The toxicological properties have not been thoroughly investigated.

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION
Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT
Proper Shipping Name: None
Non-Hazardous for Transport: This substance is considered to be non-hazardous for transport.

IATA
Non-Hazardous for Air Transport: Non-hazardous for air transport.

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION
Symbol of Danger: Xn
Indication of Danger: Harmful.

US CLASSIFICATION AND LABEL TEXT
Indication of Danger: Harmful.
US Statements: Pyrogen. May cause fever. Do not use if skin is cut or scratched. Wash thoroughly after handling.

UNITED STATES REGULATORY INFORMATION
SARA LISTED: No

CANADA REGULATORY INFORMATION
WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: No
NDSL: No

Section 16 - Other Information

DISCLAIMER
For R&D use only. Not for drug, household or other uses.

WARRANTY
The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

CHEMICAL IDENTIFICATION

RTECS Number	OJ0895400
Chemical Name	Lipopolysaccharide, escherichia coli
CAS Registry Number	93572-42-0
Last Updated	200911
Data Items Cited	140
Compound Descriptor	Drug Natural Product Human Reproductive Effector

Synonyms/Trade Names

E. coli 0111:B4 lps
E. coli LPS (serotype 0127:B8)
Escherichia coli (0113:h10:k) endotoxin
Escherichia coli lipopolysaccharide
Lipopolysaccharide (E. coli serotype 0128:B12)
Lipopolysaccharide (E. coli serotype 026:B6)
Lipopolysaccharide (E. coli)
Lipopolysaccharide from Escherichia coli O26:B6
Lipopolysaccharide from Escherichia coli, serotype 055:B5
Lipopolysaccharide, Escherichia coli serotype 0111:B4

HEALTH HAZARD DATA

ACUTE TOXICITY DATA

Type of Test	Route of Exposure	Species Observed	Dose Data	Toxic Effects	Reference
LD50 - Lethal dose, 50 percent kill	Oral	Rodent - rat	48300 ug/kg	Details of toxic effects not reported other than lethal dose value	KBIJEK Korean Biochemical Journal. (Biochemical Society of the Republic of Korea, POB 226, Mapo, Seoul, 121-600, South Korea) V. 26(4)- 1993- Volume(issue)/page/year: 27,413,1994
LD50 - Lethal dose, 50 percent kill	Intraperitoneal	Rodent - rat	10 mg/kg	Details of toxic effects not reported other than lethal dose value	PSEBAA Proceedings of the Society for Experimental Biology and Medicine. (Academic Press, Inc., 1 E. First St., Duluth, MN 55802) V.1- 1903/04- Volume(issue)/page/year: 109,429,1962
LD50 - Lethal dose, 50 percent kill	Oral	Rodent - mouse	56300 ug/kg	Details of toxic effects not reported other than lethal dose value	KBIJEK Korean Biochemical Journal. (Biochemical Society of the Republic of Korea, POB 226, Mapo, Seoul, 121-600, South Korea) V. 26(4)- 1993- Volume(issue)/page/year: 27,413,1994
LD50 - Lethal dose, 50 percent kill	Intravenous	Rodent - mouse	7670 ug/kg	Details of toxic effects not reported other than lethal dose value	MIIMDV Microbiology and Immunology. (Business Center for Academic Soc. Japan, 2-4-16 Yayoi, Bunkyo- ku, Tokyo 113, Japan) V.21- 1977- Volume(issue)/page/year: 26,455,1982
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	100 ug/kg	Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Immunological Including Allergic - increase in humoral immune response Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	EJPHAZ European Journal of Pharmacology. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1967- Volume(issue)/page/year: 455,175,2002
TCLo - Lowest published toxic concentration	Inhalation	Rodent - guinea pig	30000 mg/m3/1H	Lungs, Thorax, or Respiration - bronchiolar constriction Biochemical - Metabolism (Intermediary) -	JPETAB Journal of Pharmacology and Experimental Therapeutics. (Williams & Wilkins Co., 428 E. Preston St., Baltimore, MD 21202) V.1- 1909/10- Volume

				effect on inflammation or mediation of inflammation	(issue)/page/year: 298,298,2001
TDLo - Lowest published toxic dose	Intravenous	Rodent - mouse	400 ug/kg	Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	BPBLEO Biological and Pharmaceutical Bulletin. (Pharmaceutical Society of Japan, 2-12-15-201 Shibuya Shibuya-ku, Tokyo 150, Japan) V.16- 1993- Volume(issue)/page/year: 23,249,2000
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	40 ug/kg	Gastrointestinal - other changes	AEPPAE Naunyn-Schmiedeberg's Archiv fuer Experimentelle Pathologie und Pharmakologie. (Berlin, Ger.) V.110-253, 1925-66. For publisher information, see NSAPCC. Volume(issue)/page/year: 363,276,2001
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	1 mg/kg	Lungs, Thorax, or Respiration - other changes Lungs, Thorax, or Respiration - changes in lung weight Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - phosphatases	BCPCA6 Biochemical Pharmacology. (Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523) V.1- 1958- Volume (issue)/page/year: 59,1155,2000
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	10 mg/kg	Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - other oxidoreductases Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	JPETAB Journal of Pharmacology and Experimental Therapeutics. (Williams & Wilkins Co., 428 E. Preston St., Baltimore, MD 21202) V.1- 1909/10- Volume (issue)/page/year: 301,561,2002
LDLo - Lowest published lethal dose	Intraperitoneal	Rodent - mouse	20 mg/kg	Details of toxic effects not reported other than lethal dose value	JPETAB Journal of Pharmacology and Experimental Therapeutics. (Williams & Wilkins Co., 428 E. Preston St., Baltimore, MD 21202) V.1- 1909/10- Volume (issue)/page/year: 301,561,2002
TDLo - Lowest published	Intraperitoneal	Rodent - rat	5 mg/kg	Vascular - other changes Biochemical - Enzyme inhibition,	JPETAB Journal of Pharmacology and Experimental Therapeutics.

toxic dose				induction, or change in blood or tissue levels - other oxidoreductases Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	(Williams & Wilkins Co., 428 E. Preston St., Baltimore, MD 21202) V.1- 1909/10- Volume (issue)/page/year: 304,179,2003
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	400 ug/kg	Blood - other changes Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	JPETAB Journal of Pharmacology and Experimental Therapeutics. (Williams & Wilkins Co., 428 E. Preston St., Baltimore, MD 21202) V.1- 1909/10- Volume (issue)/page/year: 302,390,2002
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	5 mg/kg	Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - transaminases	FCTOD7 Food and Chemical Toxicology. (Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523) V.20- 1982- Volume (issue)/page/year: 40,545,2002
TDLo - Lowest published toxic dose	Intratracheal	Rodent - rat	0.1 mg/kg	Lungs, Thorax, or Respiration - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - dehydrogenases Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	TXAPA9 Toxicology and Applied Pharmacology. (Academic Press, Inc., 1 E. First St., Duluth, MN 55802) V.1- 1959- Volume (issue)/page/year: 178,172,2002
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	0.1 mg/kg	Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Biochemical - Metabolism (Intermediary) - other proteins Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	TXCYAC Toxicology. (Elsevier Scientific Pub. Ireland, Ltd., POB 85, Limerick, Ireland) V.1- 1973- Volume (issue)/page/year: 186,51,2003
TDLo -	Intraperitoneal	Rodent -	30 ug/kg	Liver - other changes	JPETAB Journal of

Lowest published toxic dose		mouse		Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - transaminases	Pharmacology and Experimental Therapeutics. (Williams & Wilkins Co., 428 E. Preston St., Baltimore, MD 21202) V.1-1909/10- Volume (issue)/page/year: 300,18,2002
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	40 ug/kg	Gastrointestinal - hypermotility, diarrhea	NNAPBA Naunyn-Schmiedebergs Archiv fuer Pharmakologie. (Berlin, Ger.) V.264-271, 1969-71. For publisher information, see NSAPCC. Volume (issue)/page/year: 367,51,2003
TDLo - Lowest published toxic dose	Intravenous	Human	4 ng/kg	Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	CEXPB9 Clinical and Experimental Pharmacology and Physiology. (Blackwell Scientific Publications, (Australia) Pty Ltd., 107 Barry St., Carlton, Vic. 3053, Australia) V.1-1974- Volume (issue)/page/year: 28,376,2001
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	7400000 units/kg	Liver - other changes Biochemical - Metabolism (Intermediary) - other proteins Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	TOSCF2 Toxicological Sciences (Oxford University Press, 6277 Sea Harbor Drive, Orlando, FL 32887) V. 41, Jan. 1998- Volume (issue)/page/year: 72,43,2003
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	3 mg/kg	Liver - other changes Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	BCPCA6 Biochemical Pharmacology. (Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523) V.1- 1958- Volume (issue)/page/year: 67,2141,2004
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	0.8 mg/kg	Liver - other changes Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - dehydrogenases	CBINA8 Chemico-Biological Interactions. (Elsevier Scientific Pub. Ireland Ltd., POB 85, Limerick, Ireland) V.1- 1969- Volume (issue)/page/year: 143-144,55,2003
TDLo - Lowest	Intraperitoneal	Rodent - rat	55 mg/kg	Cardiac - pulse rate Cardiac - change in	BCPCA6 Biochemical Pharmacology. (Pergamon

published toxic dose				force of contraction Vascular - BP lowering not characterized in autonomic section	Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523) V.1- 1958- Volume (issue)/page/year: 64,1785,2002
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	55 mg/kg	Cardiac - pulse rate Cardiac - change in force of contraction Vascular - BP lowering not characterized in autonomic section	BCPCA6 Biochemical Pharmacology. (Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523) V.1- 1958- Volume (issue)/page/year: 64,1785,2002
TDLo - Lowest published toxic dose	Subcutaneous	Rodent - mouse	0.5 ug/kg	Liver - other changes	BDERE* Birth Defects Research Part A, Clinical and molecular teratology (Hoboken, N.J. : John Wiley & Sons) V.67- 2003- Volume(issue)/page/year: 67,240,2003
TDLo - Lowest published toxic dose	Intravenous	Mammal - domestic	1 ug/kg	Cardiac - change in rate Vascular - other changes Lungs, Thorax, or Respiration - other changes	AANEAB Acta Anaesthesiologica Scandinavica. (Munksgaard International Pub., POB 2148, DK-1016 Copenhagen K, Denmark) V.1- 1957- Volume (issue)/page/year: 45,1246,2001
TDLo - Lowest published toxic dose	Intravenous	Mammal - domestic	1 ug/kg	Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Immunological Including Allergic - increase in cellular immune response Nutritional and Gross Metabolic - body temperature increase	AANEAB Acta Anaesthesiologica Scandinavica. (Munksgaard International Pub., POB 2148, DK-1016 Copenhagen K, Denmark) V.1- 1957- Volume (issue)/page/year: 45,1246,2001
TDLo - Lowest published toxic dose	Intravenous	Mammal - domestic	1 ug/kg	Biochemical - Metabolism (Intermediary) - other	AANEAB Acta Anaesthesiologica Scandinavica. (Munksgaard International Pub., POB 2148, DK-1016 Copenhagen K, Denmark) V.1- 1957- Volume (issue)/page/year: 45,1246,2001
TDLo - Lowest published toxic dose	Intravenous	Mammal - pig	35.6 ug/kg/2H	Cardiac - change in rate Cardiac - cardiac output Cardiac - other changes	AANEAB Acta Anaesthesiologica Scandinavica. (Munksgaard International Pub., POB 2148, DK-1016 Copenhagen K, Denmark) V.1- 1957- Volume (issue)/page/year: 45,1262,2001
TDLo - Lowest	Intravenous	Mammal - pig	35.6 ug/kg/2H	Vascular - BP lowering not characterized in	AANEAB Acta Anaesthesiologica

published toxic dose				autonomic section Vascular - measurement of regional blood flow Lungs, Thorax, or Respiration - other changes	Scandinavica. (Munksgaard International Pub., POB 2148, DK-1016 Copenhagen K, Denmark) V.1- 1957- Volume (issue)/page/year: 45,1262,2001
LDLo - Lowest published lethal dose	Intravenous	Mammal - pig	55.6 ug/kg/3H	Details of toxic effects not reported other than lethal dose value	AANEAB Acta Anaesthesiologica Scandinavica. (Munksgaard International Pub., POB 2148, DK-1016 Copenhagen K, Denmark) V.1- 1957- Volume (issue)/page/year: 45,1262,2001
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	3 mg/kg	Cardiac - change in rate Vascular - BP lowering not characterized in autonomic section Blood - methemoglobinemia-carboxyhemoglobin	AANEAB Acta Anaesthesiologica Scandinavica. (Munksgaard International Pub., POB 2148, DK-1016 Copenhagen K, Denmark) V.1- 1957- Volume (issue)/page/year: 46,17,2002
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	3 mg/kg	Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Blood - other changes	AANEAB Acta Anaesthesiologica Scandinavica. (Munksgaard International Pub., POB 2148, DK-1016 Copenhagen K, Denmark) V.1- 1957- Volume (issue)/page/year: 46,17,2002
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	100 ug/kg	Behavioral - food intake (animal) Endocrine - other changes Nutritional and Gross Metabolic - body temperature decrease	NEROEW Neuropsychopharmacology. (Elsevier Science, 655 Avenue of the Americas, New York, NY 10010) V.1- 1987- Volume (issue)/page/year: 24,531,2001
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	50 ug/kg	Nutritional and Gross Metabolic - body temperature decrease	NEROEW Neuropsychopharmacology. (Elsevier Science, 655 Avenue of the Americas, New York, NY 10010) V.1- 1987- Volume (issue)/page/year: 24,531,2001
TDLo - Lowest published toxic dose	Intracerebral	Rodent - mouse	92.6 ug/kg	Brain and Coverings - other degenerative changes Liver - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - hepatic microsomal mixed	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 139,35,2003

				oxidase (dealkylation, hydroxylation, etc.)	
TDLo - Lowest published toxic dose	Intracerebral	Rodent - mouse	92.6 ug/kg	Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 139,35,2003
TDLo - Lowest published toxic dose	Intracerebral	Rodent - rat	91 ug/kg	Brain and Coverings - other degenerative changes Liver - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - hepatic microsomal mixed oxidase (dealkylation, hydroxylation, etc.)	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 139,35,2003
TDLo - Lowest published toxic dose	Intracerebral	Rodent - rat	91 ug/kg	Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 139,35,2003
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	40 ug/kg	Vascular - measurement of regional blood flow Gastrointestinal - other changes	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 139,263,2003
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	40 ug/kg	Vascular - measurement of regional blood flow Gastrointestinal - other changes Biochemical - Metabolism (Intermediary) - other proteins	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 139,263,2003
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	175 ug/kg	Behavioral - changes in psychophysiological tests	NEROEW Neuropsychopharmacology. (Elsevier Science, 655 Avenue of the Americas, New York, NY 10010) V.1- 1987- Volume (issue)/page/year: 26,86,2002
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - guinea pig	4 mg/kg	Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	EJPHAZ European Journal of Pharmacology. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1967- Volume(issue)/page/year: 487,233,2004

TDLo - Lowest published toxic dose	Intratracheal	Rodent - guinea pig	0.02 mg/kg	Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	EJPHAZ European Journal of Pharmacology. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1967- Volume(issue)/page/year: 487,233,2004
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	20 mg/kg	Vascular - other changes	EJPHAZ European Journal of Pharmacology. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1967- Volume(issue)/page/year: 498,211,2004
TDLo - Lowest published toxic dose	Intravenous	Rodent - rabbit	5 mg/kg	Lungs, Thorax, or Respiration - acute pulmonary edema Blood - changes in leukocyte (WBC) count Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	JKMSEH Journal of Korean Medical Science. (Korean Academy of Medical Science, C.P.O. Box 2062, Seoul, S. Korea) V.1- 1986- Volume (issue)/page/year: 19,55,2004
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	200 ug/kg	Behavioral - somnolence (general depressed activity) Behavioral - changes in motor activity (specific assay) Nutritional and Gross Metabolic - weight loss or decreased weight gain	PSCHDL Psychopharmacology (Berlin). (Springer-Verlag New York, Inc., Service Center, 44 Hartz Way, Secaucus, NJ 07094) V.47- 1976- Volume (issue)/page/year: 170,399,2003
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	100 ug/kg	Brain and Coverings - other degenerative changes Biochemical - Metabolism (Intermediary) - other proteins Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	TXCYAC Toxicology. (Elsevier Scientific Pub. Ireland, Ltd., POB 85, Limerick, Ireland) V.1- 1973- Volume (issue)/page/year: 201,197,2004
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	5 mg/kg	Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - multiple enzyme effects Biochemical - Metabolism	TXCYAC Toxicology. (Elsevier Scientific Pub. Ireland, Ltd., POB 85, Limerick, Ireland) V.1- 1973- Volume (issue)/page/year: 196,147,2004

				(Intermediary) - lipids including transport	
TDLo - Lowest published toxic dose	Intravenous	Mammal - domestic	400 ng/kg	Endocrine - other changes Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	TOXID9 Toxicologist. (Soc. of Toxicology, Inc., 475 Wolf Ledge Parkway, Akron, OH 44311) V.1-1981- Volume (issue)/page/year: 44,180,2005
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	0.8 mg/kg	Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	TOXIA6 Toxicon. (Pergamon Press Ltd., Headington Hill Hall, Oxford OX3 OBW, UK) V.1-1962- Volume (issue)/page/year: 45,171,2005
TDLo - Lowest published toxic dose	Unreported	Rodent - mouse	2 mg/kg	Cardiac - other changes Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	TOXID9 Toxicologist. (Soc. of Toxicology, Inc., 475 Wolf Ledge Parkway, Akron, OH 44311) V.1-1981- Volume (issue)/page/year: 44,376,2005
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	5 mg/kg	Liver - other changes Biochemical - Metabolism (Intermediary) - other proteins Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	TOXID9 Toxicologist. (Soc. of Toxicology, Inc., 475 Wolf Ledge Parkway, Akron, OH 44311) V.1-1981- Volume (issue)/page/year: 44,388,2005
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	44000000 units/kg	Liver - other changes Biochemical - Metabolism (Intermediary) - other	TOXID9 Toxicologist. (Soc. of Toxicology, Inc., 475 Wolf Ledge Parkway, Akron, OH 44311) V.1-1981- Volume (issue)/page/year: 44,394,2005
TDLo - Lowest published toxic dose	Unreported	Rodent - mouse	4 mg/kg	Liver - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - transaminases Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of	TOXID9 Toxicologist. (Soc. of Toxicology, Inc., 475 Wolf Ledge Parkway, Akron, OH 44311) V.1-1981- Volume (issue)/page/year: 44,403,2005

				inflammation	
TDLo - Lowest published toxic dose	Unreported	Rodent - rat	1 mg/kg	Liver - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - transaminases Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	TOXID9 Toxicologist. (Soc. of Toxicology, Inc., 475 Wolf Ledge Parkway, Akron, OH 44311) V.1-1981- Volume (issue)/page/year: 44,403,2005
TDLo - Lowest published toxic dose	Unreported	Mammal - dog	0.2 mg/kg	Liver - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - transaminases Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	TOXID9 Toxicologist. (Soc. of Toxicology, Inc., 475 Wolf Ledge Parkway, Akron, OH 44311) V.1-1981- Volume (issue)/page/year: 44,403,2005
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	20 mg/kg	Vascular - BP lowering not characterized in autonomic section Lungs, Thorax, or Respiration - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - other oxidoreductases	CEXPB9 Clinical and Experimental Pharmacology and Physiology. (Blackwell Scientific Publications, (Australia) Pty Ltd., 107 Barry St., Carlton, Vic. 3053, Australia) V.1-1974- Volume (issue)/page/year: 30,482,2003
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	2.5 mL/kg	Kidney/Ureter/Bladder - changes in both tubules and glomeruli Kidney/Ureter/Bladder - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - catalases	JAPTO* Journal of Applied Toxicology (John Wiley & Sons, Ltd., Oldlands Way Bognor Regis West Sussex, PO22 9SA England) V.1-1981- Volume (issue)/page/year: 25,8,2005
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	2.5 mL/kg	Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - other oxidoreductases	JAPTO* Journal of Applied Toxicology (John Wiley & Sons, Ltd., Oldlands Way Bognor Regis West Sussex, PO22 9SA England) V.1-1981- Volume (issue)/page/year: 25,8,2005
TDLo - Lowest published	Unreported	Rodent - rat	4 mg/kg	Liver - other changes	TOXID9 Toxicologist. (Soc. of Toxicology, Inc., 475 Wolf Ledge Parkway,

toxic dose					Akron, OH 44311) V.1-1981- Volume (issue)/page/year: 66,293,2002
TDLo - Lowest published toxic dose	Intravenous	Rodent - rabbit	0.5 ug/kg	Vascular - regional or general arteriolar constriction Vascular - measurement of regional blood flow Nutritional and Gross Metabolic - body temperature increase	PSCHDL Psychopharmacology (Berlin). (Springer-Verlag New York, Inc., Service Center, 44 Hartz Way, Secaucus, NJ 07094) V.47-1976- Volume (issue)/page/year: 175,487,2004
TDLo - Lowest published toxic dose	Unreported	Rodent - rat	10 mg/kg	Cardiac - other changes Biochemical - Metabolism (Intermediary) - other proteins	TOXID9 Toxicologist. (Soc. of Toxicology, Inc., 475 Wolf Ledge Parkway, Akron, OH 44311) V.1-1981- Volume (issue)/page/year: 78,405,2004
TDLo - Lowest published toxic dose	Parenteral	Rodent - mouse	30 mg/kg	Lungs, Thorax, or Respiration - other changes Blood - changes in spleen	TOXID9 Toxicologist. (Soc. of Toxicology, Inc., 475 Wolf Ledge Parkway, Akron, OH 44311) V.1-1981- Volume (issue)/page/year: 66,355,2002
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	1 mg/kg	Liver - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - hepatic microsomal mixed oxidase (dealkylation, hydroxylation, etc.) Biochemical - Metabolism (Intermediary) - other	TOXID9 Toxicologist. (Soc. of Toxicology, Inc., 475 Wolf Ledge Parkway, Akron, OH 44311) V.1-1981- Volume (issue)/page/year: 60,277,2001
TDLo - Lowest published toxic dose	Subcutaneous	Bird - wild bird species	1 mg/kg	Behavioral - food intake (animal) Endocrine - changes in luteinizing hormone Nutritional and Gross Metabolic - body temperature decrease	HOBEAO Hormones and Behavior. (Academic Press, Inc., 1 E. First St., Duluth, MN 55802) V.1- 1969- Volume(issue)/page/year: 49,15,2006
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	300 ug/kg/2H	Vascular - relaxation (isolated tissues)	JPETAB Journal of Pharmacology and Experimental Therapeutics. (Williams & Wilkins Co., 428 E. Preston St., Baltimore, MD 21202) V.1-1909/10- Volume (issue)/page/year: 306,538,2003
TDLo - Lowest published toxic dose	Intravenous	Mammal - domestic	4.2 ug/kg/30M	Vascular - BP lowering not characterized in autonomic section	CYLPDN Zhongguo Yaoli Xuebao. Acta Pharmacologica Sinica. Chinese Journal of Pharmacology. (China

					International Book Trading Corp., POB 2820, Beijing, Peop. Rep. China) V.1- 1980- Volume (issue)/page/year: 23,133,2002
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	0.5 mg/kg	Liver - liver function tests impaired Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - hepatic microsomal mixed oxidase (dealkylation, hydroxylation, etc.)	EJPHAZ European Journal of Pharmacology. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1967- Volume(issue)/page/year: 510,127,2005
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	150 ug/kg	Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - other oxidoreductases Liver - other changes	ACPSI* Acta pharmacologica Sinica (Shanghai : Shanghai Institute of Materia Medica : Chinese Academy of Science ; Carlton, VIC, Australia : Blackwell Publishing Asia, 2005) V.21- 2000- Volume (issue)/page/year: 23,1023,2002
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	5 mg/kg	Reproductive - Maternal Effects - uterus, cervix, vagina Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - other Enzymes	EJPHAZ European Journal of Pharmacology. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1967- Volume(issue)/page/year: 534,218,2006
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	0.1 mg/kg	Gastrointestinal - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - cytochrome oxidases (including oxidative phosphorylation) Biochemical - Metabolism (Intermediary) - other	EJPHAZ European Journal of Pharmacology. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1967- Volume(issue)/page/year: 536,162,2006
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	20 mg/kg	Lungs, Thorax, or Respiration - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - other oxidoreductases Biochemical - Metabolism (Intermediary) - effect on inflammation or	TOXID9 Toxicologist. (Soc. of Toxicology, Inc., 475 Wolf Ledge Parkway, Akron, OH 44311) V.1- 1981- Volume (issue)/page/year: 228,151,2006

				mediation of inflammation	
TDLo - Lowest published toxic dose	Parenteral	Rodent - rat	5 mg/kg	Kidney/Ureter/Bladder - other changes Biochemical - Metabolism (Intermediary) - other proteins	TXAPA9 Toxicology and Applied Pharmacology. (Academic Press, Inc., 1 E. First St., Duluth, MN 55802) V.1- 1959- Volume (issue)/page/year: 208,163,2005
TDLo - Lowest published toxic dose	Intratracheal	Rodent - rat	5 mg/kg	Lungs, Thorax, or Respiration - emphysema Lungs, Thorax, or Respiration - acute pulmonary edema Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	JJATDK JAT, Journal of Applied Toxicology. (John Wiley & Sons Ltd., Baffins Lane, Chichester, W. Sussex PO19 1UD, UK) V.1- 1981- Volume (issue)/page/year: 26,301,2006
LDLo - Lowest published lethal dose	Intraperitoneal	Rodent - rat	5 mg/kg	Vascular - BP lowering not characterized in autonomic section Liver - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - transaminases	JPETAB Journal of Pharmacology and Experimental Therapeutics. (Williams & Wilkins Co., 428 E. Preston St., Baltimore, MD 21202) V.1- 1909/10- Volume (issue)/page/year: 317,61,2006
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	4 mg/kg	Brain and Coverings - other degenerative changes Vascular - BP lowering not characterized in autonomic section	TXAPA9 Toxicology and Applied Pharmacology. (Academic Press, Inc., 1 E. First St., Duluth, MN 55802) V.1- 1959- Volume (issue)/page/year: 214,263,2006
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	5 mg/kg	Liver - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - hepatic microsomal mixed oxidase (dealkylation, hydroxylation, etc.)	TXAPA9 Toxicology and Applied Pharmacology. (Academic Press, Inc., 1 E. First St., Duluth, MN 55802) V.1- 1959- Volume (issue)/page/year: 216,1,2006
TDLo - Lowest published toxic dose	Intracerebral	Rodent - rat	25 ug/kg	Liver - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - hepatic microsomal mixed oxidase (dealkylation, hydroxylation, etc.)	TXAPA9 Toxicology and Applied Pharmacology. (Academic Press, Inc., 1 E. First St., Duluth, MN 55802) V.1- 1959- Volume (issue)/page/year: 216,1,2006
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	25 ug/kg	Liver - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - hepatic microsomal mixed	TXAPA9 Toxicology and Applied Pharmacology. (Academic Press, Inc., 1 E. First St., Duluth, MN 55802) V.1- 1959- Volume (issue)/page/year:

				oxidase (dealkylation, hydroxylation, etc.)	216,1,2006
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	75 ug/kg	Liver - other changes Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	TOLED5 Toxicology Letters. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1977- Volume (issue)/page/year: 163,20,2006
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	44400000 units/kg	Blood - change in clotting factors	JPETAB Journal of Pharmacology and Experimental Therapeutics. (Williams & Wilkins Co., 428 E. Preston St., Baltimore, MD 21202) V.1- 1909/10- Volume (issue)/page/year: 317,635,2006
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	5 ug/kg	Nutritional and Gross Metabolic - body temperature increase	BPBLEO Biological and Pharmaceutical Bulletin. (Pharmaceutical Society of Japan, 2-12-15-201 Shibuya Shibuya-ku, Tokyo 150, Japan) V.16- 1993- Volume(issue)/page/year: 29,2236,2006
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	9523.81 ng/kg	Vascular - other changes Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 148,1060,2006
TDLo - Lowest published toxic dose	Subcutaneous	Rodent - mouse	3636.36 ng/kg	Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 149,14,2006
TDLo - Lowest published toxic dose	Unreported	Rodent - mouse	2666.67 uL/kg	Liver - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - other oxidoreductases Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 149,405,2006

TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	0.5 mg/kg	Behavioral - food intake (animal)	BPBLEO Biological and Pharmaceutical Bulletin. (Pharmaceutical Society of Japan, 2-12-15-201 Shibuya Shibuya-ku, Tokyo 150, Japan) V.16- 1993- Volume(issue)/page/year: 29,1319,2006
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	2.22 ug/kg	Immunological Including Allergic - increase in cellular immune response Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation Immunological Including Allergic - increase in humoral immune response	TIHEEC Toxicology and Industrial Health. (Princeton Scientific Pub. Co., POB 2155, Princeton, NJ 08540) V.1- 1985- Volume(issue)/page/year: 19,93,2003
TDLo - Lowest published toxic dose	Intratracheal	Rodent - rat	0.4 mg/kg	Lungs, Thorax, or Respiration - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - other oxidoreductases Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 144,190,2005
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	4.2 ug/kg	Vascular - other changes Blood - other changes	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 144,190,2005
TDLo - Lowest published toxic dose	Subcutaneous	Rodent - rat	100 ug/kg	Nutritional and Gross Metabolic - body temperature increase	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 144,538,2005
TDLo - Lowest published toxic dose	Unreported	Rodent - mouse	0.3 mg/kg	Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 144,1002,2005

TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	100 ug/kg	Nutritional and Gross Metabolic - body temperature increase	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 144,1029,2005
TDLo - Lowest published toxic dose	Intravenous	Rodent - mouse	12.5 mg/kg	Vascular - BP lowering not characterized in autonomic section	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 145,301,2005
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	10 mg/kg	Liver - hepatitis (hepatocellular necrosis), zonal Liver - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - multiple enzyme effects	TXAPA9 Toxicology and Applied Pharmacology. (Academic Press, Inc., 1 E. First St., Duluth, MN 55802) V.1- 1959- Volume (issue)/page/year: 226,128,2008
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	10 mg/kg	Liver - other changes Kidney/Ureter/Bladder - other changes Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	CEXPB9 Clinical and Experimental Pharmacology and Physiology. (Blackwell Scientific Publications, (Australia) Pty Ltd., 107 Barry St., Carlton, Vic. 3053, Australia) V.1- 1974- Volume (issue)/page/year: 32,1110,2005
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	4 mg/kg	Vascular - BP lowering not characterized in autonomic section	NSAPCC Naunyn-Schmiedeberg's Archives of Pharmacology. (Springer Verlag, Heidelberger, Pl. 3, D-1000 Berlin 33, Fed. Rep. Ger.) V.272- 1972- Volume(issue)/page/year: 369(Suppl 1),R25,2004
TDLo - Lowest published toxic dose	Intravenous	Rodent - mouse	3 mg/kg	Lungs, Thorax, or Respiration - other changes Liver - other changes Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	NSAPCC Naunyn-Schmiedeberg's Archives of Pharmacology. (Springer Verlag, Heidelberger, Pl. 3, D-1000 Berlin 33, Fed. Rep. Ger.) V.272- 1972- Volume(issue)/page/year: 369(Suppl 1),R78,2004
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	400 ug/kg	Behavioral - alteration of classical conditioning	NSAPCC Naunyn-Schmiedeberg's Archives of Pharmacology. (Springer Verlag, Heidelberger, Pl. 3, D-1000 Berlin 33, Fed. Rep. Ger.) V.272- 1972-

					Volume(issue)/page/year: 369(Suppl 1),R79,2004
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	10 mg/kg	Vascular - other changes Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	FCLPH* Fundamental & Clinical Pharmacology (Oxford : Blackwell Science) 2001- Volume (issue)/page/year: 18 (Suppl 1),65,2004
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	1 mg/kg	Gastrointestinal - other changes Biochemical - Metabolism (Intermediary) - other proteins Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	FCLPH* Fundamental & Clinical Pharmacology (Oxford : Blackwell Science) 2001- Volume (issue)/page/year: 18 (Suppl 1),95,2004
TDLo - Lowest published toxic dose	Intravenous	Rodent - rabbit	1 mg/kg	Vascular - regional or general arteriolar constriction Vascular - measurement of regional blood flow	FCLPH* Fundamental & Clinical Pharmacology (Oxford : Blackwell Science) 2001- Volume (issue)/page/year: 18 (Suppl 1),112,2004
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	10 mg/kg	Kidney/Ureter/Bladder - changes in blood vessels or in circulation of kidney Biochemical - Effect on specific coenzyme - NAD,NADP Biochemical - Metabolism (Intermediary) - other proteins	JPETAB Journal of Pharmacology and Experimental Therapeutics. (Williams & Wilkins Co., 428 E. Preston St., Baltimore, MD 21202) V.1-1909/10- Volume (issue)/page/year: 320,1061,2007
TDLo - Lowest published toxic dose	Intravenous	Rodent - mouse	2 mg/kg	Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Biochemical - Metabolism (Intermediary) - other proteins Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	JPETAB Journal of Pharmacology and Experimental Therapeutics. (Williams & Wilkins Co., 428 E. Preston St., Baltimore, MD 21202) V.1-1909/10- Volume (issue)/page/year: 321,509,2007
TDLo - Lowest	Intravenous	Rodent - rat	0.5 mg/kg	Liver - hepatitis (hepatocellular	BJMRDK Brazilian Journal of Medical and Biological

published toxic dose				necrosis), diffuse Liver - liver function tests impaired Liver - other changes	Research. (Associacao Brasileira de Divulgacao Cientifica, Faculdade de Medicina de Ribeirao Preto, USP, 141000 Ribeirao Preto, SP, Brazil) V.14-1981- Volume (issue)/page/year: 40,1637,2007
LDLo - Lowest published lethal dose	Intravenous	Rodent - rat	30 mg/kg	Lungs, Thorax, or Respiration - other changes Biochemical - Metabolism (Intermediary) - lipids including transport Biochemical - Metabolism (Intermediary) - other proteins	JPHPH* Journal of physiology and pharmacology : an official journal of the Polish Physiological Society. (Krakow Polish Physiological Society) V.42- 2001- Volume (issue)/page/year: 58,541,2007
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	50 ug/kg	Nutritional and Gross Metabolic - body temperature increase Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	JPHPH* Journal of physiology and pharmacology : an official journal of the Polish Physiological Society. (Krakow Polish Physiological Society) V.42- 2001- Volume (issue)/page/year: 58,551,2007
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	1 mg/kg	Brain and Coverings - other degenerative changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - other oxidoreductases	PHREP* Pharmacological reports : PR (Krako?w, Poland : Institute of Pharmacology, Polish Academy of Sciences) V.57- 2005- Volume (issue)/page/year: 59,164,2007
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	0.1 mg/kg	Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	PHREP* Pharmacological reports : PR (Krako?w, Poland : Institute of Pharmacology, Polish Academy of Sciences) V.57- 2005- Volume (issue)/page/year: 59,437,2007
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	75 ug/kg	Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	TOLED5 Toxicology Letters. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1977- Volume (issue)/page/year: 176,169,2008
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	4 mg/kg	Liver - other changes	TOLED5 Toxicology Letters. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1977- Volume (issue)/page/year: 177,20,2008

TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	0.5 mg/kg	Reproductive - Effects on Embryo or Fetus - extra-embryonic structures (e.g., placenta, umbilical cord) Reproductive - Effects on Embryo or Fetus - other effects to embryo Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	TOLED5 Toxicology Letters. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1977- Volume (issue)/page/year: 179,71,2008
TDLo - Lowest published toxic dose	Subcutaneous	Rodent - rat	6.25 ug/kg	Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - phosphokinase Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume(issue)/page/year: 151,618,2007
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	5 mg/kg	Vascular - BP lowering not characterized in autonomic section Nutritional and Gross Metabolic - body temperature decrease Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	BPBLEO Biological and Pharmaceutical Bulletin. (Pharmaceutical Society of Japan, 2-12-15-201 Shibuya Shibuya-ku, Tokyo 150, Japan) V.16- 1993- Volume(issue)/page/year: 31,1221,2008
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	40 ug/kg	Behavioral - somnolence (general depressed activity) Behavioral - changes in motor activity (specific assay)	PBBHAU Pharmacology, Biochemistry and Behavior. (ANKHO International Inc., P.O. Box 426, Fayetteville, NY 13066) V.1- 1973- Volume(issue)/page/year: 86,651,2007
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - guinea pig	200 ug/kg	Behavioral - changes in psychophysiological tests	PSYCDE Psychoneuroendocrinology. (Elsevier Science, 660 White Plains Road Tarrytown, NY 10591) V.1- 1975- Volume (issue)/page/year: 32,508,2007
TDLo - Lowest published	Intraperitoneal	Rodent - rat	1 mg/kg	Nutritional and Gross Metabolic - body temperature increase	PYTOEY Phytomedicine. (Gustav Fischer Verlag, Postfach 720143, D-70577

toxic dose					Stuttgart, Germany) V.1-1994- Volume (issue)/page/year: 9,419,2002

OTHER MULTIPLE DOSE TOXICITY DATA

Type of Test	Route of Exposure	Species Observed	Dose Data	Toxic Effects	Reference
TDLo - Lowest published toxic dose	Intramuscular	Rodent - guinea pig	30000 mg/m3/1H/2D (intermittent)	Lungs, Thorax, or Respiration - bronchiolar dilation Lungs, Thorax, or Respiration - bronchiolar constriction Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	JPETAB Journal of Pharmacology and Experimental Therapeutics. (Williams & Wilkins Co., 428 E. Preston St., Baltimore, MD 21202) V.1-1909/10- Volume (issue)/page/year: 298,298,2001
TDLo - Lowest published toxic dose	Subcutaneous	Rodent - mouse	600 ug/kg/3D (intermittent)	Immunological Including Allergic - increase in humoral immune response	TXCYAC Toxicology. (Elsevier Scientific Pub. Ireland, Ltd., POB 85, Limerick, Ireland) V.1- 1973- Volume (issue)/page/year: 188,309,2003
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	75 mg/kg/5D (intermittent)	Gastrointestinal - changes in structure or function of endocrine pancreas Biochemical - Metabolism (Intermediary) - other proteins	JPHPH* Journal of physiology and pharmacology : an official journal of the Polish Physiological Society. (Krakow Polish Physiological Society) V.42-2001- Volume (issue)/page/year: 58,287,2007

REPRODUCTIVE DATA

Type of Test	Route of Exposure	Species Observed	Dose Data	Sex/Duration	Toxic Effects	Reference
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	500 ug/kg	female 15 day (s) after conception	Reproductive - Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus)	PSEBAA Proceedings of the Society for Experimental Biology and Medicine. (Academic Press, Inc., 1 E. First St.,

					Reproductive - Effects on Embryo or Fetus - fetal death	Duluth, MN 55802) V.1- 1903/04- Volume (issue)/page/year: 109,429,1962
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	1 mg/kg	female 8 day (s) after conception	Reproductive - Fertility - post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants)	PSEBAA Proceedings of the Society for Experimental Biology and Medicine. (Academic Press, Inc., 1 E. First St., Duluth, MN 55802) V.1- 1903/04- Volume (issue)/page/year: 109,429,1962
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	100 ug/kg	female 17 day (s) after conception	Reproductive - Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus) Reproductive - Effects on Embryo or Fetus - fetal death	ESKHA5 Eisei Shikenjo Hokoku. Bulletin of the Institute of Hygienic Sciences. (Kokuritsu Eisei Shikenjo Kagaku, 18-1 Bushitsu Johobu, Setagaya-ku, Tokyo 158, Japan) V.1- 1886- Volume (issue)/page/year: (99),68,1981
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	1 ug/kg	female 12 day (s) after conception	Reproductive - Fertility - litter size (e.g. # fetuses per litter; measured before birth)	ESKHA5 Eisei Shikenjo Hokoku. Bulletin of the Institute of Hygienic Sciences. (Kokuritsu Eisei Shikenjo Kagaku, 18-1 Bushitsu Johobu, Setagaya-ku, Tokyo 158, Japan) V.1- 1886- Volume (issue)/page/year: (99),68,1981
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	100 ug/kg	female 15 day (s) after conception	Reproductive - Effects on Embryo or Fetus - extra-embryonic structures (e.g., placenta, umbilical cord)	ESKHA5 Eisei Shikenjo Hokoku. Bulletin of the Institute of Hygienic Sciences. (Kokuritsu Eisei Shikenjo Kagaku, 18-1 Bushitsu Johobu, Setagaya-ku, Tokyo 158, Japan) V.1- 1886- Volume (issue)/page/year: (99),68,1981

TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	100 ug/kg	female 12 day (s) after conception	Reproductive - Fertility - post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants)	ESKHA5 Eisei Shikenjo Hokoku. Bulletin of the Institute of Hygienic Sciences. (Kokuritsu Eisei Shikenjo Kagaku, 18-1 Bushitsu Johobu, Setagaya-ku, Tokyo 158, Japan) V.1- 1886- Volume (issue)/page/year: (99),68,1981
TDLo - Lowest published toxic dose	Intravenous	Rodent - mouse	4 ug/kg	female 8 day (s) after conception	Reproductive - Fertility - post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants)	JRPFA4 Journal of Reproduction and Fertility. (Biochemical Soc. Book Depot, POB 32, Commerce Way, Colchester, Essex CO2 8HP, UK) V.1- 1960- Volume (issue)/page/year: 90,395,1990
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	0.21 mg/kg	female 4-22 day(s) after conception	Reproductive - Effects on Newborn - behavioral	NETEEC Neurotoxicology and Teratology. (Pergamon Press Inc., Maxwell House, Fairview Park, Elmsford, NY 10523) V.9- 1987- Volume (issue)/page/year: 23,373,2001
TDLo - Lowest published toxic dose	Subcutaneous	Rodent - mouse	0.5 ug/kg	female 8 day (s) after conception	Reproductive - Fertility - post-implantation mortality (e.g. dead and/or resorbed implants per total number of implants) Reproductive - Specific Developmental Abnormalities - eye/ear Reproductive - Specific Developmental Abnormalities - craniofacial (including nose and tongue)	BDERE* Birth Defects Research Part A, Clinical and molecular teratology (Hoboken, N.J. : John Wiley & Sons) V.67- 2003- Volume (issue)/page/year: 67,240,2003
TDLo - Lowest	Intraperitoneal	Rodent - mouse	225 ug/kg	female 15-17 day(s) after	Reproductive - Maternal	TXCYAC Toxicology.

published toxic dose				conception	Effects - other effects Reproductive - Effects on Embryo or Fetus - fetal death	(Elsevier Scientific Pub. Ireland, Ltd., POB 85, Limerick, Ireland) V.1-1973- Volume (issue)/page/year: 217,39,2006
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	0.1 mg/kg	female 17 day (s) after conception	Reproductive - Effects on Embryo or Fetus - extra-embryonic structures (e.g., placenta, umbilical cord)	TXCYAC Toxicology. (Elsevier Scientific Pub. Ireland, Ltd., POB 85, Limerick, Ireland) V.1-1973- Volume (issue)/page/year: 211,242,2005
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	225 ug/kg	female 15-17 day(s) after conception	Reproductive - Effects on Embryo or Fetus - fetal death Reproductive - Specific Developmental Abnormalities - musculoskeletal system	TOLED5 Toxicology Letters. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1-1977- Volume (issue)/page/year: 163,20,2006
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	75 ug/kg	female 15 day (s) after conception	Reproductive - Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus)	TOLED5 Toxicology Letters. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1-1977- Volume (issue)/page/year: 163,20,2006
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	120 ug/kg	female 15 day (s) after conception	Reproductive - Maternal Effects - parturition Reproductive - Effects on Embryo or Fetus - extra-embryonic structures (e.g., placenta, umbilical cord) Reproductive - Effects on Embryo or Fetus - fetal death	TXCYAC Toxicology. (Elsevier Scientific Pub. Ireland, Ltd., POB 85, Limerick, Ireland) V.1-1973- Volume (issue)/page/year: 234,167,2007
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	75 ug/kg	female 17 day (s) after conception	Reproductive - Effects on Embryo or Fetus - fetotoxicity	TOLED5 Toxicology Letters. (Elsevier Science Pub. B.V., POB 211, 1000 AE

					(except death, e.g., stunted fetus)	Amsterdam, Netherlands) V.1-1977- Volume (issue)/page/year: 176,169,2008
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	0.2 mg/kg	female 17 day (s) after conception	Reproductive - Effects on Embryo or Fetus - other effects to embryo	TOLED5 Toxicology Letters. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1-1977- Volume (issue)/page/year: 179,71,2008
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - mouse	0.5 mg/kg	female 17 day (s) after conception	Reproductive - Effects on Embryo or Fetus - extra-embryonic structures (e.g., placenta, umbilical cord) Reproductive - Effects on Embryo or Fetus - other effects to embryo	TOLED5 Toxicology Letters. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1-1977- Volume (issue)/page/year: 179,71,2008

REVIEWS

TOXICOLOGY REVIEW	PAREAQ Pharmacological Reviews. (Williams & Wilkins, 428 E. Preston St., Baltimore, MD 21202) V.1- 1949- Volume(issue)/page/year: 58,591,2006
TOXICOLOGY REVIEW	TPHSDY Trends in Pharmacological Sciences. (Elsevier Science Pub. Co., Inc., 52 Vanderbilt Ave., New York, NY 10017) V.1- 1979- Volume (issue)/page/year: 29,181,2008
TOXICOLOGY REVIEW	JPHPH* Journal of physiology and pharmacology : an official journal of the Polish Physiological Society. (Krakow Polish Physiological Society) V.42-2001- Volume(issue)/page/year: 59,117,2008

END OF RECORD

RTECS® is provided quarterly by Symyx Software, Inc., and was last updated: **November, 2009**.

9.7 Please attach the CFIA permit.

9.8 Please describe any CFIA permit conditions:

10.0 Plants Requiring CFIA Permits

10.1 Do you use plants that require a permit from the CFIA? O YES ✓NO
If no, please proceed to Section 11.0

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

10.3 What is the origin of the plant? _____

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

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

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

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

10.8 Is the CFIA permit attached? O YES O NO
If NO, please forward the permit to he Biosafety Officer when available.

10.9 Please describe any CFIA permit conditions:

11.0 Import Requirements

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

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

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

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

12.0 Training Requirements for Personnel Named on Form

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

- Biosafety
- Laboratory and Environmental/Waste Management Safety

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

- 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 _____

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. ✓ 1 ✓ 2 O 3 **Level 2+**

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

✓YES, permit # if on-campus **BIO-RRI-0030** 0021 2L

O NO, please certify

O NOT REQUIRED for Level 1 containment

RRI 2218A

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: May 12, 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.

_____

_____

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

SOP's will be followed in which injury is scrubbed with detergent and flowing water, exposed person will go to Staff Health.

_____

15.0 Approvals

UWO Biohazard Subcommittee: SIGNATURE: _____
Date: 25 May 2010

Safety Officer for Institution where experiments will take place: SIGNATURE: _____
Date: May 19, 2010

Safety Officer for University of Western Ontario (if different from above): SIGNATURE: J Stanley
Date: May 18, 2010

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

Approval Number: BIO-RR1-0021 Expiry Date (3 years from Approval): May 20, 2013

Special Conditions of Approval:

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