The University *of* Western Ontario
BIOLOGICAL AGENTS REGISTRY FORM
Approved Biohazards Subcommittee: October 14, 2011
Biosafety Website: www.uwo.ca/humanresources/biosafety/

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

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

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

Electronically completed forms are to be submitted to Occupational Health and Safety, (OHS), (Support Services Building, Room 4190 or to jstanle2@uwo.ca) for distribution to the Biohazards Subcommittee. For questions regarding this form, please contact the Biosafety Officer at extension 81135 or biosafety@uwo.ca. If there are changes to the information on this form (excluding grant title and funding agencies), contact Occupational Health and Safety for a modification form. See website: www.uwo.ca/humanresources/biosafety.

Please ensure that all questions are fully and clearly answered. Failure to do so will lead to the form being returned, which will cause delays in your approval and frustration for you and your colleagues on the Committee.

If you are re-submitting this form as requested by the Biohazards Subcommittee, please make modifications to the form in bold print, highlighted in yellow. Please re-submit forms electronically.

PRINCIPAL INVESTIGATOR:	**Christopher Pin**
DEPARTMENT:	**Paediatrics**
ADDRESS:	**A5-134, Victoria Research Laboratories**
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EMERGENCY PHONE NUMBER(S):	**519-657-1263**
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Changes to Every Page

Location of experimental work to be carried out :

Building :	**Victoria Research Laboratories**	Room(s):	**5th floor open lab**
Building :	**Victoria Research Laboratories**	Room(s):	**A5-126, A5-129**
Building :		Room(s):	

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

FUNDING AGENCY/AGENCIES: **Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council**

GRANT TITLE(S): **Signaling Networks in Pancreatic Disease (CIHR); Regulation of Acinar Cell Function (NSERC)**

UNDERGRADUATE COURSE NAME(IF APPLICABLE): **N/A**

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

Name	UWO E-mail Address	Date of Biosafety Training
Charis Johnson	**charislj@hotmail.com**	**October, 2005**
Rashid Mehmood	**biorashid@gmail.com**	**March, 2010**
Caitlin Sullivan	**csulli2@uwo.ca**	**January, 2012**
Scott Laing	**slaing5@uwo.ca**	**May, 2011**

Camilla Stepniak	cstepnia@uwo.ca	September, 2009
Kira Misaraca	kmisurac@uwo.ca	May, 2012

Please explain how the biological agents are used in your project and how they are stored and disposed of. The BARF without this description will not be reviewed.

The biological agents that are used in my laboratory can be grouped into four categories. (1) Plasmid DNA that is amplified in E.coli for use in cloning transgenes and targeting vectors both in mice and cell lines; (2) adenoviral vectors constructed for infection of isolated rodent pancreatic primary acinar cells and cell lines; (3) Cell lines that are used to characterize the effects of altered gene expression of treatment with signaling pathway activators or inhibitors; and (4) hormones used to initiate gene recombination (tamoxifen) or pancreatitis (cerulein) in mice.

Storage: Plasmids, adenoviruses and bacteria are stored in -80oC freezers within the CHRI. These freezers are within a locked area that allows for limited access. When these reagents are being used in tissue cultures, the experiments take place in a closed room that has limited access and is locked after hours. Cell lines are either maintained in incubators within a closed room that has limited access and is locked after hours OR are stored in -150oC freezers in restricted access areas in the London Regional Cancer Program. All hormones and toxins are stored in restricted areas within locked freezers or refrigerators within the Children's Health Research Institute.

Disposal: Any media used for the culturing cells that have been infected/transfected or E.coli that have used for expansion is treated thoroughly with bleach and disposed in a biological hazards waste container Hormones/toxins are stored until used and not disposed.

Please include a ONE page research summary or teaching protocol in lay terms.
Forms with summaries more than one page will not be reviewed.

CIHR

Goal: To understand the pathways that regulate pancreatic cell differentiation, function and susceptibility to disease. To this end, we are mis-expressing proteins in cell lines and in mice that will lead to alterations in cell signaling pathways, transcription, and epigenetic reprogramming.

Governing Hypothesis: FGF21 signaling and the Unfolded Protein Response (UPR) signaling pathway work antagonistically and dictate the extent of pancreatic injury associated with pancreatitis.
AIM #1: Determine the role of FGF21 signaling during pancreatitis. We will examine the severity of pancreatitis in genetic mouse models with elevated (Alb-FGF21+) or absent (Fgf21-/-) levels of FGF21. We will use markers of pancreatitis severity, including the ratio of apoptotic vs. necrotic cell death, to determine the effects of altered FGF21 signaling on the onset and extent of pancreatic damage. In addition, we will determine if intracellular signaling pathways, most notably the ER stress response, are altered in purified acinar cell cultures from these mice.
AIM #2: Identify the significance of PERK signaling in dictating the severity of pancreatitis. To promote loss of PERK activity, we will generate a novel mouse model in which GADD34 is constitutively expressed in pancreatic acinar cells. Conversely, we will restore PERK activity in Mist1-/- purified acinar cells by blocking GADD34 activity with salubrinal, a pharmacological inhibitor for GADD34. We will then characterize the cellular response to supramaximal cholecystokinin signaling in vivo and in vitro to examine the importance of PERK signaling in limiting acinar cell damage.
AIM #3: Define the relationship between the ER stress response, FGF21 signaling and MIST1 during CIP. We will examine the transcriptional hierarchy of these events during acinar cell stress. I propose a model in which activation of the ER stress response leads to ATF3 repression of Mist1 and Fgf21 expression. To test this model, we will determine ATF3's ability to regulate Mist1 gene expression in pancreatic acinar cells under normal and stress conditions using electrophoretic mobility shift assays and chromatin immunoprecipitation analysis.
Significance: The experiments of proposed here will identify the importance of FGF21 and UPR signaling in providing a protective advantage against pancreatitis.

NSERC

Research Objectives: We are interested in determining the function of a novel isoform of Secretory Pathway Ca2+ ATPase 2 (SPCA2).
Hypothesis: SPCA2 plays a role in intracellular ion regulation and exocrine cell function
Experimental Design:
1. Elucidate the structure of the Atp2c2 gene in exocrine cells – We have evidence that the SPCA2 protein produced in acinar cells is a result of expression from an alternative start site of the Atp2c2 gene. We will elucidate the amino terminus of SPCA2 and delineate the promoter and enhancer regions of Atp2c2 that dictate cell specific expression of SPCA2.
2. Determine the relationship of SPCA2 to Ca2+ and Mn2+ regulation in acinar cells –We will express acinar-form of SPCA2 and mutants that disrupt predicted protein structures into acinar and non-acinar cell lines to follow the localization of SPCA2, map out functional domains and determine the role this protein has in ion movement.
3. Identify the cellular response to loss of SPCA2 function –We will use adenoviral approaches to specifically knock down SPCA2 expression in primary acinar and AR42J cells. Ca2+ movement and regulated exocytosis will be monitored in these cells following secretagogue stimulation. In addition, targeted recombination will be employed to specifically ablate SPCA2 and the resulting SPCA2-/- mice will be characterized for exocrine cell morphology and function.

1.0 Microorganisms

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

Do you use microorganisms that require a permit from the CFIA? ☐ YES ☒ NO
If YES, please give the name of the species ______________________
What is the origin of the microorganism(s)? ______________________

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

Please attach the CFIA permit.

Please describe any CFIA permit conditions:

1.2 Please complete the table below:

Full Scientific Name of Biological Agent(s)* (Be specific)	Is it known to be a human pathogen? YES/NO	Is it known to be an animal pathogen? YES/NO	Is it known to be a zoonotic agent? YES/NO	Maximum quantity to be cultured at one time? (in Litres)	Source/ Supplier	PHAC or CFIA Containment Level
E.coli Dh5alpha	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	**100 ml liquid**		☒ 1 ☐ 2 ☐ 2+ ☐ 3
E.coli - XL1Blue	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	**100 ml liquid**		☒ 1 ☐ 2 ☐ 2+ ☐ 3
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No			☐ 1 ☐ 2 ☐ 2+ ☐ 3
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No			☐ 1 ☐ 2 ☐ 2+ ☐ 3
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No			☐ 1 ☐ 2 ☐ 2+ ☐ 3
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No			☐ 1 ☐ 2 ☐ 2+ ☐ 3
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No			☐ 1 ☐ 2 ☐ 2+ ☐ 3
	☐ Yes ☐ No	☐ Yes ☐ No	☐ Yes ☐ No			☐ 1 ☐ 2 ☐ 2+ ☐ 3

Please attach a Material Safety Data Sheet or equivalent from the supplier if the bacterium used is not on this link:
http://www.uwo.ca/humanresources/docandform/docs/ohs/CFIA_Ecoli_list.pdf

Additional Comments: **We use bacteria simply for cloning of new DNA plasmids and expansion of plasmid DNA**

2.0 Cell Culture

2.1 Does your work involve the use of cell cultures? ☒ YES ☐ NO
(If NO, please proceed to Section 3.0)

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

Cell Type	Is this cell type used in your work?	Source of Primary Cell Culture Tissue	AUS Protocol Number
Human	☐ Yes ☒ No		Not applicable
Rodent	☒ Yes ☐ No	**Mouse pancreas**	**2008-116**
Non-human primate	☐ Yes ☒ No		
Other (specify)	☐ 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)*	Containment Level of each cell line	Supplier / Source of cell line(s)
Human	☒ Yes ☐ No	**PANC1, HEK293**	**All cell lines are level 2**	**ATCC (already in lab)**
Rodent	☒ Yes ☐ No	**AR42J, ARIP, 266.6, NIH 3T3**	**All are 2 except NIH3T3 (1)**	**ATCC and Cedarlane (266.6)**
Non-human primate	☐ Yes ☒ No			
Other (specify)	☐ Yes ☒ No			

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

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

Additional Comments: **PANC1 was derived from pancreatic ductal adenocarcinoma; AR42J and ARIP were derived from rat pancreatic tissue through SV40 transformation; 266.6 obtained from CedarLane with CFIA and PHS approval**

3.0 Use of Human Source Materials

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

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

Human Source Material	**Source/Supplier /Company Name**	**Is Human Source Material Infected With An Infectious Agent? YES/UNKNOWN**	**Name of Infectious Agent (If applicable)**	**PHAC or CFIA Containment Level (Select one)**
Human Blood (whole) or other Body Fluid	**Patients in LHSC**	☐ Yes ☒ Unknown	**N/A**	☐1 ☒2 ☐2+ ☐3
Human Blood (fraction) or other Body Fluid		☐ Yes ☐ Unknown		☐1 ☐2 ☐2+ ☐3
Human Organs or Tissues (unpreserved)	**Patients in LHSC**	☐ Yes ☒ Unknown	**N/A**	☐1 ☒2 ☐2+ ☐3

Human Organs or Tissues (preserved)	**Pathology Dept., UWO**	Not Applicable	**N/A**	Not Applicable

Additional Comments: **Blood/saliva obtained from control and patients; pancreatic tissue obtained from patients with pancreatic adenocarcinoma; archival tissue sections obtained from Pathology - all per REB 17012**

4.0 Genetically Modified Organisms and Cell lines

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

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

Bacteria Used for Cloning *	Plasmid(s) **	Source of Plasmid	Gene Transformed or Transfected	Will there be a change due to transformation of the bacteria?	Will there be a change in the pathogenicity of the bacteria after the genetic modification?	What are the consequences due to the transformation of the bacteria?
E.coli DH5alpha	**See attached addendum**	**See attached addendum**	**See attached addendum**	**See attached addendum**	**See attached addendum**	**See attached addendum**

**** Please attach a Material Safety Data Sheet or equivalent if available.***
***** Please attach a plasmid map.***
******No Material Safety Data Sheet is required for the following strains of E. coli:***
http://www.uwo.ca/humanresources/docandform/docs/ohs/CFIA_Ecoli_list.pdf

4.3 Will genetic modification(s) of bacteria and/or cells involving viral vectors be made?
☒ YES, complete table below ☐ NO

Virus Used for Vector Construction	Vector(s) *	Source of Vector	Gene(s) Transduced	Describe the change that results from transduction
Adenovirus	**pAdEasy Listed in the plasmid table**	**Invitrogen**	**Mist1, PKCdelta, GFP + derivatives**	**altered gene expression, fluorescence**

**** Please attach a Material Safety Data Sheet or equivalent.***

4.3.1 Will virus be replication defective? ☒ YES ☐ NO

4.3.2 Will virus be infectious to humans or animals? ☒ YES ☐ NO

4.3.3 Will this be expected to increase the containment level required? ☐ YES ☒ NO

5.0 Will genetic sequences from the following be involved?

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

5.1 Is any work being conducted with prions or prion sequences? ☒ NO ☐ YES

Additional Comments: **The SV40 Large T antigen is within the ARIP and AR42J cells and not part of the virus.**

9.0 Biological Toxins and Hormones

9.1 Will toxins or hormones of biological origin be used? ☒ YES ☐ NO If **NO**, please proceed to Section 10.0

12/12/12 - Not used per conversation with PI JS

9.2 If YES, please name the toxin(s) or hormones(s) **Hormones:Tamoxifen, caerulein (cholecystokininanalogue); Toxins: ~~mitomycin~~ C, tunicamycin, salubrinal, DZNep (3-Deazaneplanicin), L-ethionine, DMSO (Dimethylsulfoxide)**
Please attach information, such as a Material Safety Data Sheet, for the toxin(s) used.

9.3 What is the LD_{50} (specify species) of the toxin or hormone **Not available for caerulein, L-ethionine, DZNep or Salubrinal; Tamoxifen=3100 mg/kg(mice); tunicamycin=6.25 mg/kg(rat); DMSO =14,500mg/kg**

9.4 How much of the toxin or hormone is handled at one time*? **DMSO (100 mg); caerulein (5 mg); tamoxifen (10 mg); Salubrinal (5 mg); tunicamycin (10 mg); DZNep (5 mg); ethionine (2 g)**

9.5 How much of the toxin or hormone is stored*? **DZNep (50 mg); DMSO (1000 mg), caerulein (500 mg); tamoxifen (5 g); Salubrinal (50 mg); tunicamycin (100 mg); L-ethionine (10 g)**

9.6 Will any biological toxins or hormones be used in live animals? ☒ YES ☐ NO
If **YES**, Please provide details: **caerulein and ethionine (experimental model for pancreatitis in mice); tamoxifen (gavaged in mice to generate temporal gene recombination) ; tunicamycin, DMSO, DZNep, Salubrinal (injected ino mice to inhibit the unfolded protein response).**

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

Additional Comments: _____

10.0 Insects

10.1 Do you use insects? ☐ 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 insect?

10.4 What is the life stage of the insect?

10.5 What is your intention? ☐ Initiate and maintain colony, give location:
☐ "One-time" use, give location:

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

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

6.0 Human Gene Therapy Trials

6.1 Will human clinical trials be conducted involving a biological agent? ☐ YES ☒ NO
(including but not limited to microorganisms, viruses, prions, parasites or pathogens of plant or animal origin)
If no, please proceed to Section 7.0

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

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

6.4 How will the biological agent be administered?

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

6.6 Has human ethics approval been obtained? ☐ YES, number: ☐ NO ☐ PENDING

7.0 Animal Experiments

7.1 Will live animals be used? ☒ YES ☐ NO If **NO**, please proceed to section 8.0

7.2 Name of animal species to be used **Mouse**

7.3 AUS protocol # **2008-116**

7.4 List the location(s) for the animal experimentation and housing. **VRL A7-121A, A5-108; LRCP A4-4022**

7.5 Will any of the agents listed in section 4.0 be used in live animals
☐ NO ☒ YES, specify: **Some of the plasmids will be used to generate genetically modified mice**

7.6 Will the agent(s) be shed by the animal:
☐ YES ☒ NO, please justify: **The DNA will be integrated into the genome. Any DNA not integrated will be targeted by the cell for degradation**

8.0 Use of Animal species with Zoonotic Hazards

8.1 Will any animals with zoonotic hazards or their organs, tissues, lavages or other body fluids including blood be used (see list below)? ☐ YES ☒ NO - If **NO**, please proceed to section 9.0

8.2 Will live animals be used? ☐ YES ☐ NO

8.3 If **YES**, please specify the animal(s) used:

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

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

11.0 Plants

11.1 Do you use plants? ☐ YES ☒ NO - If **NO**, please proceed to Section 12.0

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

11.3 What is the origin of the plant?

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

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

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

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

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

12.0 Import Requirements

12.1 Will any of the above agents be imported? ☐ YES, country of origin ☒ NO
If **NO**, please proceed to Section 13.0

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

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

12.4 Has the import permit been sent to OHS? ☐ YES, please provide permit # ☐ NO

13.0 Training Requirements for Personnel Named on Form

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

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

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

An X in the check box indicates you agree with the above statement... ☒
Enter Your Name Christopher Pin ***Date:*** October 12, 2012

14.0 Containment Levels

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

14.2 Has the facility been certified by OHS for this level of containment?
☒ YES, location and date of most recent biosafety inspection: **March, 2009**
☐ NO, please certify
☐ NOT REQUIRED for Level 1 containment

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

15.0 Procedures to be Followed

15.1 Are additional risk reduction measures necessary beyond containment level 1, 2, 2+ or 3 measures that are unique to these agents? ☒ YES ☐ NO

If **YES** please describe:

For all mouse experiments, solutions are prepared in a fume hood, cages with injected mice are clearly labeled and animal staff made aware of the injection regime prior to starting. Bedding is handled with appropriate PPE and disposed of following autclaving.

15.2 Please outline what will be done if there is an exposure to the biological agents listed such as a needlestick injury or an accidental splash:
Skin exposure: Wash the affected area thoroughly using antimicrobial soap and report incident to OHS. Splash to eyes: Immediately flush eyes with running water for 15 minutes using eyewash and forcibly hold eye(s) open to ensure effective wash behind the eyelids. Report incident to OHS. Needle stick: Wash affected area thoroughly using antimicrobial soap for 5 minutes and report incident

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

An X in the check box indicates you agree with the above statement... ☒
Enter Your Name **Christopher Pin** ***Date:*** **October 12, 2012**

15.4 Additional Comments: _____

16.0 Approvals

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

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

3) Safety Officer for Institution where experiments will take place (if not UWO):
SIGNATURE: _____
Date: NOV 12, 2012

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

Special Conditions of Approval:

Appendix 1: Plasmids used in Pin Laboratory (Section 4.2)

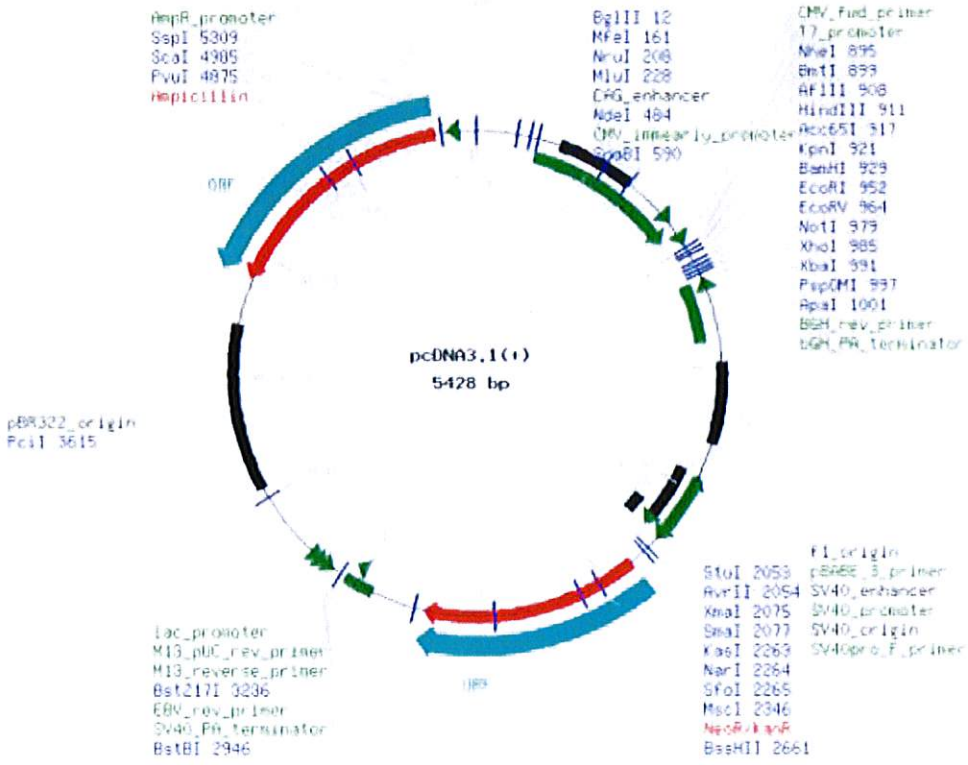
Bacteria Used for Cloning*	Plasmid(s)**	Source of Plasmid	Gene Transformed or Transfected	Will there be a change due to transformation of the bacteria	Will there be a change in the pathogenicity of the bacteria after genetic modification?	What are the consequences due to the transformation of the bacteria?
All in E.Coli - DH5α or E.coli XLIIBlue	1. pcDNA3.3	Invitrogen	Mist1, Atp2c2, Gjb1, Pdx1, Cdc42, Smad4, IgfII, HNF6, HNF3beta, beta-catenin	Antibiotic resistance, gene expression	No	Antibiotic resistance, gene expression
	2. pBlueScript SK (also KS; +/-)	Stratagene	Pdx hsp, FLAG-Ngn3, HNF6 (partial) HNF3beta (partial) CreERT, MIST1 (portions), IGFII, Migf	Antibiotic resistance	No	Antibiotic resistance
	3a. pGL2	Promega	Luciferase + Promoters of Mist1, Elastase, TCF1	Antibiotic resistance, chemi-luminescence	No	Antibiotic resistance, chemi-luminescence
	3b. pGL2 promoter	Promega	Luciferase	Antibiotic resistance, chemi-luminescence	No	Antibiotic resistance, chemi-luminescence
	3c. pGL3	Promega	Luciferase + Promoters of Mist1, Elastase	Antibiotic resistance, chemi-luminescence	No	Antibiotic resistance, chemi-luminescence
	3d. pGL3 promoter	Promega	Luciferase	Antibiotic resistance, chemi-luminescence	No	Antibiotic resistance, chemi-luminescence
	4. pCMV-Sport 6	Invitrogen	ATF3	Antibiotic resistance, gene expression	No	Antibiotic resistance, gene expression
	5. pPD46 (variation of pPD16.01	in house	LacZ + promoters of Elastase, Mist1	Antibiotic resistance, gene expression	No	Antibiotic resistance, gene expression

Bacteria Used for Cloning*	Plasmid(s)**	Source of Plasmid	Gene Transformed or Transfected	Will there be a change due to transformation of the bacteria	Will there be a change in the pathogenicity of the bacteria after genetic modification?	What are the consequences due to the transformation of the bacteria?
	6. pTRI	Ambion	GAPDH, cyclophilin, beta-actin, S28 rRNA	Antibiotic resistance	No	Antibiotic resistance
	7a. pGEMT	Promega	Portions of Papl, Cckar, Cckbr Regl, p8	Antibiotic resistance	No	Antibiotic resistance
	7b. pGEMT Easy	Promega	-	Antibiotic resistance	No	Antibiotic resistance
	8. pIND	Invitrogen	MyoD	Antibiotic resistance, gene expression	No	Antibiotic resistance, gene expression
	9. pCS2	Lina Dagnino	Lef1, beta-catenin	Antibiotic resistance, gene expression	No	Antibiotic resistance, gene expression
	10. pBABEpuro	D. Ron	Gadd34	Antibiotic resistance, gene expression	No	Antibiotic resistance, gene expression
	11. pNL (variation of pUC18 + LacZ)	in house	LacZ + promoters of MRF4, Mist1	Antibiotic resistance, gene expression	No	Antibiotic resistance, gene expression
	12. pCCALL2 IRES-GFP	C. Lobe	GFP, Mist1, Atf3, Ngn3, FLAG-Nkx2.2	Antibiotic resistance, gene expression, fluorescence	No	Antibiotic resistance, gene expression, fluorescence
	13. pCR2.1	A. Deangelis	Ceacam1, Ceacam2	Antibiotic resistance	No	Antibiotic resistance
	14. pYX-Asc	IMAGE Consortium	ATF4	Antibiotic resistance, gene expression	No	Antibiotic resistance, gene expression
	15. pAdEasy	Promega	MIST1, GFP	Antibiotic resistance, gene expression, fluorescence	No	Antibiotic resistance, gene expression, fluorescence
	16. pCMV	R. Costa	HNF3beta, HNF3alpha, HNF6	Antibiotic resistance, gene expression	No	Antibiotic resistance, gene expression

Bacteria Used for Cloning*	Plasmid(s)**	Source of Plasmid	Gene Transformed or Transfected	Will there be a change due to transformation of the bacteria	Will there be a change in the pathogenicity of the bacteria after genetic modification?	What are the consequences due to the transformation of the bacteria?
	17. pUC 119	ATCC	LacZ	Antibiotic resistance, gene expression	No	Antibiotic resistance, gene expression
	18. pEGFP-C1	Invitrogen	GFP, VAMP2	Antibiotic resistance, gene expression, fluorescence	No	Antibiotic resistance, gene expression, fluorescence
	19. pGTN28. pGTN38, pGTN39	New England Biolabs	-	Antibiotic resistance	No	Antibiotic resistance
	20. pCAGGs	G. DiMattia	Atf3	Antibiotic resistance, gene expression	No	Antibiotic resistance, gene expression

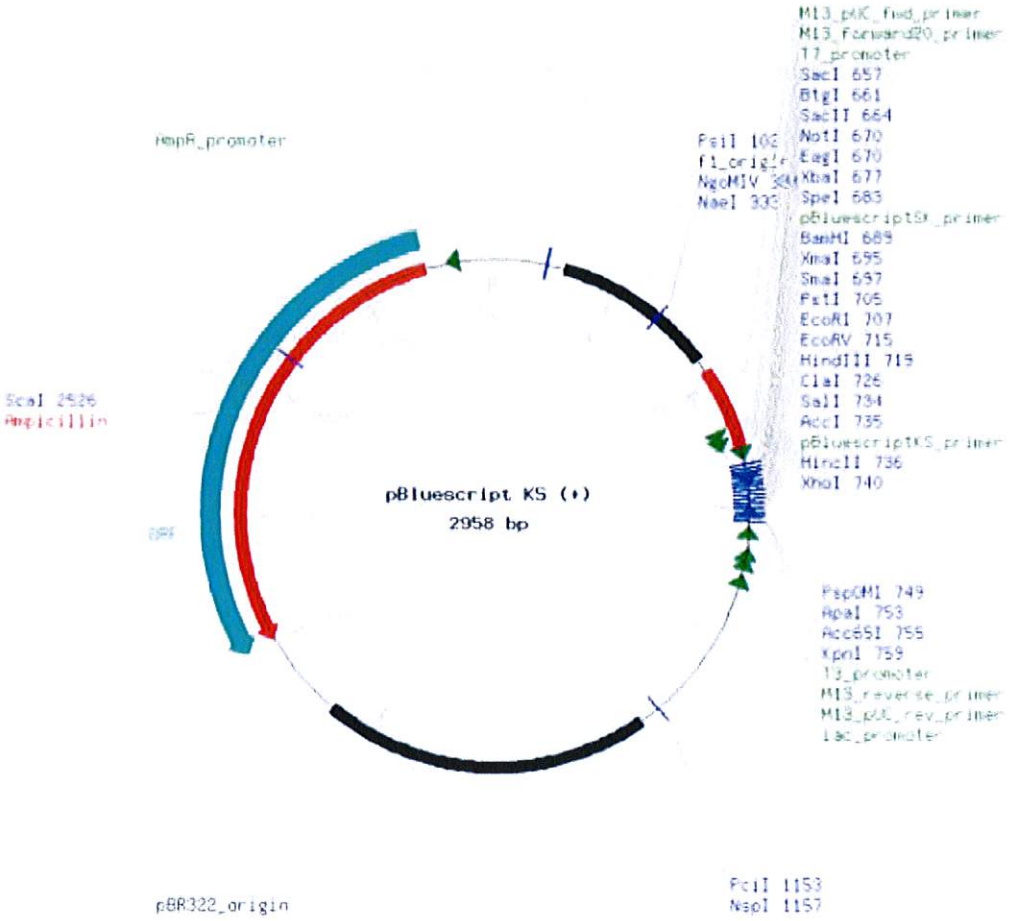
1. pcDNA3.1(+) - also have pcDNA3 and pcDNA3.1(-)

Plasmid Name	pcDNA3.1(+)
Alt Names	pcDNA3.1+, pcDNA3.1
Source/Vendor	Invitrogen
Plasmid Type	Mammalian
Viral/Non-viral	Nonviral
Stable/Transient	Transient
Constitutive/Inducible	Constitutive
Promoter	CMV
Expression Level	High
Plasmid Size	5428
Sequencing Primer	T7 Fwd
Sequencing Primer Sequence	5'd[TAATACGACTCACTATAGGG]3'
Bacterial Resistance	Ampicilin
Mammalian Selection	G418, neo
Notes	Differs from other pcDNA3.1 in drug resistance; +/- refers to orientation of f1 ori.
Catalog Number	V790-20



2. pBluescript KS(+) - also have KS(-), SK(+) and SK(-) variants

Plasmid Name	pBluescript KS (+)
Alt Names	pBSKS, pBluescriptKS
Source/Vendor	Stratagene
Plasmid Type	Bacterial
Plasmid Size	3000
Bacterial Resistance	Ampicillin
Plasmid Sequence	View Sequence



2a. Example of gene fragment cloned into pBluescript SK(+)

CONSTRUCT NAME: pBS gMist1a-BamHI (AKA pBS Mist1-BamHI)

CONSTRUCTED BY: Christopher Pin

DESCRIPTION: The mouse Mist1 gene spanning from -2700 to the 3' flanking BamHI site. Should contain the entire Mist1 sequence.

ORIGIN & MODIFICATIONS: The BAC clone obtained from Genome Systems was digested with BamHI and shotgun cloned into pBS. Orientation is unknown.

VECTOR: pBS

INSERTION SITE: BamHI

INSERT SIZE: 10.5 kb

DIGEST ENZYMES AND RESULTING FRAGMENT SIZES:

BamHI : 10.5 and 2.9 kb
EcoRI/BamHI: 8.5, 2.9 and 2.0kb

ANTIBIOTIC RESISTANCE: Amp

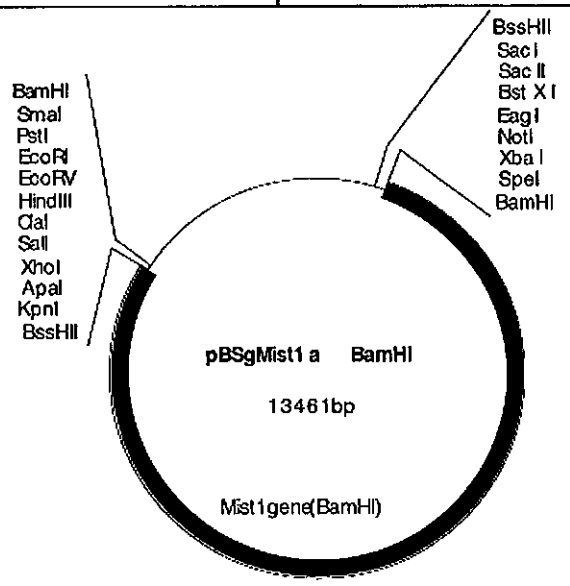
β-GAL SELECTION: No

AVAILABLE STOCKS

-80° DNA PLASMID STOCK
RACK#:
BOX ID:

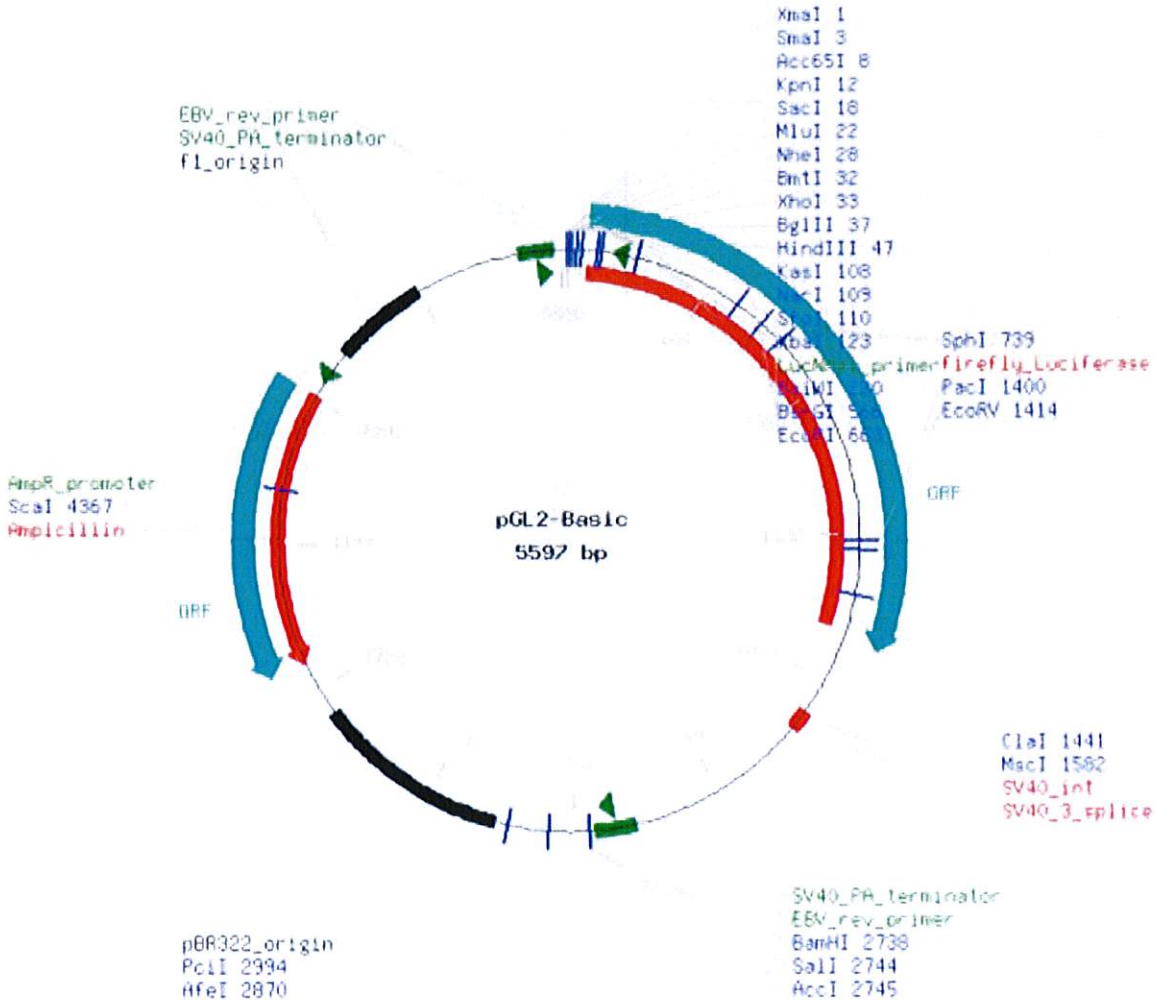
-80° C GLYCEROL STOCK
RACK #:
BOX I.D.:
Host: DH5

MAP:



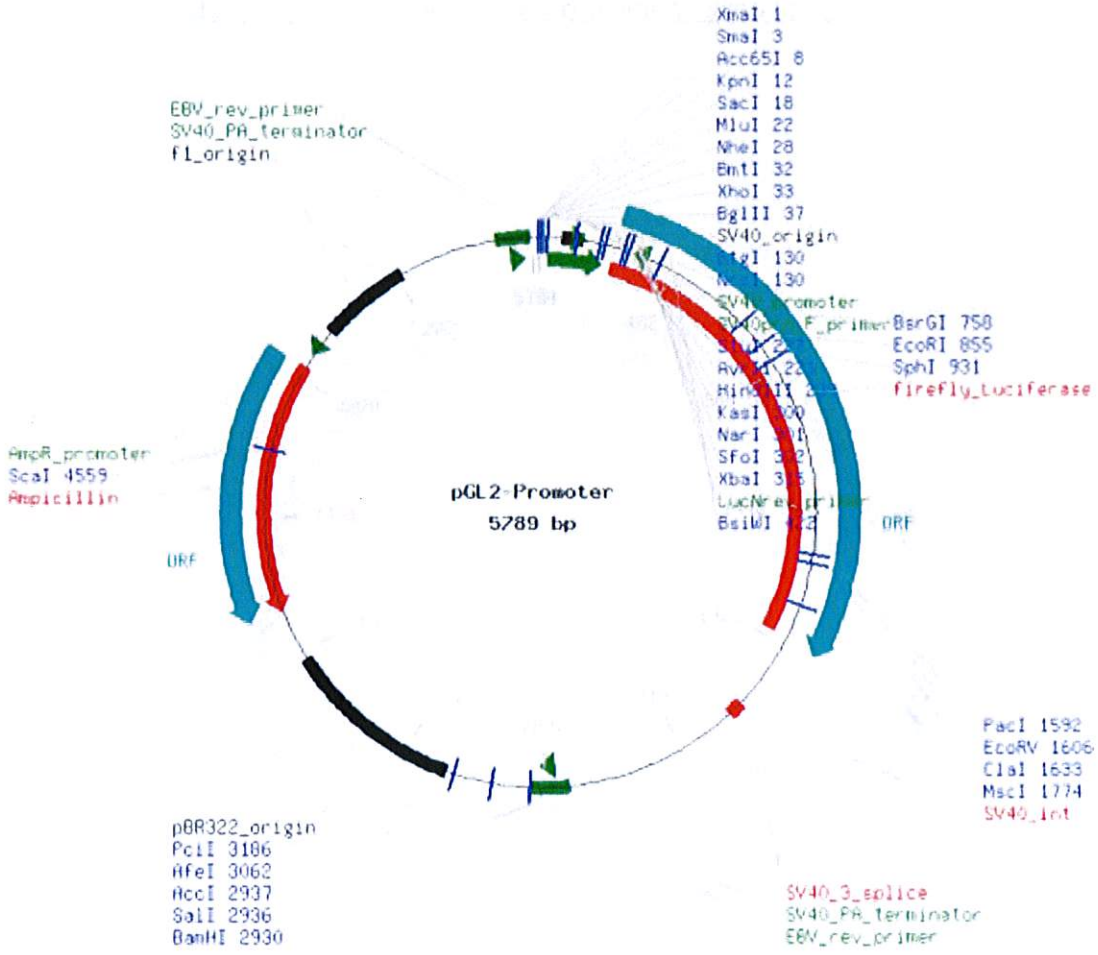
3a. pGL2-Basic

Plasmid Name	pGL2-Basic
Source/Vendor	Promega
Plasmid Size	5597
Notes	pGL2-Basic has no enhancer or promoter. Hosts: E.coli JM109, mammal. Related vectors: f1, pBR322, pGL2-Enhancer, pGL2-Promoter, pGL2-Control. (Information source: VectorDB.)
Link	http://seq.yeastgenome.org/vectordb/vector_descrip/PGL2BASIC.html



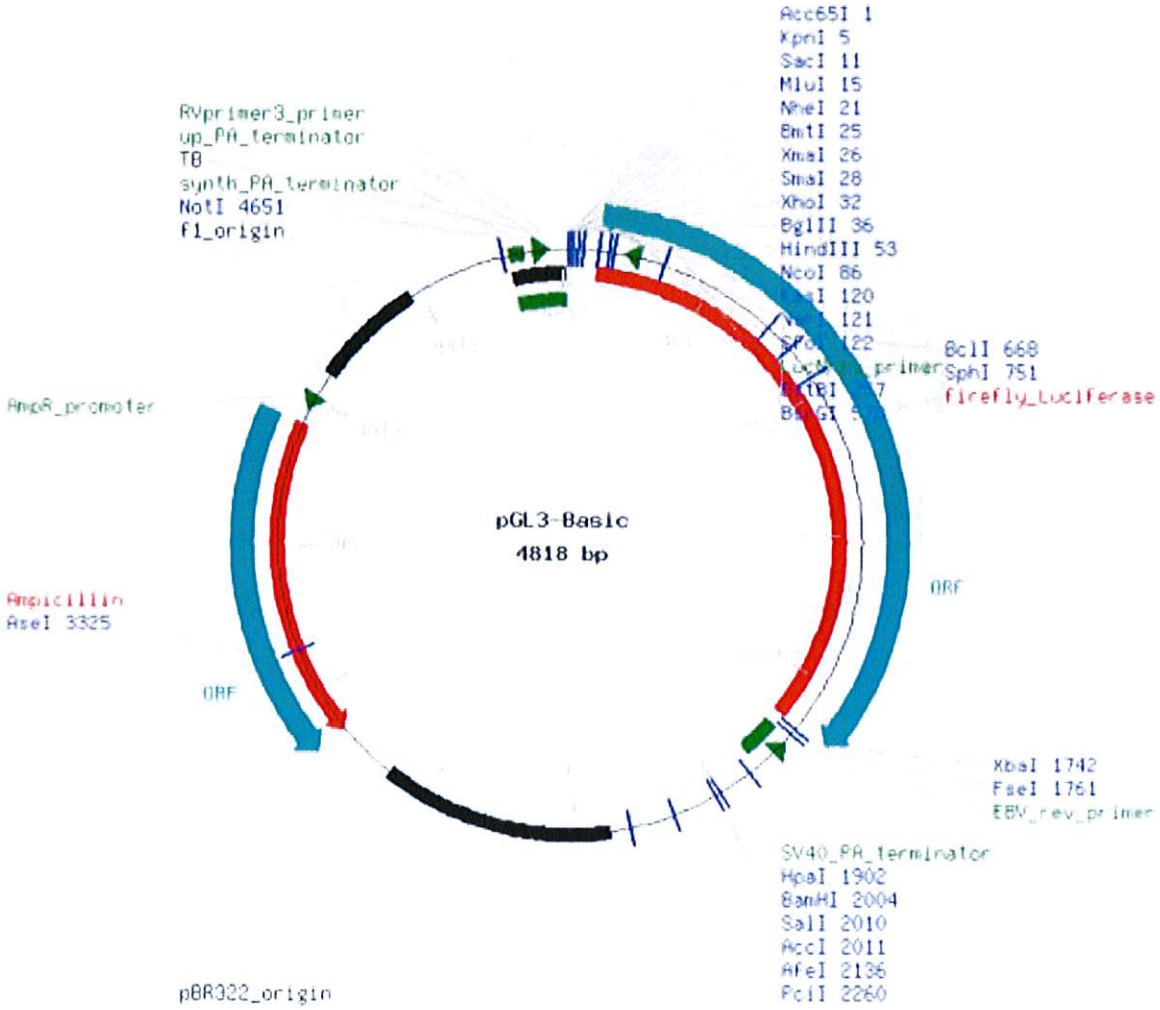
3b. pGL2-Promoter

Plasmid Name	pGL2-Promoter
Source/Vendor	Promega
Plasmid Size	5789
Notes	pGL2-Promoter has promoter but no enhancer. Hosts: E.coli JM109, mammal. Related vectors: f1, pBR322, pGL2-Enhancer, pGL2-Basic, pGL2-Control. (Information source: VectorDB.)
Link	http://seq.yeastgenome.org/vectordb/vector_descrip/PGL2PROMO.html



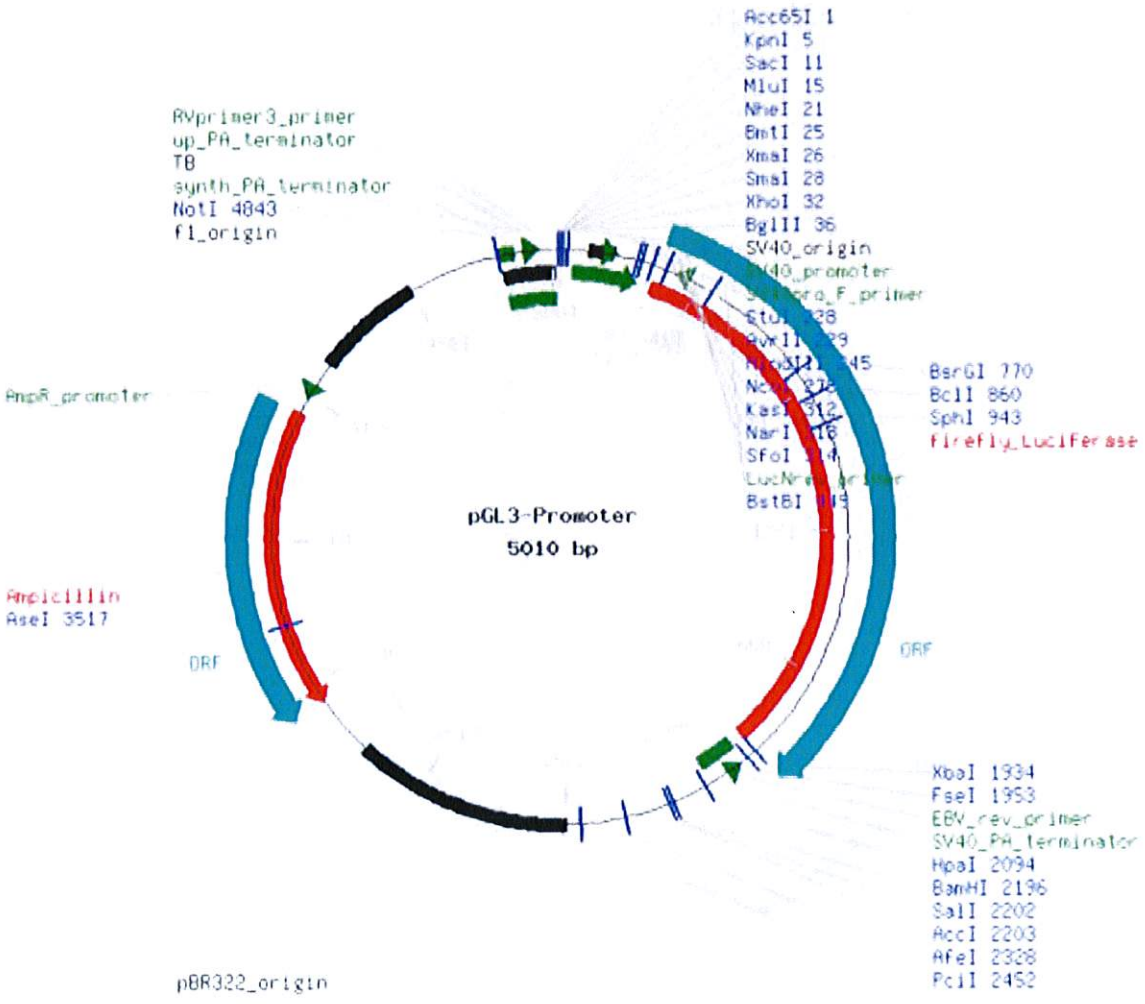
3c. pGL3-Basic

Plasmid Name	pGL3-Basic
Source/Vendor	Promega
Viral/Non-viral	Non-viral
Plasmid Size	4818
Sequencing Primer	RVprimer3
Sequencing Primer Sequence	CTAGCAAAATAGGCTGTCCC
Bacterial Resistance	Ampicillin
Notes	Luciferase reporter vector. See http://www.promega.com/vectors/cloning_vectors.htm#b05
Catalog Number	E1751
Link	http://seq.yeastgenome.org/vectordb/vector_descrip/PGL3BASIC.html



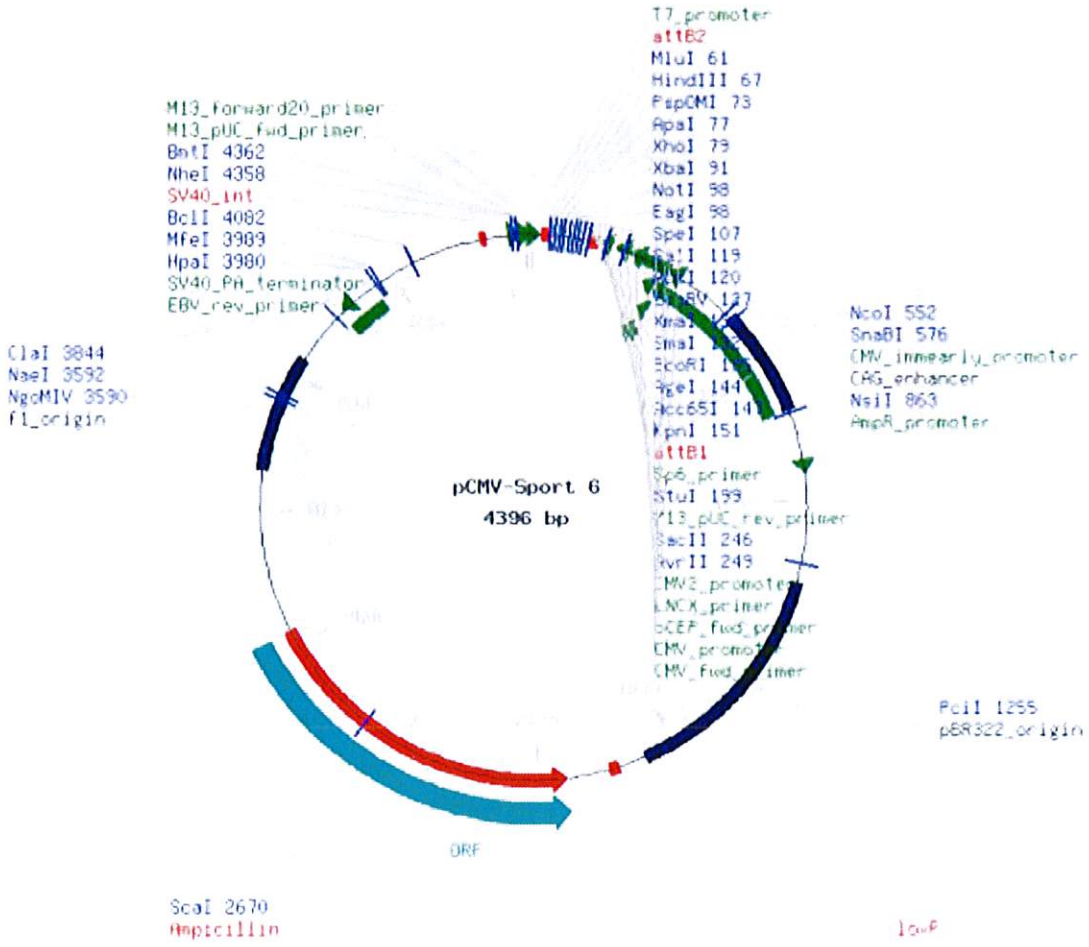
3d. pGL3-Promoter

Plasmid Name	pGL3-Promoter
Source/Vendor	Promega
Viral/Non-viral	Non-viral
Plasmid Size	5010
Sequencing Primer	RVprimer3
Sequencing Primer Sequence	CTAGCAAAATAGGCTGTCCC
Bacterial Resistance	Ampicillin
Notes	Luciferase reporter vector. For mor information, see http://www.promega.com /vectors/cloning_vectors.htm#b05.
Catalog Number	E1761
Plasmid Sequence	View Sequence



4. pCMV-Sport6

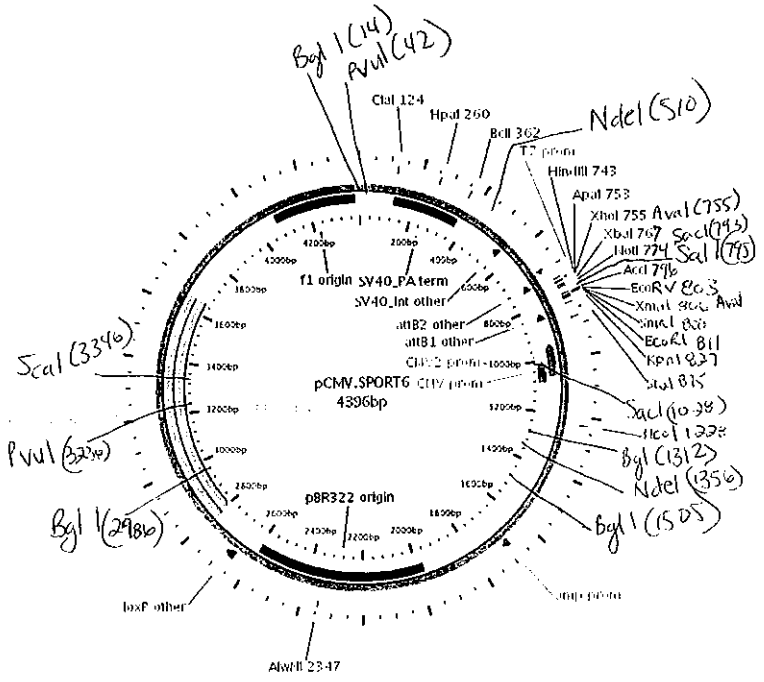
Plasmid Name	pCMV-Sport 6
Source/Vendor	Invitrogen
Plasmid Type	Bacterial & mammalian
Viral/Non-viral	Nonviral
Stable/Transient	Transient
Constitutive/Inducible	Constitutive
Promoter	CMV
Expression Level	High
Plasmid Size	4400
Sequencing Primer	Sp6
Sequencing Primer Sequence	5'd[GATTTAGGTGACACTATAG]3'
Protein Tags	none
Bacterial Resistance	Ampicillin
Mammalian Selection	None



4b. Example of a clone in pCMV-Sport6

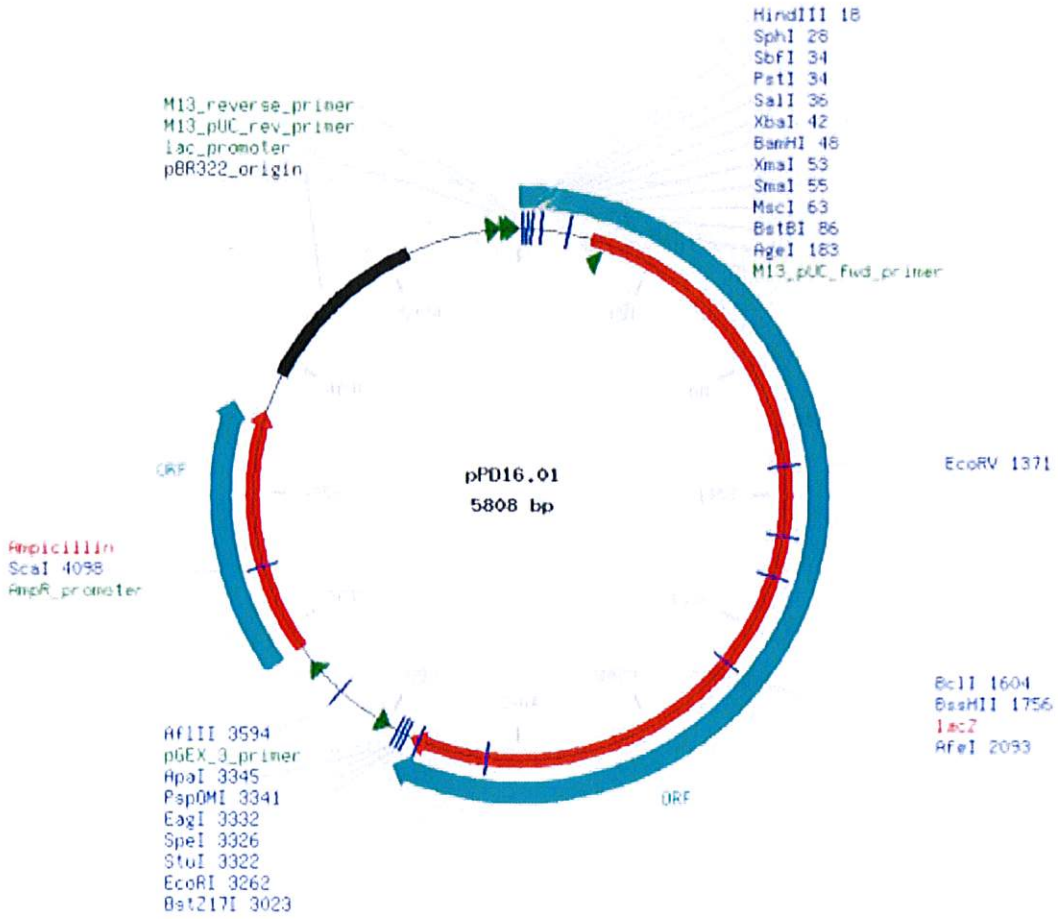
Clone Data Sheet For Pin Laboratory

Construct Name: 4011514 (ATF 3) activating transcription factor 3 Constructed By: I.M.A.G.E. Consortium [LLNL] C/O Barbara Kellam	
Description: Invitrogen plasmid containing sequence of the mouse ATF3 inserted b/w Sal I/Not I Origin and Modifications: Pertinent References:	
Vector: pCMV-SPORT6 Size 4396bp Insertion Site: 5' Sal I/Not I 3' Insert Size: Digest Enzymes and Resulting Fragment Sizes:	Antibiotic Resistance: Chloramphenicol, ampicillin β-gal selection: Plasmid Stock Location:



5a. pPD46 - a variation of the backbone vector is presented below

Plasmid Name	pPD16.01
Plasmid Size	5808
Notes	Hosts: E.coli. Related vectors: pBR322, pPD1.27, pPD16.43, pPD16.51, pPD18.32, pPD21.28, pPD22.04, pPD22.11, pPD26.14, pPD26.77, pPD34.110, pPD8.02, pPD8.33. (Information source: VectorDB.)
Link	http://seq.yeastgenome.org/vectordb/vector_descrip/PPD1601.html



5b. An example of a promoter fragment cloned into pPD46 (EI indicates Elastase promoter)

CONSTRUCT NAME: -92+8 EIp pPD.46

CONSTRUCTED BY: Christopher Pin

DESCRIPTION: minimal elastase I promoter with no enhancers (-92 +8) in front of the LacZ gene.

ORIGIN & MODIFICATIONS:

VECTOR: pPD46

INSERTION SITE: HindIII/BamHI

INSERT SIZE: 100 bp

DIGEST ENZYMES AND RESULTING FRAGMENT SIZES:

ANTIBIOTIC RESISTANCE: Amp

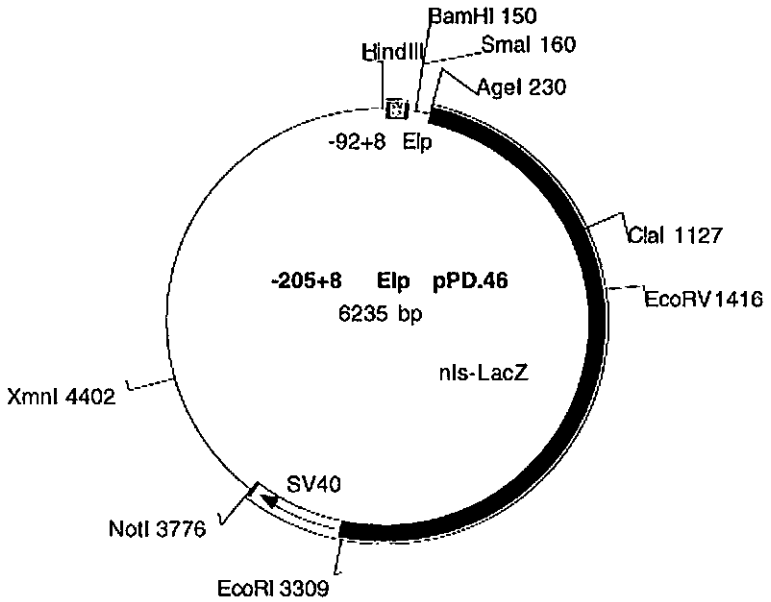
β-GAL SELECTION: No

AVAILABLE STOCKS

-80° DNA PLASMID STOCK
RACK#:
BOX ID:

-80° C GLYCEROL STOCK
RACK #:
BOX I.D.:
Host: DH5

MAP:



6a. PTRI vectors obtained from Ambion (Gapdh fragment)

pTRI-GAPDH - Mouse Antisense Control Template

NOTE:Commercial use of this vector requires a license from Ambion

Catalog #: 7431 - 10 μg

Concentration: 0.5 mg/ml

Storage Conditions: Store at -20°C or 4°C.

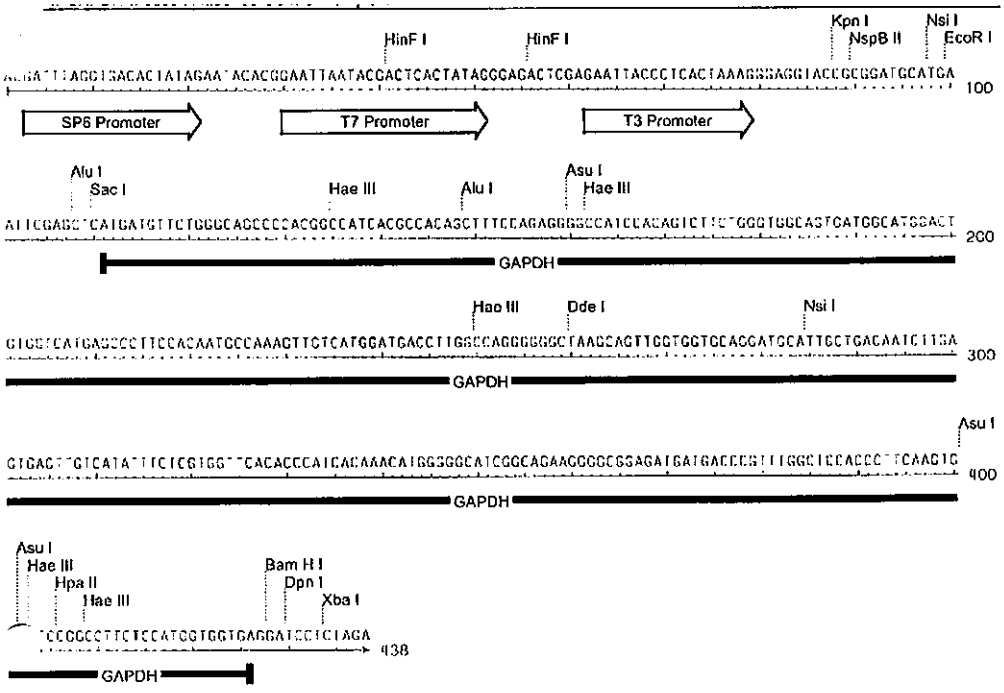
All Ambion plasmids are shipped at ambient temperature for convenience and cost. This in no way affects the high quality performance of this plasmid. Upon receipt, store the plasmid at 4°C for frequent use or -20°C for long term storage.

Storage Buffer: 10 mM Tris-HCl pH 7.5, 1 mM EDTA.

Quality Control: The linearized pTRI-GAPDH-Mouse plasmid migrates as a single band of the expected size (3.389 kb) on a 1% agarose gel. Transcription of the linearized plasmid (0.5 μg) with 20 units of SP6, T7, or T3 RNA Polymerase results in at least 50% incorporation of (α-^{32}P)UTP into product that consists of >80% full length transcripts, by 5% denaturing polyacrylamide gel. The sequence of the mouse GAPDH fragment is confirmed by dideoxynucleotide sequencing.

USER INFORMATION

The pTRI-GAPDH-Mouse antisense control template contains a 316 bp fragment of the mouse glyceraldehyde 3-phosphate dehydrogenase (GAPDH) gene derived from exons 8-5[1] (nucleotides of 660-345 of Accession #M32599[2]). The sequence is shown on the following page, in the antisense orientation. **The GAPDH gene fragment is inserted into the *Sac* I - *Bam* H I sites of a TRIPLEscript™ transcription vector. The TRIPLEscript vectors have tandem SP6, T7, and T3 promoters allowing the use of any of these enzymes to synthesize transcripts. The plasmid has been linearized by digestion with *Xba I* and *Hind* III and is ready for use as a template for in vitro transcription reactions. When transcribed with the following RNA polymerases, antisense transcripts of the indicated length are produced by this template: SP6=413 bases; T7=383 bases; T3=355 bases.** These transcripts can be used as probes with ribonuclease protection assays, S1 nuclease assays, *in situ* hybridizations and Northern blots. Use of this probe in ribonuclease protection assays or S1 nuclease assays will generate a protected fragment size of 316 nt. Digestion with *Dde* I results in a template for a probe that will protect a 154 nucleotide fragment of the GAPDH-mRNA. GAPDH is a "housekeeping" gene which is expressed at a relatively constant level in most but not all tissues; for example, its level has been shown to vary during adipocyte differentiation in response to induction of an insulin-sensitive transcription factor (3,4,6). GAPDH levels also varied with developmental stage and with dexamethasone treatment in embryonic chick heart and tendon cells (5). Accession #M32599[2].



6b. PTRI vectors obtained from Ambion (Cyclophilin fragment)

pTRI-Cyclophilin-Rat Antisense Control Template

7680

NOTE:Commercial use of this vector requires a license from Ambion.

Catalog #: 7680 - 10 µg

Concentration: 0.5 mg/ml

Storage Conditions: Store at -20°C or 4°C.

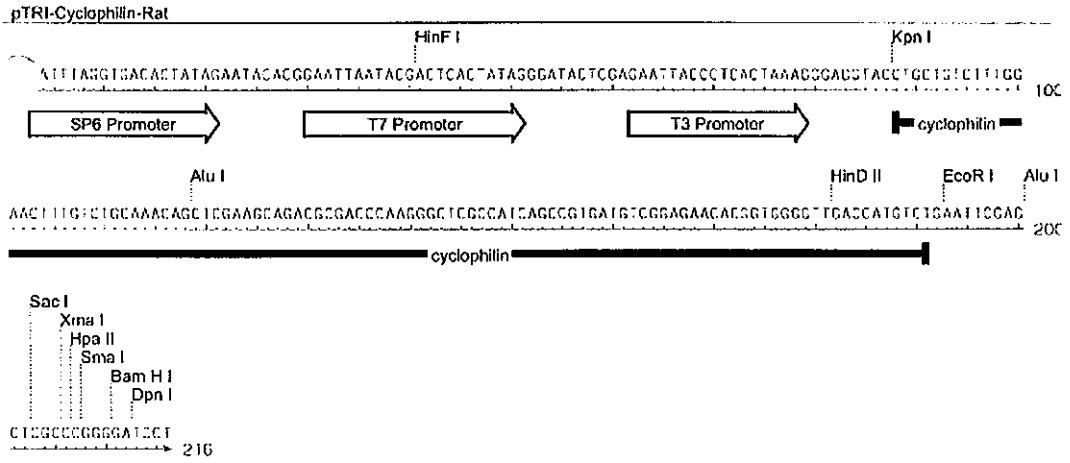
All Ambion plasmids are shipped at ambient temperature for convenience and cost. This in no way affects the high quality performance of this template. Upon receipt, store the plasmid at 4°C for frequent use or -20°C for long term storage.

Storage Buffer: 10 mM Tris-HCl pH 7.5, 1 mM EDTA.

Quality Control: The linearized pTRI-cyclophilin-Rat plasmid migrates as a single band of the expected size (3.2 kb) on a 1% agarose gel. The template is tested functionally using Ambion's MAXIscript™ Kit (Cat. #1308-1326). The sequence of the pTRI-cyclophilin-Rat fragment has been confirmed by dideoxynucleotide sequencing.

USER INFORMATION

The pTRI-cyclophilin-Rat antisense control template contains a 103 bp insert of a highly conserved region of the rat cyclophilin gene spanning exons 1 and 2 (nucleotides 142-38 of Accession #M19533). The sequence of this pTRI-cyclophilin insert is shown on the following page, in the antisense orientation. The cyclophilin fragment is inserted into the *Kpn*I-*Eco*RI sites of one of Ambion's TRIPLEscript™ vectors which has tandem SP6, T7, and T3 promoters allowing the use of any of the corresponding RNA polymerases to synthesize antisense probes. **The plasmid has been linearized with *Hind*III and *Xba*I. When transcribed with the following RNA polymerases, antisense transcripts of the indicated lengths are produced by this template: SP6 = 195 bases; T7 = 165 bases; T3 = 138 bases.** Note that the pTRI-Cyclophilin-Rat insert contains one mismatch with the published sequence at base 165. However, this mismatch does not affect hybridization of the transcribed RNA probe or protected fragment size in nuclease protection assays. These transcripts will be complementary to rat cyclophilin RNA and can be used as probes in ribonuclease protection assays (RPAs), S1 nuclease assays, and Northern blots and dot blots to detect the presence of cyclophilin mRNA. Hybridization of the transcript to rat total RNA will protect a 103 nucleotide fragment of the cyclophilin mRNA. The size of the rat cyclophilin mRNA as detected by Northern analysis is approximately 0.74 kb.



6c. PTRI vectors obtained from Ambion (beta-actin fragment)

pTRI-β-Actin-Mouse Antisense Control Template

7423

NOTE:Commercial use of this vector requires a license from Ambion.

Catalog #: 7423 - 10 µg

Concentration: 0.5 mg/ml

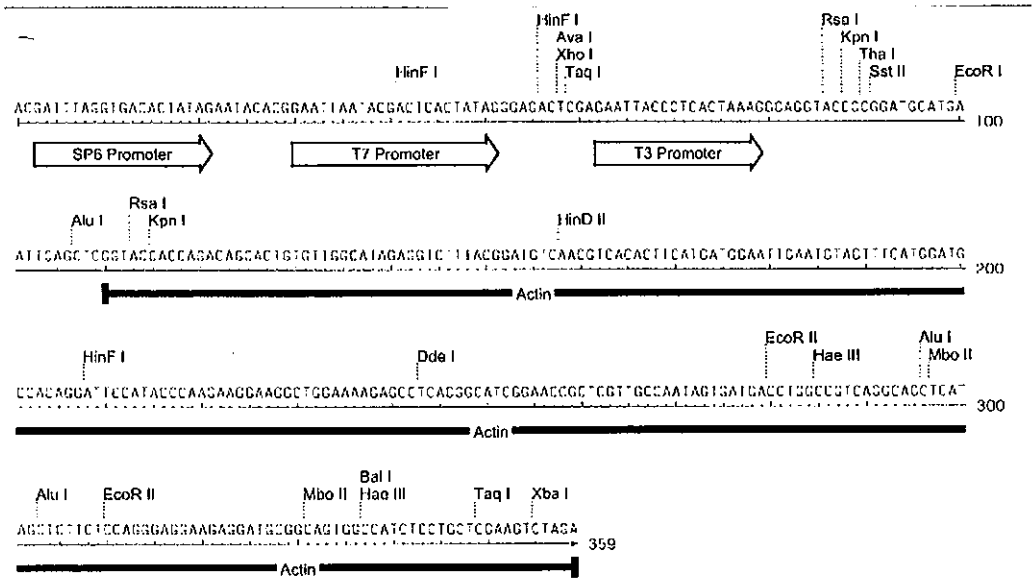
Storage Conditions: Store at -20°C or 4°C.

All Ambion plasmids are shipped at ambient temperature for convenience and cost. This in no way affects the high quality performance of this plasmid. Upon receipt, store the plasmid at 4°C for frequent use or -20°C for long term storage.

Quality Control: The linearized pTRI-β-actin-Mouse plasmid migrates as a single band of the expected size (3.32 kb) on a 1% agarose gel. The template is tested functionally using Ambion's MAXIscript™ Kit (Cat. #1308-1326). The sequence of the Mouse β-actin fragment has been confirmed by dideoxynucleotide sequencing.

USER INFORMATION

The pTRI-β-actin-Mouse antisense control template contains a 245 bp fragment of the mouse cytoplasmic β-actin gene[1] which extends from codon 303 to codon 220 (nucleotides 989-739 of Accession #X03672)[2]. The sequence of the β-Actin control template is shown on the following page, in the antisense orientation. The β-actin fragment is inserted into a TRIPLEscript™ vector. Ambion's TRIPLEscript™ vectors have tandem SP6, T7, and T3 promoters allowing the use of any of the corresponding phage RNA polymerases for the synthesis of transcripts. **The plasmid has been linearized by digestion with *Xba* I and *Hind* III and is ready for use as a template for in vitro transcription reactions. When transcribed with the following RNA polymerases, antisense transcripts of the indicated length are produced by this template: SP6=334 bases; T7=304 bases; T3=276 bases.** These transcripts can be used as probes with ribonuclease and S1 nuclease protection assays, and Northern and dot blots to detect the presence of β-Actin mRNA. Hybridization of the transcript to mouse total RNA will protect a 245 nt fragment of mouse β-actin mRNA. There are 21 single base mismatches and 1 double base mismatch in the region spanned by this probe between mouse and human. The size of the Mouse β-Actin mRNA is 2.1 kb[1].



6d. PTRI vectors obtained from Ambion (28S fragment)

pTRI-RNA-28S Antisense Control Template

7340

NOTE:Commercial use of this vector requires a license from Ambion.

Catalog #: 7340 - 10 µg

Concentration: 0.5 mg/ml

Storage Conditions: Store at -20°C or 4°C.

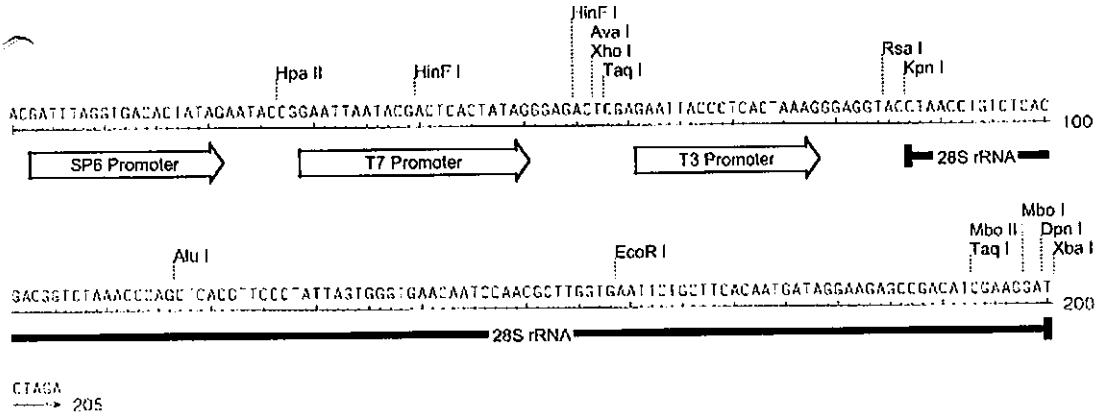
All Ambion plasmids are shipped at ambient temperature for convenience and cost. This in no way affects the high quality performance of this plasmid. Upon receipt, store the plasmid at 4°C for frequent use or -20°C for long term storage.

Storage Buffer: 10 mM Tris-HCl pH 7.5, 1 mM EDTA.

Quality Control: The linearized pTRI-RNA-28S plasmid migrates as a single band of the expected size (3.15 kb) on a 1% agarose gel. The template is tested functionally using Ambion's MAXIscript™ Kit (Cat. #1308-1326). The sequence of the 28S rRNA fragment has been confirmed by dideoxynucleotide nucleotide sequencing.

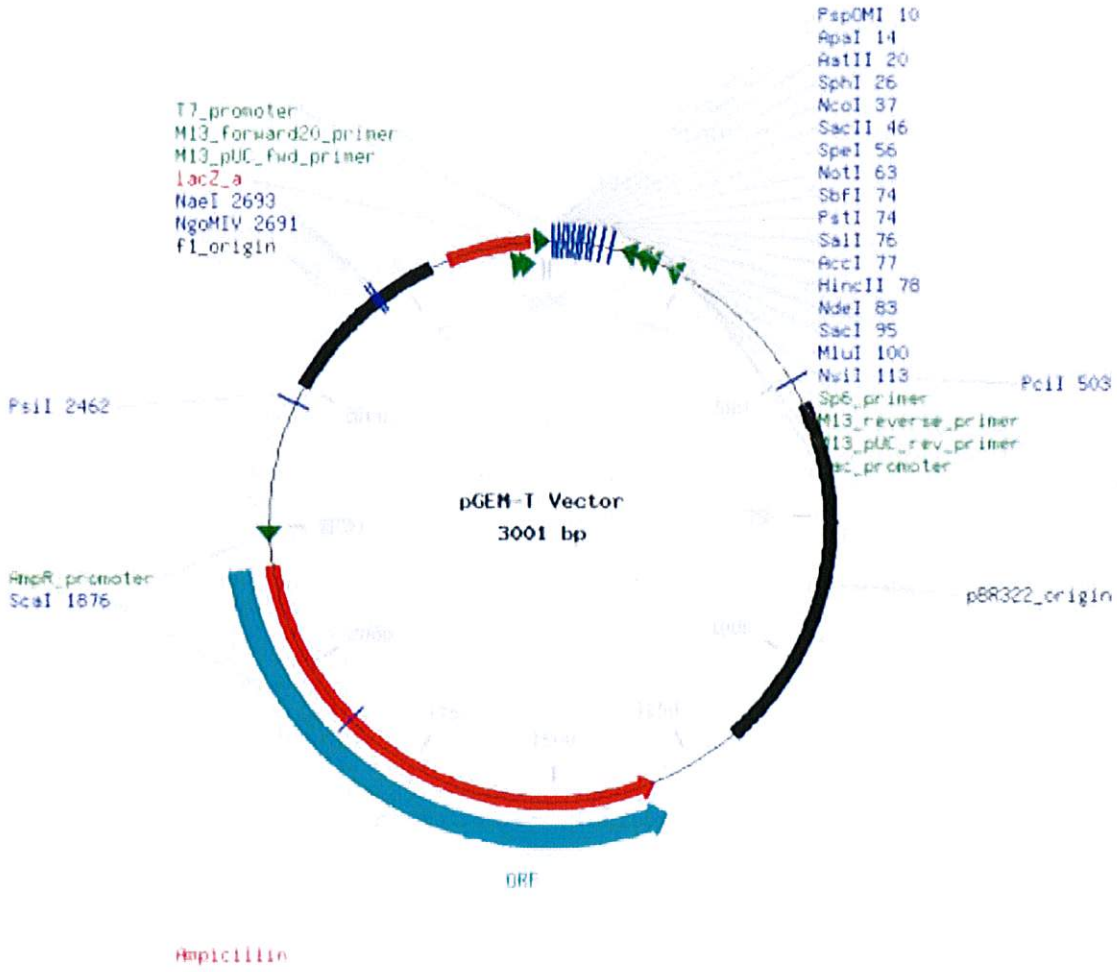
USER INFORMATION

The pTRI-RNA-28S antisense control template contains a 115 bp cDNA fragment of the highly conserved region of the Human 28S rRNA gene (nucleotides 4515-4400 of Accession #M11167, HUMRGM) inserted into the *Kpn* I - *Xba* I sites of one of Ambion's TRIPLEscript™ vectors. The sequence of this 28S rRNA insert, along with relevant regions of the vector, is shown on the following page. The insert is in the antisense orientation and RNA probes transcribed from this template will be complementary to 28S rRNA. Ambion's TRIPLEscript™ vectors have tandem SP6, T7 and T3 promoters, allowing the use of any of the corresponding RNA polymerases to synthesize antisense probes. **The plasmid has been linearized with both *Xba* I *and Hind* III. It is ready for use as a template for *in vitro* transcription reactions.** These transcripts can be used as probes in nuclease protection assays (RPAs and S1 nuclease assays), and Northern blots as an internal standard or reference to establish the relative amount of RNA in each sample. When transcribed with the following RNA polymerases, antisense transcripts of the indicated lengths are produced by this template: SP6 = 202 bases; T7 = 173 bases; T3 = 145 bases. Hybridization of any of these transcripts to total RNA from a wide variety of organisms will protect a 115 nucleotide fragment of 28S rRNA in an RPA and will detect the 4,718 nucleotide human 28S rRNA species on a Northern blot. A polymorphism exists in the human population at base number 157 on the attached map. This nucleotide may be A or G and will not be detected as a mismatch under standard RPA conditions. The sequence is otherwise completely conserved in the genera *Mus, Xenopus* and *Homo*. There are 4 nucleotide differences in rice and 5 in *C.elegans*. The full length human 28S rRNA is 4718 nt long.



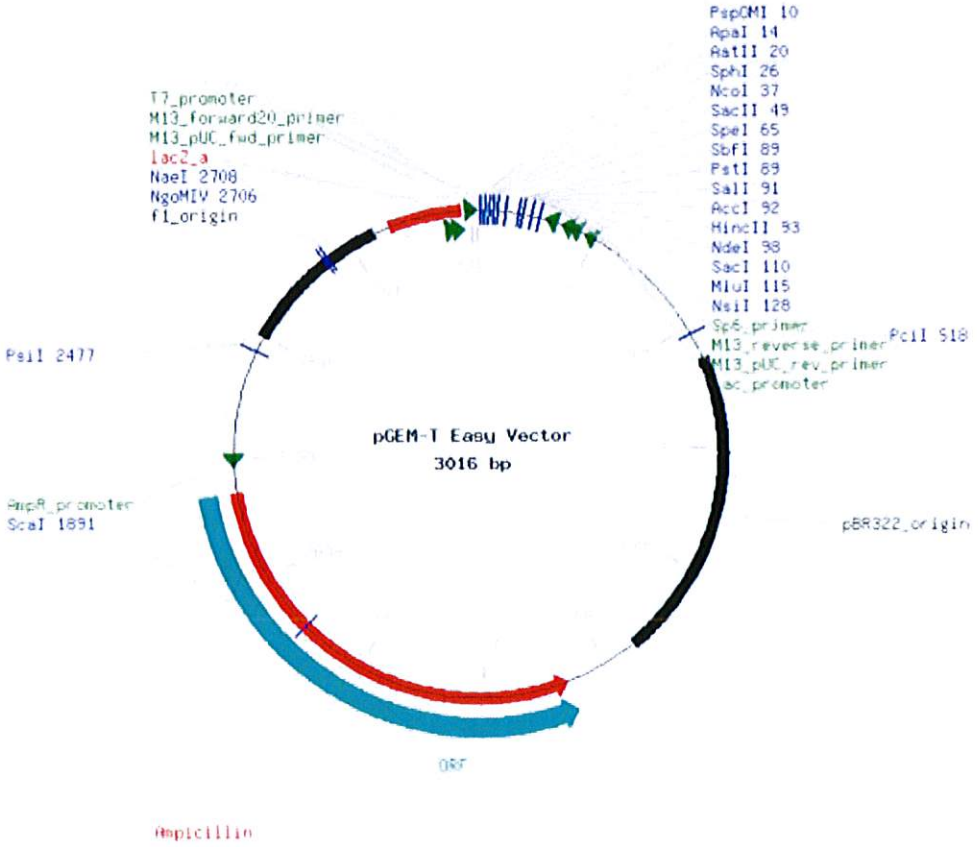
7a. pGEMT

Plasmid Name	pGEM-T Vector
Source/Vendor	Promega
Plasmid Size	3000
Catalog Number	A3600



7b. pGEMT Easy

Plasmid Name	pGEM-T Easy Vector
Source/Vendor	Promega
Plasmid Type	Bacterial
Viral/Non-viral	Nonviral
Stable/Transient	Transient
Constitutive/Inducible	Constitutive
Expression Level	High
Plasmid Size	3015
Sequencing Primer	T7, SP6, M13Fwd or M13Rev
Bacterial Resistance	Ampicillin
Notes	The only difference between pGEM-T and pGEM-T Easy is in the multiple cloning site (MCS). The MCS of the pGEM-T Easy Vector contains sequences on either side of the insert that are recognized by the restriction enzymes Not I and EcoR I. This allows the insert DNA to be removed with a single restriction digest using either of these enzymes.
Catalog Number	A1360
Link	http://www.promega.com/catalog/search.asp?IsAd=0&SOption=Catalog&keywo...



7c. Example of a gene fragment cloned into pGEMT

CONSTRUCT NAME: pGEMT PAP

CONSTRUCTED BY: Christopher Pin

DESCRIPTION: partial mouse pancreatitis-associated protein coding region to be used for probes

ORIGIN & MODIFICATIONS: partial sequence of the mouse PAP was PCR'd from RT sample of pancreas using PFU and primers PAP 5' PAP 3'. Cloned into the pGEMT Easy vector. ***NOTE:*** ~~***Orientation is unknown.***~~ 5'→3'

VECTOR: pGEMT easy

INSERTION SITE:

INSERT SIZE: 503 bp

DIGEST ENZYMES AND RESULTING FRAGMENT SIZES:

EcoRI: 503 bp and 3000 bp

ANTIBIOTIC RESISTANCE: Amp

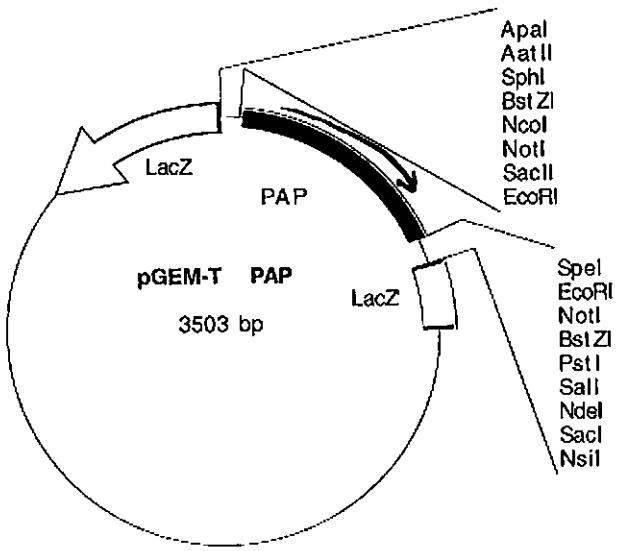
β-GAL SELECTION:

AVAILABLE STOCKS

-80° DNA PLASMID STOCK
RACK#:
BOX ID:

-80° C GLYCEROL STOCK
RACK#:
BOX I.D.:
Host: DH5

MAP:



8. pIND

CONSTRUCT NAME: pIND

CONSTRUCTED BY: In Vitrogen

DESCRIPTION: Ecdysone Inducible vector obtained from InVitrogen 2/97 (C.Pin)

ORIGIN & MODIFICATIONS:

JOURNAL REFERENCE: No et al (1996) PNAS 93, 3346-3351

VECTOR: -

INSERTION SITE: -

INSERT SIZE: -

DIGEST ENZYMES AND RESULTING FRAGMENT SIZES:

ANTIBIOTIC RESISTANCE: Amp

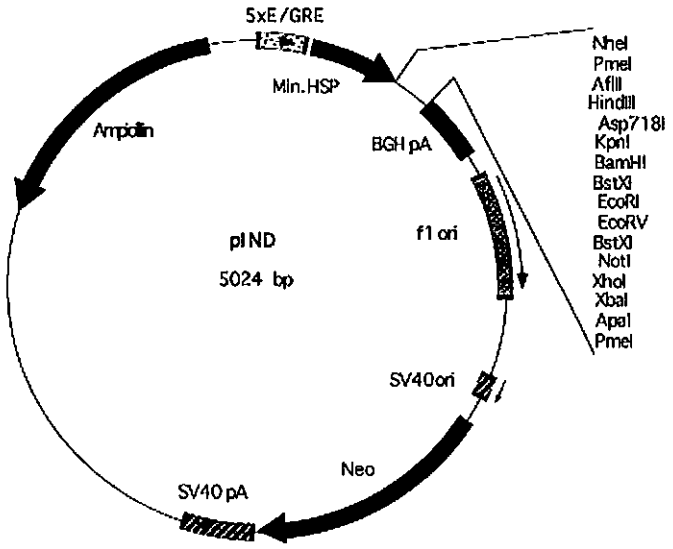
β-GAL SELECTION: No

AVAILABLE STOCKS

-80 DNA PLASMID STOCK
RACK#:
BOX ID :

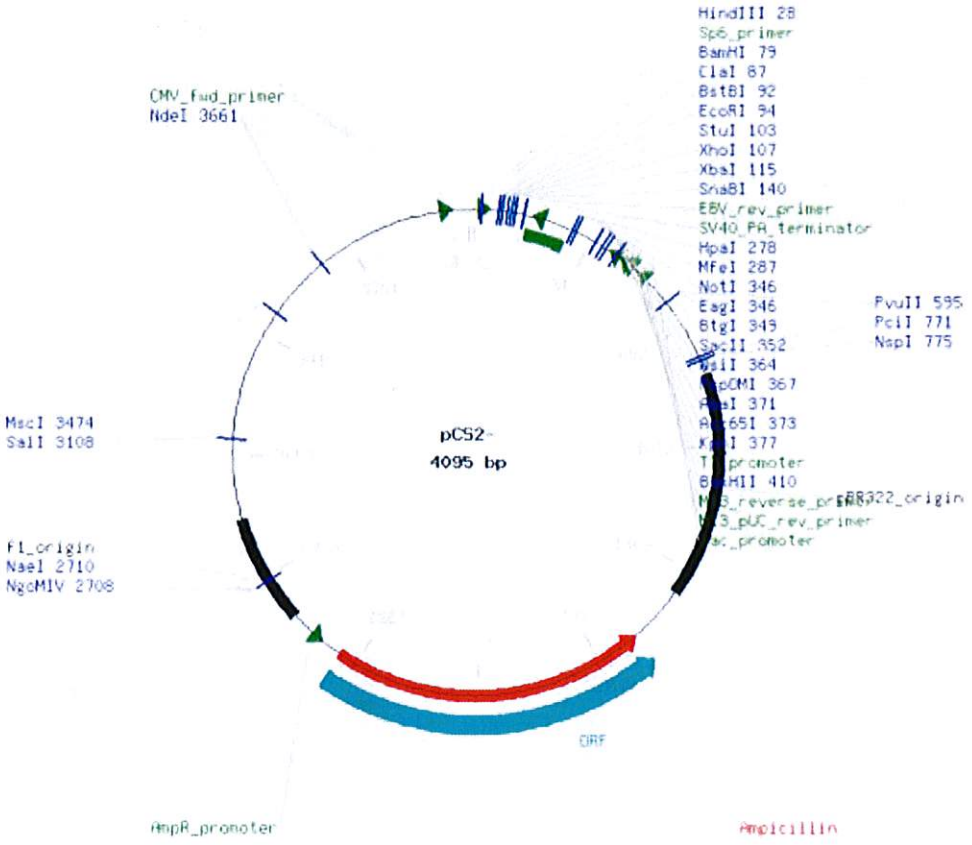
-80° C GLYCEROL STOCK
RACK #:
BOX I.D.:
Host: DH5

MAP:



9. pCS2-

Plasmid Name	pCS2-
Plasmid Type	xenopus/mammalian/avian/zebrafish
Plasmid Size	4095
Sequencing Primer	SP6
Bacterial Resistance	Ampicillin

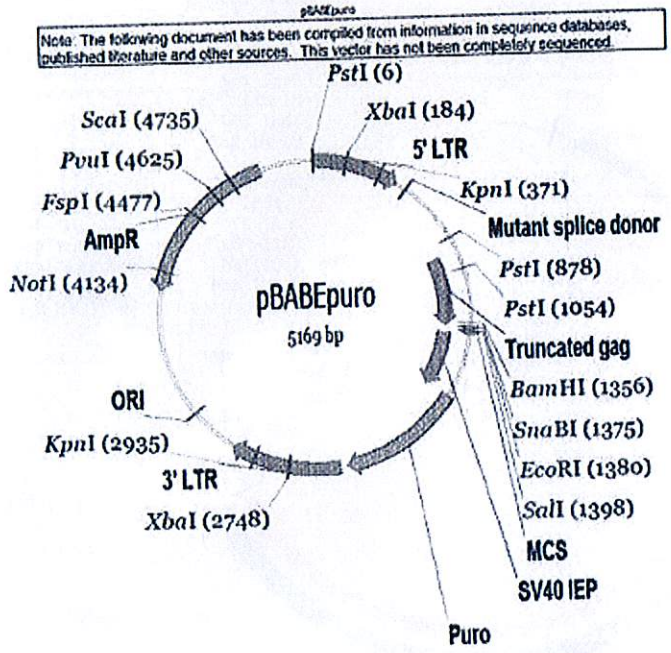


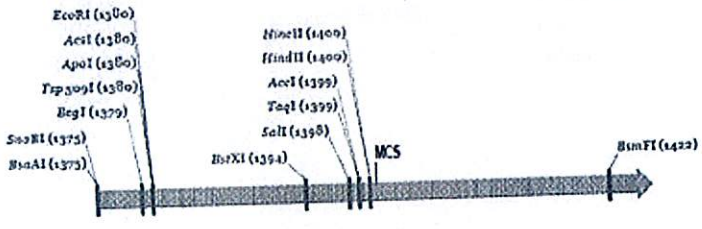
10. pBABE-Puro

Plasmid Name	pBABE-puro
Source/Vendor	Addgene Plasmid Repository
Plasmid Type	Mammalian expression,Retroviral
Plasmid Size	5169
Sequencing Primer	pBABE 5'
Bacterial Resistance	Ampicillin
Mammalian Selection	Puromycin
Notes	Deposited by Bob Weinberg to Addgene's plasmid repository. See http://www.addgene.org/1764 . Morgenstern JP, Land H., 1990, Nucleic Acids Research 18(12):3587-96. If you are using the pBABE protocol from the Weinberg Lab to generate virus, please note that Addgene supplies pCL-Eco (#12371), VSV-G (#8454), and a gag/pol expression vector (#8455).
Catalog Number	Addgene Plasmid 1764
Link	http://www.addgene.org/1764

Author's pBABE-puro Map

Click on the map or here to download the image file.

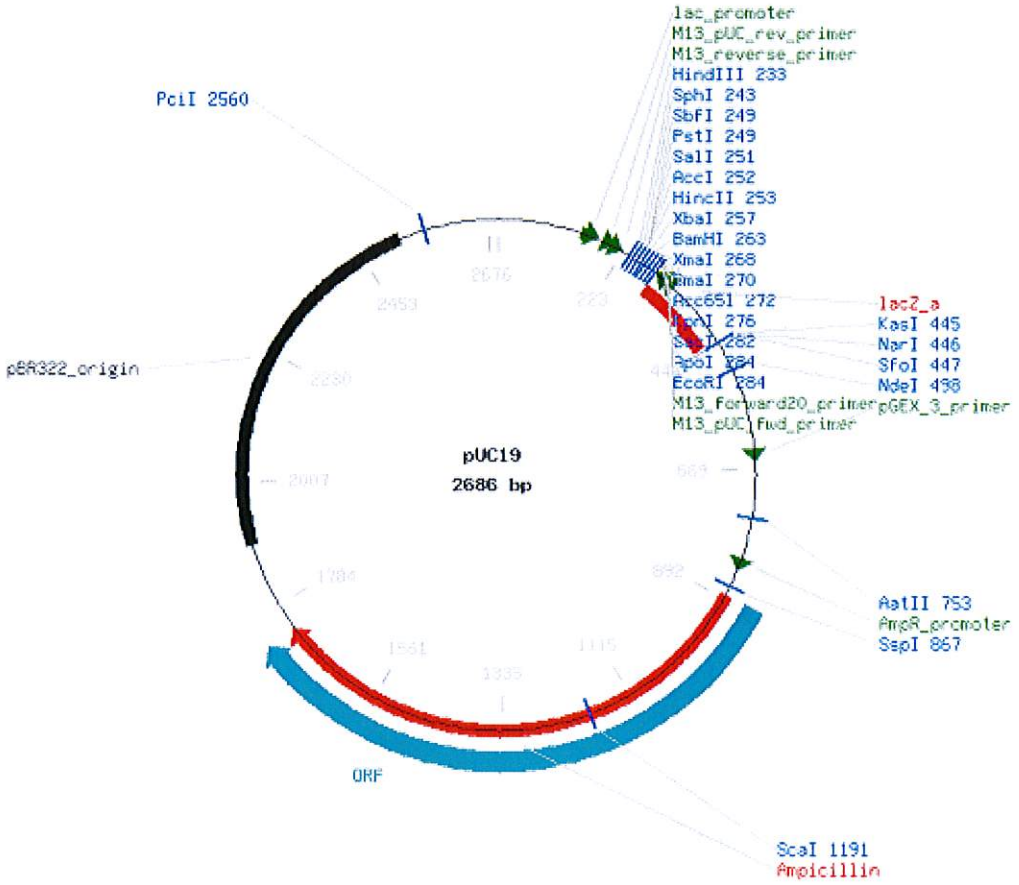




Fragment of pBABEpuro
51 bp (molecule 5169 bp)

11. pNL - variation of pUC18 with LacZ gene inserted

Plasmid Name pUC18 **Source/Vendor** ATCC
Plasmid Size 2686
Notes Expression Vector For Adjustable Expression Of Exogenous Genes In Prokaryotes; Patent number WO8809373-A/8 (01-DEC-1988). This patent sequence is not up-to-date. Expression vector with lacZ' as an insertional detection marker. Medium is 1227 LB plus ampicillin. GenBank entry #L08752 is not current with commercial entries. Hosts: E.coli JM103, E.coli DH5alpha, E.coli DH10B, E.coli TB1, E.coli JM83, E.coli JM105, E.coli JM109, E.coli NM522, E.coli K-12, E.coli. Related vectors: pBR322, M13mp18, pUC12, pUC19. (Information source: VectorDB.)
Catalog Number 37253
Link http://www.atcc.org/catalog/numSearch/numResults.cfm?atccNum=37253



12. pCCALL2-IRES-EGFP

Clone Data Sheet For Pin Laboratory

Construct Name: **pCCALL2-IRES-EGFP**

Constructed By: **Dr Corrinne Lobe corrinne.lobe@swchsc.on.ca**

Description: **LoxP sites flank the LacZ/neomycin gene, once removed by Cre the promoter is then adjacent to IRES-EGFP.**
Genes can be inserted in BglII and XhoI site upstream of IRES-EGFP.

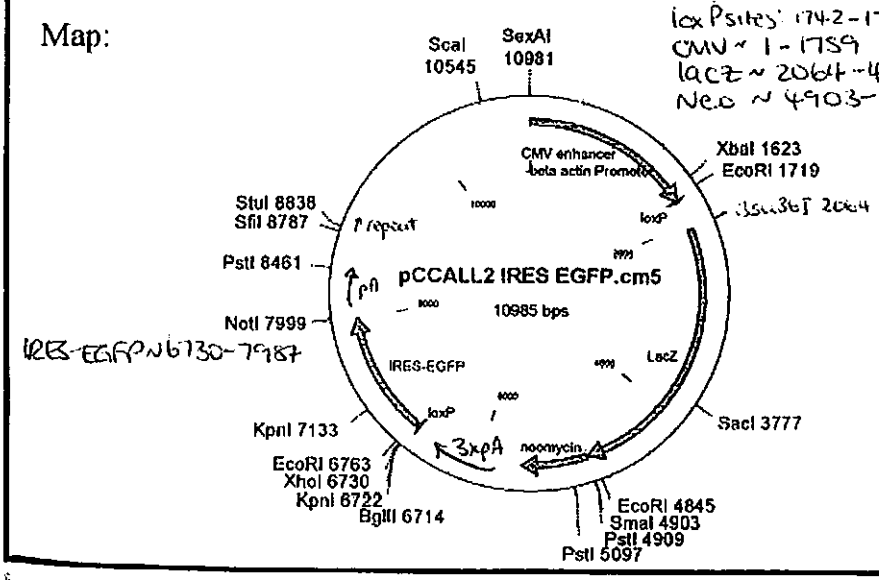
Origin and Modifications: **C.Lobe**

Pertinent References: **Genesis 28:147-155 (2000).**

Vector: Insertion Site: Insert Size: Digest Enzymes and Resulting Fragment Sizes:	Antibiotic Resistance: **Ampicillin** β-gal selection: **yes, but not after addition of Cre** Plasmid Stock Location: **-80C**

Map:

lox Psites: 174-2-1775 & 6680-6713
CMV ~ 1-1759
lacZ ~ 2064-4903
Neo ~ 4903-5580



IRES-EGFP ~ 6730-7987

primer for sequencing 6661-6680

13. pCR2.1

Clone Data Sheet For Pin Laboratory

Construct Name: ~~[illegible]~~ pCR 2.1 T/A CEACAM 1 (CC1)

Constructed By: ANTHONY DEANGELIS

Description: INVITROGEN plasmid containing sequence of the mouse CEACAM 1 (exon 2) inserted into the EcoRI site

Origin and Modifications: plasmid from Invitrogen (pCR2.1 T/A)
- insert was produced by RT-PCR

Pertinent References:

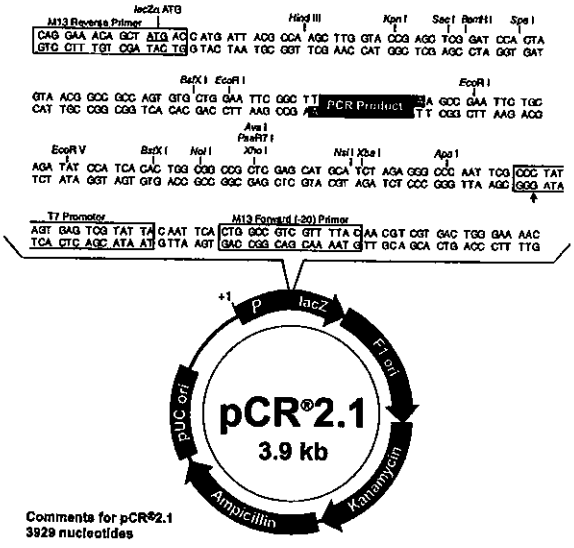
Vector: pCR2.1 T/A
Insertion Site: EcoRI
Insert Size: 280 bp

Digest Enzymes and
Resulting Fragment Sizes:

Antibiotic Resistance:
Kanamycin, Ampicillin
β-gal selection:

Plasmid Stock Location:
-80°C freezer

Map of pCR®2.1 The map of the linearized vector, pCR®2.1, is shown below. The arrow indicates the start of transcription for the T7 RNA polymerase. The complete sequence of pCR®2.1 is available from our Web site (www.invitrogen.com) or by contacting Technical Service (page 18).



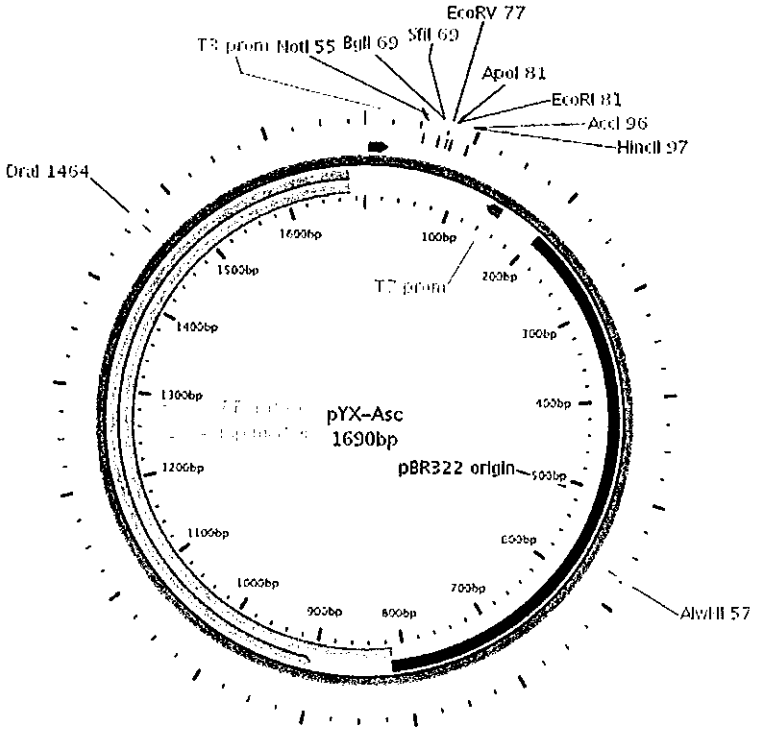
Comments for pCR®2.1
3929 nucleotides

LacZα gene: bases 1-545
M13 Reverse priming site: bases 205-221
T7 promoter: bases 362-381
M13 (-20) Forward priming site: bases 389-404
f1 origin: bases 546-983
Kanamycin resistance ORF: bases 1317-2111
Ampicillin resistance ORF: bases 2129-2989
pUC origin: bases 3134-3807

14. pYX-Asc (with ATF4 cloned into it)

Clone Data Sheet For Pin Laboratory

Construct Name: 30551592 (Activating transcription factor 4) ATF4	
Constructed By: I.M.A.G.E. Consortium [LLNL] c/o Barbara Kellam	
Description: Soares lab plasmid containing sequence of the mouse ATF4 inserted b/w EcoRI/NotI	
Origin and Modifications:	
Pertinent References:	
Vector: pYX-Asc 1690bp Insertion Site: 5' EcoRI / NotI 3' Insert Size:	Antibiotic Resistance: Chloramphenicol, ampicillin β-gal selection:
Digest Enzymes and Resulting Fragment Sizes:	Plasmid Stock Location:

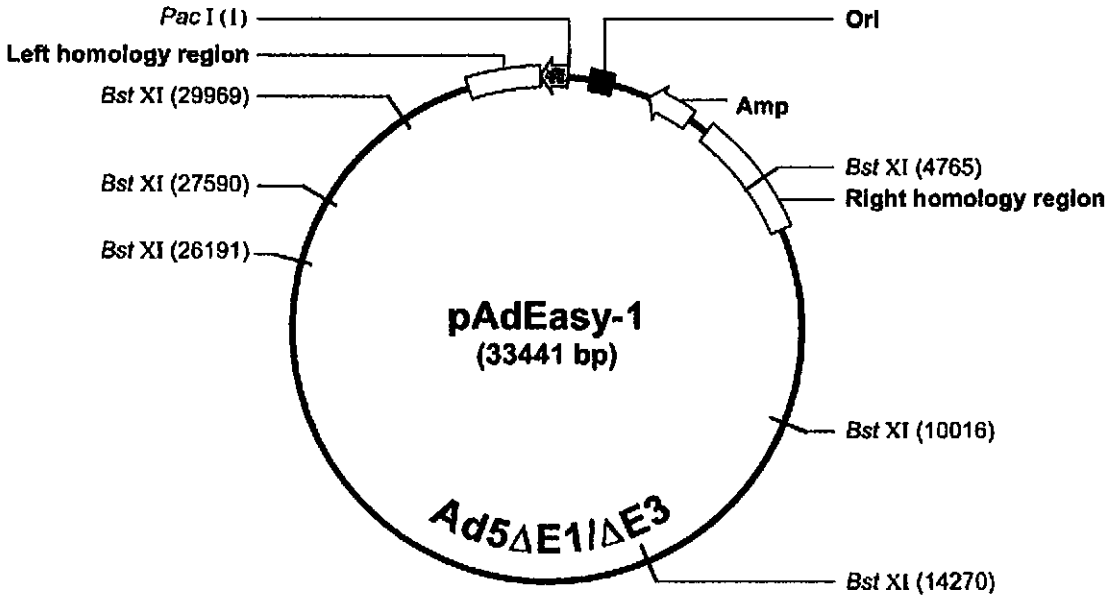


15. pAdEasy-1

pAdEasy-1 AES1010

The pAdEasy-1 vector is supplied in a closed circular plasmid format of 0.6 µg (100 ng/µL) in TE buffer.

pAdEasy-1 is a 33.4kb plasmid containing the adenovirus serotype 5 (Ad5) genome with deletions in the E1 (Ad5 nucleotides 1-3533) and E3 (Ad5 nucleotides 28,130-30,820) regions. Upon homologous recombination in bacteria with a transfer vector, in which a gene cassette of interest has been cloned, a new plasmid is generated with the expression cassette inserted into the E1 region of the adenovirus genome. This new recombinant plasmid is later transfected into QBI-293A cells to generate a recombinant adenovirus expressing the desired gene product. This plasmid contains a copy of the ampicillin resistance gene as well as the pBR322 origin of replication.



16. pCMV HNF3β, HNF3α and HNF6

CONSTRUCT NAME: CMV-HNF3-beta, CMV-HNF3-alpha, and CMV-HNF6

CONSTRUCTED BY: Robert Costa's lab

DESCRIPTION: mammalian expression vectors of the winged helix proteins HNF3-beta, HNF3-alpha and HNF6

ORIGIN & MODIFICATIONS:

VECTOR:

INSERTION SITE: 1600 bp

INSERT SIZE: EcoRI

DIGEST ENZYMES AND RESULTING FRAGMENT SIZES:

see map

ANTIBIOTIC RESISTANCE: Amp

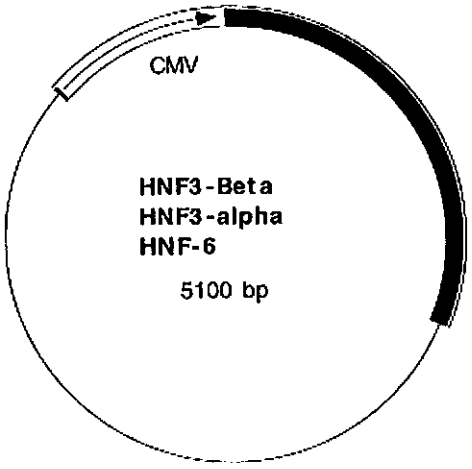
β-GAL SELECTION: No

AVAILABLE STOCKS

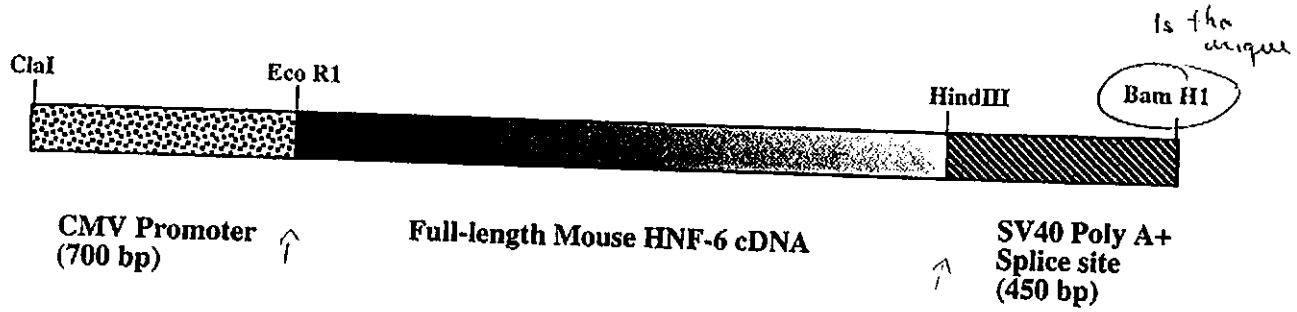
-80° DNA PLASMID STOCK
RACK#:
BOX ID:

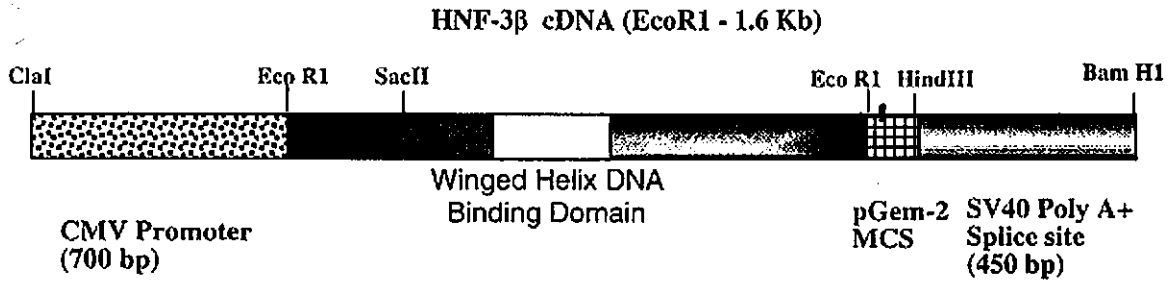
-80° C GLYCEROL STOCK
RACK #:
BOX I.D.:
Host: DH5

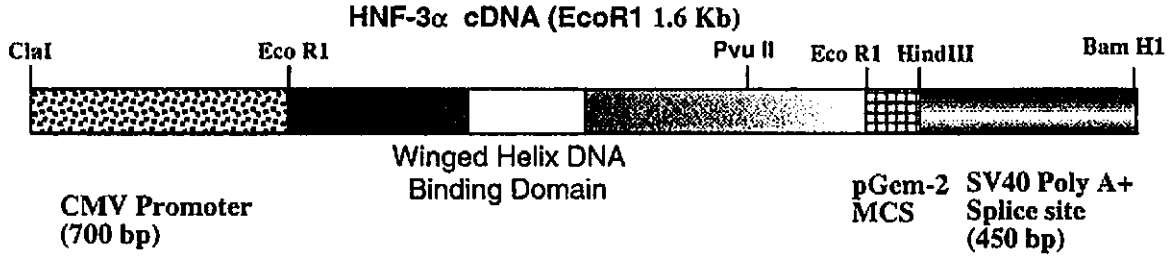
MAP:

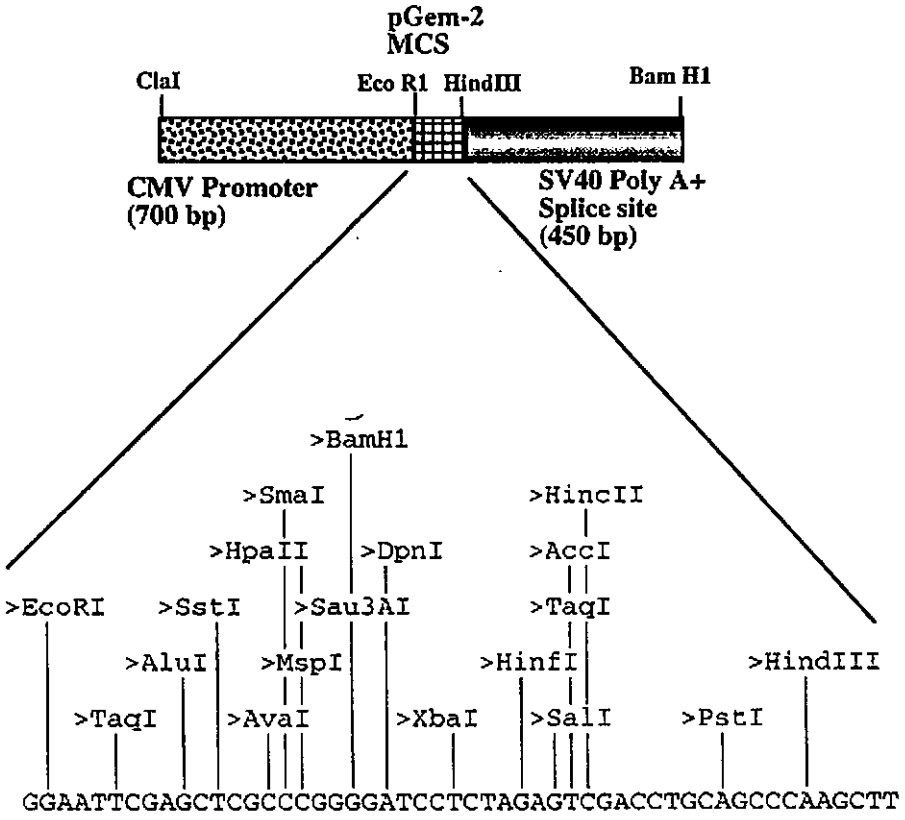


see attached maps


ClaI
Eco R1
HindIII
Bam H1
CMV Promoter
(700 bp)
Full-length Mouse HNF-6 cDNA
SV40 Poly A+
Splice site
(450 bp)

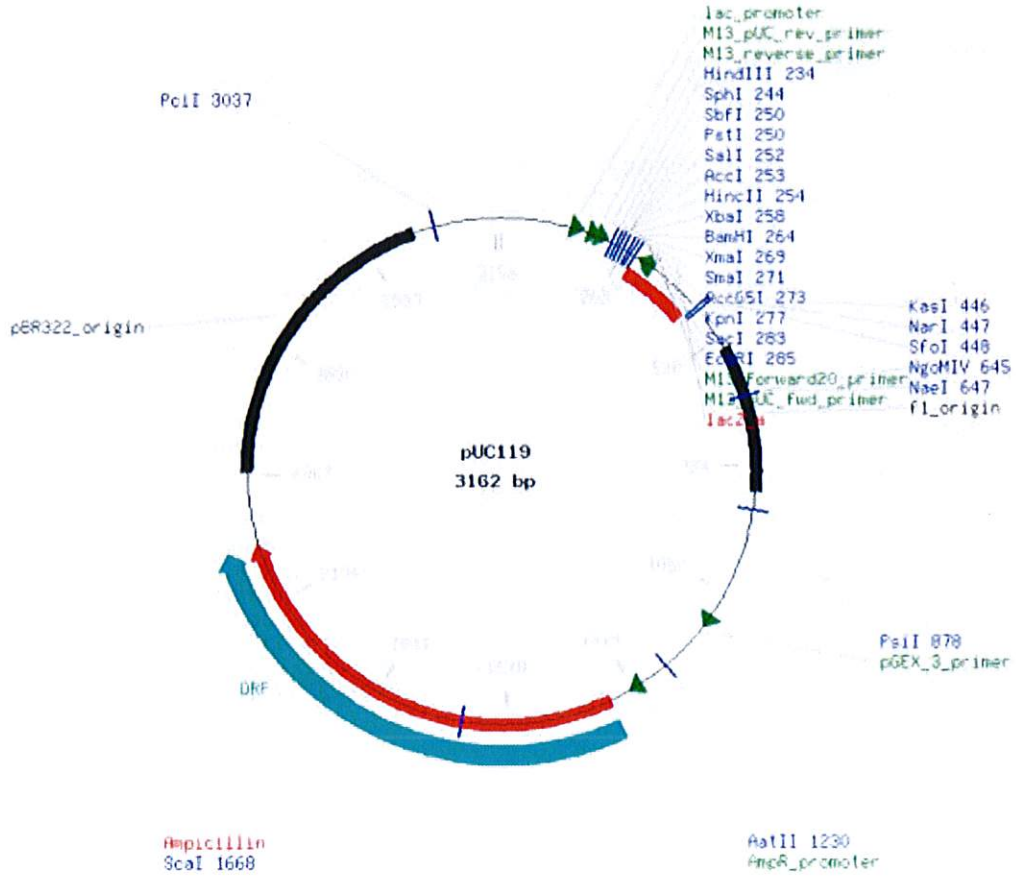

HNF-3β cDNA (EcoR1 - 1.6 Kb)
ClaI
Eco R1
SacII
Eco R1
HindIII
Bam H1
Winged Helix DNA
Binding Domain
CMV Promoter
(700 bp)
pGem-2
MCS
SV40 Poly A+
Splice site
(450 bp)


HNF-3α cDNA (EcoR1 1.6 Kb)
ClaI
Eco R1
Pvu II
Eco R1
HindIII
Bam H1
Winged Helix DNA
Binding Domain
CMV Promoter
(700 bp)
pGem-2
MCS
SV40 Poly A+
Splice site
(450 bp)


pGem-2
MCS
ClaI
Eco R1
HindIII
Bam H1
CMV Promoter
(700 bp)
SV40 Poly A+
Splice site
(450 bp)
>BamH1
>SmaI
>HincII
>HpaII
>DpnI
>AccI
>EcoRI
>SstI
>Sau3AI
>TaqI
>AluI
>MspI
>HinfI
>HindIII
>TaqI
>AvaI
>XbaI
>SalI
>PstI
GGAATTCGAGCTCGCCCGGGGATCCTCTAGAGTCGACCTGCAGCCCAAGCTT

17. pUC119

Plasmid Name	pUC119
Source/Vendor	ATCC
Plasmid Size	3162
Notes	A pUC derivative containing the IG (intergenic) region of M13 for production of ssDNA. Medium is 1227 LB plus ampicillin. NCBI gi: 464018 Hosts: E.coli JM103, E.coli JM101, E.coli JM105, E.coli. Related vectors: pUC19, pUC118. (Information source: VectorDB.)
Catalog Number	37461
Link	http://www.atcc.org/catalog/numSearch/numResults.cfm?atccNum=37461



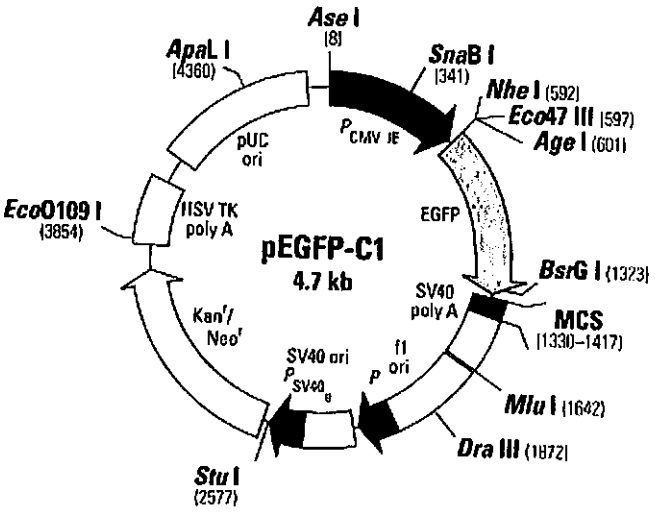
18. pEGFP-C1

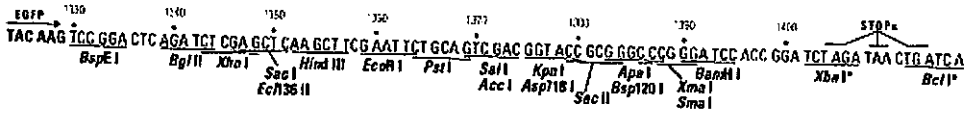
pEGFP-C1 Vector Information

GenBank Accession #: U55763

PT3028-5

Catalog #6084-1





Restriction Map and Multiple Cloning Site (MCS) of pEGFP-C1. All restriction sites shown are unique. The *Xba* I and *Bcl* I sites (*) are methylated in the DNA provided by BD Biosciences Clontech. If you wish to digest the vector with these enzymes, you will need to transform the vector into a *dam*⁻ host and make fresh DNA.

Description

pEGFP-C1 encodes a red-shifted variant of wild-type GFP (1–3) which has been optimized for brighter fluorescence and higher expression in mammalian cells. (Excitation maximum = 488 nm; emission maximum = 507 nm.) pEGFP-C1 encodes the GFPmut1 variant (4) which contains the double-amino-acid substitution of Phe-64 to Leu and Ser-65 to Thr. The coding sequence of the EGFP gene contains more than 190 silent base changes which correspond to human codon-usage preferences (5). Sequences flanking EGFP have been converted to a Kozak consensus translation initiation site (6) to further increase the translation efficiency in eukaryotic cells. The MCS in pEGFP-C1 is between the EGFP coding sequences and the SV40 poly A. Genes cloned into the MCS will be expressed as fusions to the C-terminus of EGFP if they are in the same reading frame as EGFP and there are no intervening stop codons. SV40 polyadenylation signals downstream of the EGFP gene direct proper processing of the 3' end of the EGFP mRNA. The vector backbone also contains an SV40 origin for replication in mammalian cells expressing the SV40 T-antigen. A neomycin resistance cassette (Neo'), consisting of the SV40 early promoter, the neomycin/kanamycin resistance gene of Tn5, and polyadenylation signals from the Herpes simplex virus thymidine kinase (HSV TK) gene, allows stably transfected eukaryotic cells to be selected using G418. A bacterial promoter upstream of this cassette expresses kanamycin resistance in *E. coli*. The pEGFP-C1 backbone also provides a pUC origin of replication for propagation in *E. coli* and an f1 origin for single-stranded DNA production.

(PR29971; published 03 October 2002)

19a. pGT-N28 - contains the neomycin resistance cassette

CONSTRUCT NAME: pGT-N28

CONSTRUCTED BY: New England Biolabs (received by C. Pin)

DESCRIPTION: Neomycin targeting vector with multiple cloning sites upstream and downstream of the Neo^R cassette

ORIGIN & MODIFICATIONS:

JOURNAL REFERENCE: Evans et al. (1995) *Biotechniques* 19, 130-135.
Capecchi, M.R. (1989) *Trends Genet.* 5, 70-76.

VECTOR: -

INSERTION SITE:

INSERT SIZE: neo cassette is ~ 1.8 kb

DIGEST ENZYMES AND RESULTING FRAGMENT SIZES:

EcoRI - linear
EcoRI/BamHI - 1.9 kb and 2.7 kb

ANTIBIOTIC RESISTANCE: Amp

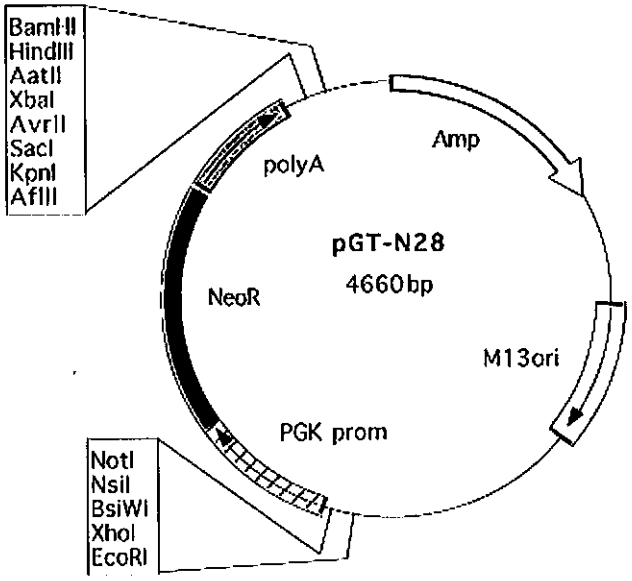
β-GAL SELECTION: No

AVAILABLE STOCKS

-80 DNA **PLASMID STOCK**
RACK#:
BOX ID :

-80° C GLYCEROL STOCK
RACK #:
BOX I.D.:
Host: DH5

MAP:



19b. pGT-N39 - contains the neomycin resistance cassette

CONSTRUCT NAME: pGT-N39

CONSTRUCTED BY: New England Biolabs (received by C. Pin)

DESCRIPTION: Neomycin targeting vector with multiple cloning sites upstream and downstream of the Neo^R cassette

ORIGIN & MODIFICATIONS:

JOURNAL REFERENCE: Evans et al. (1995) *Biotechniques* 19, 130-135.
Capecchi, M.R. (1989) *Trends Genet.* 5, 70-76.

VECTOR: -

INSERTION SITE:

INSERT SIZE: neo cassette is ~ 1.8 kb

DIGEST ENZYMES AND RESULTING FRAGMENT SIZES:

EcoRI - linear
EcoRI/HindIII - 1.9 kb and 2.7 kb

ANTIBIOTIC RESISTANCE: Amp

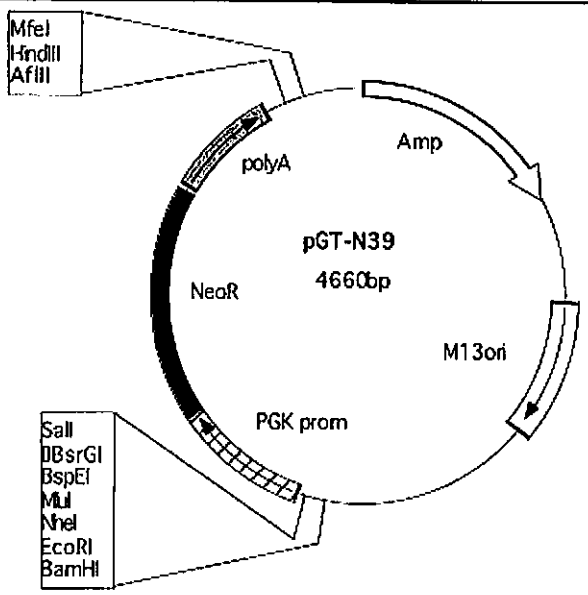
β-GAL SELECTION: No

AVAILABLE STOCKS

-80 DNA **PLASMID STOCK**
RACK#:
BOX ID :

-80° C GLYCEROL STOCK
RACK #:
BOX I.D.:
Host: DH5

MAP:



19c. pGT-N38 - contains the neomycin resistance cassette

CONSTRUCT NAME: pGT-N38

CONSTRUCTED BY: New England Biolabs (received by C. Pin)

DESCRIPTION: Neomycin targeting vector with multiple cloning sites upstream and downstream of the Neo^R cassette

ORIGIN & MODIFICATIONS:

JOURNAL REFERENCE: Evans et al. (1995) *Biotechniques* 19, 130-135.
Capecchi, M.R. (1989) *Trends Genet.* 5, 70-76.

VECTOR: -

INSERTION SITE:

INSERT SIZE: neo cassette is ~ 1.8 kb

DIGEST ENZYMES AND RESULTING FRAGMENT SIZES:

EcoRI - linear
EcoRI/HindIII - 1.9 kb and 2.7 kb

ANTIBIOTIC RESISTANCE: Amp

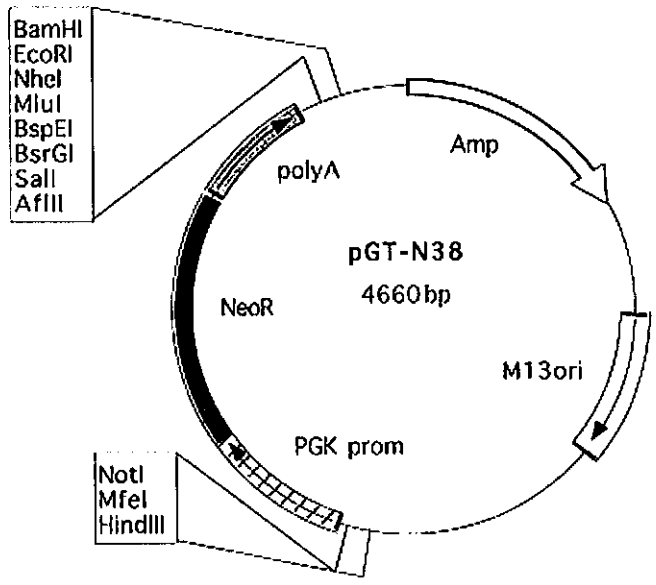
β-GAL SELECTION: No

AVAILABLE STOCKS

-80 DNA **PLASMID STOCK**
RACK#:
BOX ID :

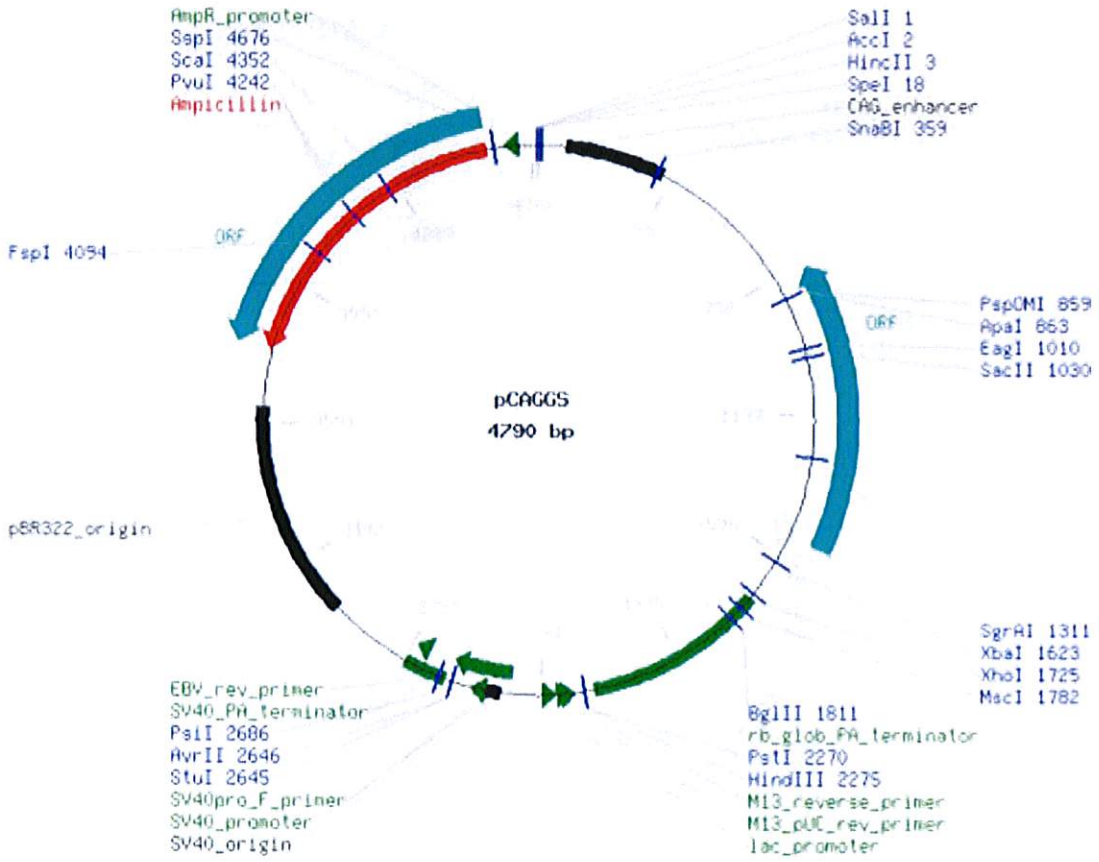
-80° C GLYCEROL STOCK
RACK #:
BOX I.D.:
Host: DH5

MAP:



20. pCAGGS

Plasmid Name	pCAGGS
Source/Vendor	BCCM
Plasmid Type	mammalian
Promoter	AG/CMV-IE/lac
Plasmid Size	4801
Bacterial Resistance	Amp
Notes	LMBP 2453. Sequence from the Laboratory of Molecular Genetics, The Institute of Medical Science, The University of Tokyo.
Link	http://www.belspo.be/bccm/db/plasmid_details2.asp?NM=pCAGGS target=_b...



Conforms to ANSI Z400.5-2004 Standard (United States)

Material Safety Data Sheet

Agilent Technologies

Stratagene pADEasy-1 Vector, Catalog #240005

1. Product and company identification

Product name : Stratagene pADEasy-1 Vector, Catalog #240005

Material uses : Analytical reagent.
0.025 ml

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

Part No. : 240005

Validation date : 10/14/2010

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

2. Hazards identification

Physical state : Liquid.

OSHA/HCS status : 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.

Emergency overview

Hazard statements : NOT EXPECTED TO PRODUCE SIGNIFICANT ADVERSE HEALTH EFFECTS WHEN THE RECOMMENDED INSTRUCTIONS FOR USE ARE FOLLOWED.

Precautions : No known significant effects or critical hazards. Avoid prolonged contact with eyes, skin and clothing.

Potential acute health effects

Inhalation : No known significant effects or critical hazards.

Ingestion : No known significant effects or critical hazards.

Skin : No known significant effects or critical hazards.

Eyes : No known significant effects or critical hazards.

Potential chronic health effects

Chronic effects : No known significant effects or critical hazards.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : No known significant effects or critical hazards.

Fertility effects : No known significant effects or critical hazards.

Over-exposure signs/symptoms

Inhalation : No specific data.

Ingestion : No specific data.

Skin : No specific data.

Eyes : No specific data.

Medical conditions aggravated by over-exposure : None known.

See toxicological information (section 11)

3. Composition/information on ingredients

Name	CAS number	%
No hazardous ingredient		

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

4. First aid measures

Eye contact : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention if symptoms occur.

Skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if symptoms occur.

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

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

Protection of first-aiders : No action shall be taken involving any personal risk or without suitable training.

Notes to physician : No specific treatment. Treat symptomatically. Contact poison treatment specialist immediately if large quantities have been ingested or inhaled.

5. Fire-fighting measures

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

Extinguishing media

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

Not suitable : None known.

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

Hazardous thermal decomposition products : No specific data.

Special protective equipment for fire-fighters : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6. Accidental release measures

Personal precautions : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Put on appropriate personal protective equipment (see Section 8).

Environmental precautions : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).

Methods for cleaning up : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.

7. Handling and storage

Handling : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas.

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

8. Exposure controls/personal protection

Ingredient
No exposure limit value known.

Consult local authorities for acceptable exposure limits.

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

Engineering measures : No special ventilation requirements. Good general ventilation should be sufficient to control worker exposure to airborne contaminants. If this product contains ingredients with exposure limits, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure below any recommended or statutory limits.

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

Personal protection

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

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

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

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

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

Other protection : Not available.

9. Physical and chemical properties

Physical state : Liquid.
Flash point : Not available.
Auto-ignition temperature : Not available.
Flammable limits : Not available.
Color : Not available.
Odor : Not available.
pH : 7.5
Boiling/condensation point : 100°C (212°F)
Melting/freezing point : 0°C (32°F)
Density : Not available.
Vapor pressure : Not available.
Vapor density : Not available.
Odor threshold : Not available.
Evaporation rate : Not available.
Solubility : Easily soluble in the following materials: cold water and hot water.

10. Stability and reactivity

Chemical stability : The product is stable.
Conditions to avoid : No specific data.
Materials to avoid : Reactive or incompatible with the following materials: oxidizing materials, reducing materials, metals, acids and alkalis.
Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

11. Toxicological information

Acute toxicity

Not available.

Irritation/Corrosion

Conclusion/Summary : Not available.

Sensitizer

Conclusion/Summary : Not available.

Chronic toxicity / Carcinogenicity / Mutagenicity / Teratogenicity / Reproductive toxicity

Not available.

12. Ecological information

Ecotoxicity : No known significant effects or critical hazards.
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. Empty containers or liners may retain some product residues. This material and its container must be disposed of in a safe way. Significant quantities of waste product residues should not be disposed of via the foul sewer but processed in a suitable effluent treatment plant. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. 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 : Not regulated.

U.S. Federal regulations : **TSCA 8(a) IUR**: Partial exemption
United States inventory (TSCA 8b): All components are listed or exempted.

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

Clean Water Act (CWA) 311: Edetic acid

Clean Air Act (CAA) 112 accidental release prevention: No products were found.

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

Clean Air Act Section 602 Class I Substances : Not listed

Clean Air Act Section 602 Class II Substances : Not listed

DEA List I Chemicals (Precursor Chemicals) : Not listed

DEA List II Chemicals (Essential Chemicals) : Not listed

State regulations

Massachusetts : None of the components are listed.

New York : None of the components are listed.

New Jersey : None of the components are listed.

15. Regulatory information

Pennsylvania : None of the components are listed.

California Prop. 65

No products were found.

16. Other information

Label requirements : NOT EXPECTED TO PRODUCE SIGNIFICANT ADVERSE HEALTH EFFECTS WHEN THE RECOMMENDED INSTRUCTIONS FOR USE ARE FOLLOWED.

Date of issue : 10/14/2010

Date of previous issue : No previous validation.

Version : 1

Indicates information that has changed from previously issued version.

Notice to reader

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

Material Safety Data Sheet

Version 5.0
Revision Date 09/19/2012
Print Date 10/10/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	L-Ethionine
Product Number	:	E1260
Brand	:	Sigma
Product Use	:	For laboratory research purposes.

Supplier	:	Sigma-Aldrich Canada, Ltd 2149 Winston Park Drive OAKVILLE ON L6H 6J8 CANADA	Manufacturer	: Sigma-Aldrich Corporation 3050 Spruce St. St. Louis, Missouri 63103 USA
Telephone	:	+1 9058299500		
Fax	:	+1 9058299292		
Emergency Phone # (For both supplier and manufacturer)	:	1-800-424-9300		
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956		

2. HAZARDS IDENTIFICATION

Emergency Overview

Target Organs

Liver

WHMIS Classification

D2B	Toxic Material Causing Other Toxic Effects	Moderate skin irritant Moderate respiratory irritant Moderate eye irritant

GHS Classification

Skin irritation (Category 2)
Eye irritation (Category 2A)
Specific target organ toxicity - single exposure (Category 3)

GHS Label elements, including precautionary statements

Pictogram

Signal word: Warning

Hazard statement(s)

H315	Causes skin irritation.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.

Precautionary statement(s)

P261	Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264	Wash skin thoroughly after handling.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves/ eye protection/ face protection.
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340	IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for

	breathing.
P305 + P351 + P338	IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P312	Call a POISON CENTER or doctor/ physician if you feel unwell.
P321	Specific treatment (see supplemental first aid instructions on this label).
P332 + P313	If skin irritation occurs: Get medical advice/ attention.
P337 + P313	If eye irritation persists: Get medical advice/ attention.
P362	Take off contaminated clothing and wash before reuse.
P403 + P233	Store in a well-ventilated place. Keep container tightly closed.
P405	Store locked up.
P501	Dispose of contents/ container to an approved waste disposal plant.

HMIS Classification

Health hazard:	2
Chronic Health Hazard:	*
Flammability:	0
Physical hazards:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : L-2-Amino-4-(ethylthio)butyric acid

Formula : $C_6H_{13}NO_2S$

Molecular Weight : 163.24 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
S-Ethyl-L-homocysteine			
13073-35-3	235-966-4	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NOx), Sulphur oxides

Explosion data - sensitivity to mechanical impact
no data available

Explosion data - sensitivity to static discharge
no data available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Do not let product enter drains.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Immersion protection
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:Dermatril® (Aldrich Z677272, Size M)

Splash protection
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 30 min
Material tested:Dermatril® (Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 873000, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an Industrial Hygienist familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Eye protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Specific engineering controls
Use mechanical exhaust or laboratory fumehood to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid
Colour	no data available

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 280 °C (536 °F) - dec.
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NOx), Sulphur oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
no data available

Inhalation LC50
Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

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

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
Inhalation - May cause respiratory irritation.

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. Causes respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. Causes skin irritation.
Eyes	Causes eye irritation.

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

Synergistic effects
no data available

Additional Information
RTECS: ES6825300

12. ECOLOGICAL INFORMATION

Toxicity

no data available

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

WHMIS Classification

D2B	Toxic Material Causing Other Toxic Effects	Moderate skin irritant Moderate respiratory irritant Moderate eye irritant

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

Further information

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 Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 5.0
Revision Date 04/23/2012
Print Date 10/10/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Tamoxifen

Product Number : T5648
Brand : Sigma
Product Use : For laboratory research purposes.

Supplier : Sigma-Aldrich Canada, Ltd
2149 Winston Park Drive
OAKVILLE ON L6H 6J8
CANADA

Manufacturer : Sigma-Aldrich Corporation
3050 Spruce St.
St. Louis, Missouri 63103
USA

Telephone : +1 9058299500
Fax : +1 9058299292
Emergency Phone # (For both supplier and manufacturer) : 1-800-424-9300
Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

Target Organs

Eyes, Liver, Kidney, Blood

WHMIS Classification

D2A Very Toxic Material Causing Other Toxic Effects — Teratogen, Carcinogen, Reproductive hazard

GHS Classification
Acute toxicity, Oral (Category 5)
Carcinogenicity (Category 1B)
Reproductive toxicity (Category 1B)
Effects on or via lactation

GHS Label elements, including precautionary statements

Pictogram

Signal word: Danger

Hazard statement(s)
H303 May be harmful if swallowed.
H350 May cause cancer.
H360 May damage fertility or the unborn child.
H362 May cause harm to breast-fed children.

Precautionary statement(s)
P201 Obtain special instructions before use.
P263 Avoid contact during pregnancy/ while nursing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.

HMIS Classification

Health hazard:	1
Chronic Health Hazard:	*
Flammability:	0
Physical hazards:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : (Z)-1-(p-Dimethylaminoethoxyphenyl)-1,2-diphenyl-1-butene
trans-2-[4-(1,2-Diphenyl-1-butenyl)phenoxy]-*N*,*N*-dimethylethylamine

Formula : $C_{26}H_{29}NO$ $C_{26}H_{29}NO$

Molecular Weight : 371.51 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Tamoxifen			
10540-29-1	234-118-0	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NOx)

Explosion data - sensitivity to mechanical impact
no data available

Explosion data - sensitivity to static discharge
no data available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Evacuate personnel to safe areas. Avoid breathing dust.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature: 2 - 8 °C

Light sensitive.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face particle respirator type N100 (US) or type P3 (EN 143) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Immersion protection
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 480 min
Material tested:Dermatril® (Aldrich Z677272, Size M)

Splash protection
Material: Nitrile rubber
Minimum layer thickness: 0.11 mm
Break through time: > 30 min
Material tested:Dermatril® (Aldrich Z677272, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 873000, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an Industrial Hygienist familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Eye protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Specific engineering controls
Use mechanical exhaust or laboratory fumehood to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid
Colour	no data available

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 97 - 98 °C (207 - 208 °F) - lit.
Boiling point	no data available
Flash point	not applicable
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
Light.

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NOx)
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - rat - 4,100 mg/kg

Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

no data available

Carcinogenicity

This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Possible human carcinogen

IARC:	1 - Group 1: Carcinogenic to humans (Tamoxifen)
ACGIH:	No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

Reproductive toxicity

May cause reproductive disorders.

Teratogenicity

Effects on or via lactation

Presumed human reproductive toxicant

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Synergistic effects
no data available

Additional Information
RTECS: KR5919600

12. ECOLOGICAL INFORMATION

Toxicity

no data available

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material. Dissolve or mix the material with a combustible solvent and burn in a chemical incinerator equipped with an afterburner and scrubber.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

WHMIS Classification

D2A	Very Toxic Material Causing Other Toxic Effects	Teratogen Carcinogen Reproductive hazard

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

Further information

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 Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Tunicamycin

sc-3506

Material Safety Data Sheet

Hazard Alert Code Key:	EXTREME	HIGH	MODERATE	LOW

Section 1 - CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME
Tunicamycin

STATEMENT OF HAZARDOUS NATURE
CONSIDERED A HAZARDOUS SUBSTANCE ACCORDING TO OSHA 29 CFR 1910.1200.

NFPA

SUPPLIER
Company: Santa Cruz Biotechnology, Inc.
Address:
2145 Delaware Ave
Santa Cruz, CA 95060
Telephone: 800.457.3801 or 831.457.3800
Emergency Tel: CHEMWATCH: From within the US and Canada: 877-715-9305
Emergency Tel: From outside the US and Canada: +800 2436 2255 (1-800-CHEMCALL) or call +613 9573 3112

PRODUCT USE
A tool to study glycoprotein synthesis in a wide variety of biological systems. Family of nucleoside antibiotics produced by Streptomyces lysosuperificus. Tunicamycin interferes with glycoprotein synthesis in yeast and mammalian systems and enhances antiviral and anticellular activity of interferon. Possesses cell-surface altering activity. Inhibits the transfer of N-acetylglucosamine-1-phosphate from UDP-N-acetylglucosamine to dolichol monophosphate and thereby blocks the formation of N-glycosidic protein-carbohydrate linkages. Active in vitro against Gram-positive bacteria, yeasts, fungi and viruses.

SYNONYMS
C39-H64-N4-O16, "(E)-N-[(2S, 3R, 4R, 5R, 6R)-2-[(2R, 3R, 4R, 5S, 6R)-3-acet", "(E)-N-[(2S, 3R, 4R, 5R, 6R)-2-[(2R, 3R, 4R, 5S, 6R)-3-acet", "amido-4, 5-dihydroxy-6-(hydroxymethyl)oxan-2-yl]oxy", "amido-4, 5-dihydroxy-6-(hydroxymethyl)oxan-2-yl]oxy", "-6-[2-[(2R, 3S, 4R, 5R)-5-(2, 4-dioxopyrimidin-1-yl)-3", "-6-[2-[(2R, 3S, 4R, 5R)-5-(2, 4-dioxopyrimidin-1-yl)-3", ", 4-dihydroxyoxolan-2-yl]-2-hydroxyethyl]-4, 5-dihyd", ", 4-dihydroxyoxolan-2-yl]-2-hydroxyethyl]-4, 5-dihyd", roxyoxan-3-yl]-5-methylhex-2-enamide, roxyoxan-3-yl]-5-methylhex-2-enamide, "nucleoside antibiotic"

Section 2 - HAZARDS IDENTIFICATION

CANADIAN WHMIS SYMBOLS

EMERGENCY OVERVIEW
RISK
Very toxic if swallowed.

POTENTIAL HEALTH EFFECTS
ACUTE HEALTH EFFECTS

SWALLOWED

■ Severely toxic effects may result from the accidental ingestion of the material; animal experiments indicate that ingestion of less than 5 gram may be fatal or may produce serious damage to the health of the individual.

EYE

■ Although the material is not thought to be an irritant, direct contact with the eye may cause transient discomfort characterized by tearing or conjunctival redness (as with windburn). Slight abrasive damage may also result. The material may produce foreign body irritation in certain individuals.

SKIN

■ The material is not thought to be a skin irritant (as classified using animal models). Abrasive damage however, may result from prolonged exposures. Good hygiene practice requires that exposure be kept to a minimum and that suitable gloves be used in an occupational setting.
■ Skin contact with the material may damage the health of the individual; systemic effects may result following absorption.
■ Open cuts, abraded or irritated skin should not be exposed to this material.
■ Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.

INHALED

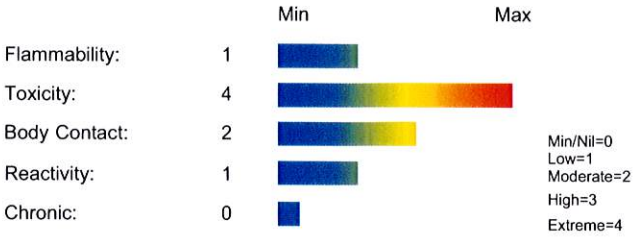
■ The material is not thought to produce respiratory irritation (as classified using animal models). Nevertheless inhalation of dusts, or fume, especially for prolonged periods, may produce respiratory discomfort and occasionally, distress.
■ Inhalation of dusts, generated by the material during the course of normal handling, may produce serious damage to the health of the individual.
■ Persons with impaired respiratory function, airway diseases and conditions such as emphysema or chronic bronchitis, may incur further disability if excessive concentrations of particulate are inhaled.

CHRONIC HEALTH EFFECTS

■ Long-term exposure to the product is not thought to produce chronic effects adverse to the health (as classified using animal models); nevertheless exposure by all routes should be minimized as a matter of course.
Long term exposure to high dust concentrations may cause changes in lung function i.e. pneumoconiosis; caused by particles less than 0.5 micron penetrating and remaining in the lung. Prime symptom is breathlessness; lung shadows show on X-ray.

Section 3 - COMPOSITION / INFORMATION ON INGREDIENTS

HAZARD RATINGS



NAME	CAS RN	%
tunicamycin	11089-65-9	>98

Section 4 - FIRST AID MEASURES

SWALLOWED

■

- Give a slurry of activated charcoal in water to drink. NEVER GIVE AN UNCONSCIOUS PATIENT WATER TO DRINK.
- At least 3 tablespoons in a glass of water should be given.
- Although induction of vomiting may be recommended (IN CONSCIOUS PERSONS ONLY), such a first aid measure is dissuaded because to the risk of aspiration of stomach contents. (i) It is better to take the patient to a doctor who can decide on the necessity and method of emptying the stomach. (ii) Special circumstances may however exist; these include non- availability of charcoal and the ready availability of the doctor.

NOTE: If vomiting is induced, lean patient forward or place on left side (head-down position, if possible) to maintain open airway and prevent aspiration. NOTE: Wear protective gloves when inducing vomiting.

- REFER FOR MEDICAL ATTENTION WITHOUT DELAY.
- In the mean time, qualified first-aid personnel should treat the patient following observation and employing supportive measures as indicated by the patient's condition.
- If the services of a medical officer or medical doctor are readily available, the patient should be placed in his/her care and a copy of the MSDS should be provided. Further action will be the responsibility of the medical specialist.
- If medical attention is not available on the worksite or surroundings send the patient to a hospital together with a copy of the MSDS.

(ICSC20305/20307).

EYE

■ If this product comes in contact with the eyes:

- Immediately hold eyelids apart and flush the eye continuously with running water.
- Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.
- Continue flushing until advised to stop by the Poisons Information Center or a doctor, or for at least 15 minutes.
- Transport to hospital or doctor without delay.
- Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.

SKIN

■ If skin contact occurs:

- Immediately remove all contaminated clothing, including footwear
- Flush skin and hair with running water (and soap if available).
- Seek medical attention in event of irritation.

INHALED

■

- If fumes or combustion products are inhaled remove from contaminated area.
- Lay patient down. Keep warm and rested.
- Prostheses such as false teeth, which may block airway, should be removed, where possible, prior to initiating first aid procedures.
- Apply artificial respiration if not breathing, preferably with a demand valve resuscitator, bag-valve mask device, or pocket mask as trained. Perform CPR if necessary.
- Transport to hospital, or doctor, without delay.

NOTES TO PHYSICIAN

■ Treat symptomatically.
for poisons (where specific treatment regime is absent):

BASIC TREATMENT

- Establish a patent airway with suction where necessary.
- Watch for signs of respiratory insufficiency and assist ventilation as necessary.
- Administer oxygen by non-rebreather mask at 10 to 15 l/min.
- Monitor and treat, where necessary, for pulmonary edema .
- Monitor and treat, where necessary, for shock.
- Anticipate seizures .
- DO NOT use emetics. Where ingestion is suspected rinse mouth and give up to 200 ml water (5 ml/kg recommended) for dilution where patient is able to swallow, has a strong gag reflex and does not drool.

ADVANCED TREATMENT

- Consider orotracheal or nasotracheal intubation for airway control in unconscious patient or where respiratory arrest has occurred.
- Positive-pressure ventilation using a bag-valve mask might be of use.
- Monitor and treat, where necessary, for arrhythmias.
- Start an IV D5W TKO. If signs of hypovolemia are present use lactated Ringers solution. Fluid overload might create complications.
- Drug therapy should be considered for pulmonary edema.
- Hypotension with signs of hypovolemia requires the cautious administration of fluids. Fluid overload might create complications.
- Treat seizures with diazepam.
- Proparacaine hydrochloride should be used to assist eye irrigation.

BRONSTEIN, A.C. and CURRANCE, P.L.
EMERGENCY CARE FOR HAZARDOUS MATERIALS EXPOSURE: 2nd Ed. 1994.

Section 5 - FIRE FIGHTING MEASURES

Vapour Pressure (mmHG):	Negligible
Upper Explosive Limit (%):	Not available.
Specific Gravity (water=1):	Not available
Lower Explosive Limit (%):	Not available

EXTINGUISHING MEDIA

■

- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.
- Water spray or fog - Large fires only.

FIRE FIGHTING

■

- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Use fire fighting procedures suitable for surrounding area.
- DO NOT approach containers suspected to be hot.
- Cool fire exposed containers with water spray from a protected location.
- If safe to do so, remove containers from path of fire.
- Equipment should be thoroughly decontaminated after use.

GENERAL FIRE HAZARDS/HAZARDOUS COMBUSTIBLE PRODUCTS

■

- Combustible solid which burns but propagates flame with difficulty.
- Avoid generating dust, particularly clouds of dust in a confined or unventilated space as dusts may form an explosive mixture with air, and any source of ignition, i.e. flame or spark, will cause fire or explosion. Dust clouds generated by the fine grinding of the solid are a particular hazard; accumulations of fine dust may burn rapidly and fiercely if ignited.
- Dry dust can be charged electrostatically by turbulence, pneumatic transport, pouring, in exhaust ducts and during transport.
- Build-up of electrostatic charge may be prevented by bonding and grounding.

- Powder handling equipment such as dust collectors, dryers and mills may require additional protection measures such as explosion venting.

Combustion products include: carbon monoxide (CO), carbon dioxide (CO_2), nitrogen oxides (NOx), other pyrolysis products typical of burning organic material.
May emit poisonous fumes.

FIRE INCOMPATIBILITY

■ Avoid contamination with oxidizing agents i.e. nitrates, oxidizing acids,chlorine bleaches, pool chlorine etc. as ignition may result.

PERSONAL PROTECTION

Glasses:
Gloves:
Respirator:
Particulate

Section 6 - ACCIDENTAL RELEASE MEASURES

MINOR SPILLS

■

- Clean up waste regularly and abnormal spills immediately.
- Avoid breathing dust and contact with skin and eyes.
- Wear protective clothing, gloves, safety glasses and dust respirator.
- Use dry clean up procedures and avoid generating dust.
- Vacuum up or sweep up. NOTE: Vacuum cleaner must be fitted with an exhaust micro filter (HEPA type) (consider explosion-proof machines designed to be grounded during storage and use).
- Dampen with water to prevent dusting before sweeping.
- Place in suitable containers for disposal.

MAJOR SPILLS

■

- Clear area of personnel and move upwind.
- Alert Emergency Responders and tell them location and nature of hazard.
- Wear full body protective clothing with breathing apparatus.
- Prevent, by any means available, spillage from entering drains or water course.
- Stop leak if safe to do so.
- Contain spill with sand, earth or vermiculite.
- Collect recoverable product into labeled containers for recycling.
- Neutralize/decontaminate residue.
- Collect solid residues and seal in labeled drums for disposal.
- Wash area and prevent runoff into drains.
- After clean up operations, decontaminate and launder all protective clothing and equipment before storing and re-using.
- If contamination of drains or waterways occurs, advise emergency services.

ACUTE EXPOSURE GUIDELINE LEVELS (AEGL) (in ppm)

AEGL 1: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience notable discomfort, irritation, or certain asymptomatic nonsensory effects. However, the effects are not disabling and are transient and reversible upon cessation of exposure.
AEGL 2: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
AEGL 3: The airborne concentration of a substance above which it is predicted that the general population, including susceptible individuals, could experience life-threatening health effects or death.

Section 7 - HANDLING AND STORAGE

PROCEDURE FOR HANDLING

■

- Avoid all personal contact, including inhalation.
- Wear protective clothing when risk of exposure occurs.
- Use in a well-ventilated area.
- Prevent concentration in hollows and sumps.
- DO NOT enter confined spaces until atmosphere has been checked.
- DO NOT allow material to contact humans, exposed food or food utensils.
- Avoid contact with incompatible materials.
- When handling, DO NOT eat, drink or smoke.
- Keep containers securely sealed when not in use.
- Avoid physical damage to containers.
- Always wash hands with soap and water after handling.
- Work clothes should be laundered separately.
- Launder contaminated clothing before re-use.
- Use good occupational work practice.
- Observe manufacturer's storing and handling recommendations.
- Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.

Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.

- Do NOT cut, drill, grind or weld such containers
- In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.

RECOMMENDED STORAGE METHODS

■ Glass container.

- Lined metal can, Lined metal pail/drum
- Plastic pail
- Polyliner drum
- Packing as recommended by manufacturer.
- Check all containers are clearly labeled and free from leaks.

For low viscosity materials:

- Drums and jerricans must be of the non-removable head type.
- Where a can is to be used as an inner package, the can must have a screwed enclosure.

For materials with a viscosity of at least 2680 cSt. (23 deg. C) and solids (between 15 C deg. and 40 deg C.):

- Removable head packaging;
- Cans with friction closures and
- low pressure tubes and cartridges may be used.

- Where combination packages are used, and the inner packages are of glass, there must be sufficient inert cushioning material in contact with inner and outer packages * . - In addition, where inner packagings are glass and contain liquids of packing group I and II there must be sufficient inert absorbent to absorb any spillage *. - * unless the outer packaging is a close fitting molded plastic box and the substances are not incompatible with the plastic. All inner and sole packagings for substances that have been assigned to Packaging Groups I or II on the basis of inhalation toxicity criteria, must be hermetically sealed.

STORAGE REQUIREMENTS

■

- Store in original containers.
- Keep containers securely sealed.
- Store in a cool, dry, well-ventilated area.
- Store away from incompatible materials and foodstuff containers.
- Protect containers against physical damage and check regularly for leaks.
- Observe manufacturer's storing and handling recommendations.

SAFE STORAGE WITH OTHER CLASSIFIED CHEMICALS

X X + X X +

X: Must not be stored together
O: May be stored together with specific preventions
+: May be stored together

Section 8 - EXPOSURE CONTROLS / PERSONAL PROTECTION

EXPOSURE CONTROLS

Source	Material	TWA ppm	TWA mg/m³	STEL ppm	STEL mg/m³	Peak ppm	Peak mg/m³	TWA F/CC	Notes
US - Oregon Permissible Exposure Limits (Z3)	tunicamycin (Inert or Nuisance Dust: (d) Total dust)		10						*
US OSHA Permissible Exposure Levels (PELs) - Table Z3	tunicamycin (Inert or Nuisance Dust: (d) Respirable fraction)		5						
US OSHA Permissible Exposure Levels (PELs) - Table Z3	tunicamycin (Inert or Nuisance Dust: (d) Total dust)		15						
US - Hawaii Air Contaminant Limits	tunicamycin (Particulates not other wise regulated - Total dust)		10						
US - Hawaii Air Contaminant Limits	tunicamycin (Particulates not other wise regulated - Respirable fraction)		5						
US - Oregon Permissible Exposure Limits (Z3)	tunicamycin (Inert or Nuisance Dust: (d) Respirable fraction)		5						*
US - Tennessee Occupational Exposure Limits - Limits For Air Contaminants	tunicamycin (Particulates not otherwise regulated Respirable fraction)		5						
US - Wyoming Toxic and Hazardous Substances Table Z1 Limits for Air Contaminants	tunicamycin (Particulates not otherwise regulated (PNOR)(f)-Respirable fraction)		5						
US - Michigan Exposure Limits for	tunicamycin (Particulates not otherwise regulated, Respirable		5						

Air Contaminants	otherwise regulated, Respirable dust)	5

MATERIAL DATA

TUNICAMYCIN:

■ Airborne particulate or vapor must be kept to levels as low as is practicably achievable given access to modern engineering controls and monitoring hardware. Biologically active compounds may produce idiosyncratic effects which are entirely unpredictable on the basis of literature searches and prior clinical experience (both recent and past).

PERSONAL PROTECTION




Consult your EHS staff for recommendations

EYE

■

- Chemical protective goggles with full seal
- Shielded mask (gas-type)
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lens or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59]

HANDS/FEET

■ Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include: such as:

- frequency and duration of contact,
- chemical resistance of glove material,
- glove thickness and
- dexterity

Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739).

- When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374) is recommended.
- When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374) is recommended.
- Contaminated gloves should be replaced.

Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.

- Rubber gloves (nitrile or low-protein, powder-free latex). Employees allergic to latex gloves should use nitrile gloves in preference.
- Double gloving should be considered.
- PVC gloves.
- Protective shoe covers.
- Head covering.

OTHER

■

- For quantities up to 500 grams a laboratory coat may be suitable.
- For quantities up to 1 kilogram a disposable laboratory coat or coverall of low permeability is recommended. Coveralls should be buttoned at collar and cuffs.
- For quantities over 1 kilogram and manufacturing operations, wear disposable coverall of low permeability and disposable shoe covers.
- For manufacturing operations, air-supplied full body suits may be required for the provision of advanced respiratory protection.
- Eye wash unit.
- Ensure there is ready access to an emergency shower.
- For Emergencies: Vinyl suit
- Handle extremely poisonous natural toxins in closed systems such as glove bags or other enclosures, to avoid accidental contact. Workers should wear complete disposable clothing including shoe covers, gloves and mask with an independent air supply.

■

- Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory . These may be government mandated or vendor recommended.
- Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- Use approved positive flow mask if significant quantities of dust becomes airborne.
- Try to avoid creating dust conditions.

RESPIRATOR

■

Protection Factor	Half-Face Respirator	Full-Face Respirator	Powered Air Respirator

10 x PEL	P1	-	PAPR-P1
	Air-line*	-	-
50 x PEL	Air-line**	P2	PAPR-P2
100 x PEL	-	P3	-
		Air-line*	-
100+ x PEL	-	Air-line**	PAPR-P3

* - Negative pressure demand ** - Continuous flow
Explanation of Respirator Codes:
Class 1 low to medium absorption capacity filters.
Class 2 medium absorption capacity filters.
Class 3 high absorption capacity filters.
PAPR Powered Air Purifying Respirator (positive pressure) cartridge.
Type A for use against certain organic gases and vapors.
Type AX for use against low boiling point organic compounds (less than 65°C).
Type B for use against certain inorganic gases and other acid gases and vapors.
Type E for use against sulfur dioxide and other acid gases and vapors.
Type K for use against ammonia and organic ammonia derivatives
Class P1 intended for use against mechanically generated particulates of sizes most commonly encountered in industry, e.g. asbestos, silica.
Class P2 intended for use against both mechanically and thermally generated particulates, e.g. metal fume.
Class P3 intended for use against all particulates containing highly toxic materials, e.g. beryllium.
The local concentration of material, quantity and conditions of use determine the type of personal protective equipment required.
Use appropriate NIOSH-certified respirator based on informed professional judgement. In conditions where no reasonable estimate of exposure can be made, assume the exposure is in a concentration IDLH and use NIOSH-certified full face pressure demand SCBA with a minimum service life of 30 minutes, or a combination full facepiece pressure demand SAR with auxiliary self-contained air supply. Respirators provided only for escape from IDLH atmospheres shall be NIOSH-certified for escape from the atmosphere in which they will be used.

ENGINEERING CONTROLS

■ For potent pharmacological agents:
Powders
To prevent contamination and overexposure, no open handling of powder should be allowed.

- Powder handling operations are to be done in a powders weighing hood, a glove box, or other equivalent ventilated containment system.
- In situations where these ventilated containment hoods have not been installed, a non-ventilated enclosed containment hood should be used.
- Pending changes resulting from additional air monitoring data, up to 300 mg can be handled outside of an enclosure provided that no grinding, crushing or other dust-generating process occurs.
- An air-purifying respirator should be worn by all personnel in the immediate area in cases where non-ventilated containment is used, where significant amounts of material (e.g., more than 2 grams) are used, or where the material may become airborne (as through grinding, etc.).
- Powder should be put into solution or a closed or covered container after handling.
- If using a ventilated enclosure that has not been validated, wear a half-mask respirator equipped with HEPA cartridges until the enclosure is validated for use.

Solutions Handling:

- Solutions can be handled outside a containment system or without local exhaust ventilation during procedures with no potential for aerosolisation. If the procedures have a potential for aerosolisation, an air-purifying respirator is to be worn by all personnel in the immediate area.
- Solutions used for procedures where aerosolisation may occur (e.g., vortexing, pumping) are to be handled within a containment system or with local exhaust ventilation.
- In situations where this is not feasible (may include animal dosing), an air-purifying respirator is to be worn by all personnel in the immediate area. If using a ventilated enclosure that has not been validated, wear a half-mask respirator equipped with HEPA cartridges until the enclosure is validated for use.
- Ensure gloves are protective against solvents in use.

Unless written procedures, specific to the workplace are available, the following is intended as a guide:

- For Laboratory-scale handling of Substances assessed to be toxic by inhalation. Quantities of up to 25 grams may be handled in Class II biological safety cabinets *; Quantities of 25 grams to 1 kilogram may be handled in Class II biological safety cabinets* or equivalent containment systems Quantities exceeding 1 kg may be handled either using specific containment, a hood or Class II biological safety cabinet*,
- HEPA terminated local exhaust ventilation should be considered at point of generation of dust, fumes or vapors.
- The need for respiratory protection should also be assessed where incidental or accidental exposure is anticipated. Dependent on levels of contamination, PAPR, full face air purifying devices with P2 or P3 filters or air supplied respirators should be evaluated. When handling: Quantities of up to 25 grams, an approved respirator with HEPA filters or cartridges should be considered Quantities of 25 grams to 1 kilogram, a half-face negative pressure, full negative pressure, or powered helmet-type air purifying respirator should be considered. Quantities in excess of 1 kilogram, a full face negative pressure, helmet-type air purifying, or supplied air respirator should be considered.

Written procedures, specific to a particular work-place, may replace these recommendations
* For Class II Biological Safety Cabinets, Types B2 or B3 should be considered. Where only Class I, open fronted Cabinets are available, glove panels may be added, Laminar flow cabinets do not provide sufficient protection when handling these materials unless especially designed to do so.
Air should be supplied by an independent system.

Section 9 - PHYSICAL AND CHEMICAL PROPERTIES

PHYSICAL PROPERTIES

Solid.
Does not mix with water.

State	Divided solid	Molecular Weight	840
Melting Range (°F)	453.2- 455 (decomp)	Viscosity	Not Applicable

Boiling Range (°F)	Not available	Solubility in water (g/L)	Partly miscible
Flash Point (°F)	Not available	pH (1% solution)	Not applicable
Decomposition Temp (°F)	Not Available	pH (as supplied)	Not applicable
Autoignition Temp (°F)	Not available	Vapour Pressure (mmHG)	Negligible
Upper Explosive Limit (%)	Not available.	Specific Gravity (water=1)	Not available
Lower Explosive Limit (%)	Not available	Relative Vapor Density (air=1)	Not Applicable
Volatile Component (%vol)	Negligible	Evaporation Rate	Not applicable

APPEARANCE

White crystalline powder; does not mix well with water. Soluble in alkaline water, pyridine, hot methanol. A mixture containing at least 10 homologous molecules with the main components described variously as tunicamycins V, VII, II and X or A, B, C, D. The tunicamycins contain uracil, N-acetylglucosamine, an 11-carbon aminodialdose (tunicamine) and a fatty acid linked to the amino group of tunicamine.

Section 10 - CHEMICAL STABILITY

CONDITIONS CONTRIBUTING TO INSTABILITY

■

- Presence of incompatible materials.
- Product is considered stable.
- Hazardous polymerization will not occur.

STORAGE INCOMPATIBILITY

■ Avoid reaction with oxidizing agents.

For incompatible materials - refer to Section 7 - Handling and Storage.

Section 11 - TOXICOLOGICAL INFORMATION

tunicamycin

TOXICITY AND IRRITATION

■ No significant acute toxicological data identified in literature search.
Effects on fertility recorded.

Section 12 - ECOLOGICAL INFORMATION

Refer to data for ingredients, which follows:
TUNICAMYCIN:
■ DO NOT discharge into sewer or waterways.

Section 13 - DISPOSAL CONSIDERATIONS

Disposal Instructions

All waste must be handled in accordance with local, state and federal regulations.
¦ Puncture containers to prevent re-use and bury at an authorized landfill.
Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked.
A Hierarchy of Controls seems to be common - the user should investigate:

- Reduction
- Reuse
- Recycling
- Disposal (if all else fails)

This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.
DO NOT allow wash water from cleaning equipment to enter drains. Collect all wash water for treatment before disposal.

- Recycle wherever possible. Special hazard may exist - specialist advicemay be required.
- Consult manufacturer for recycling options.
- Consult Waste Management Authority for disposal.
- Bury or incinerate residue at an approved site.
- Decontaminate empty containers. Observe all label safeguards untilcontainers are cleaned and destroyed.
- Puncture containers to prevent re-use and bury at an authorized landfill.

Section 14 - TRANSPORTATION INFORMATION

DOT:

Symbols:	None	Hazard class or Division:	6.1
Identification Numbers:	UN3462	PG:	II
Label Codes:	6.1	Special provisions:	141, IB8, IP2, IP4, T3 TP33
Packaging: Exceptions:	None	Packaging: Non-bulk:	212
Packaging: Exceptions:	None	Quantity limitations: Passenger aircraft/rail:	25 kg
Quantity Limitations: Cargo aircraft only:	100 kg	Vessel stowage: Location:	B
Vessel stowage: Other:	None		

Hazardous materials descriptions and proper shipping names:
Toxins, extracted from living sources, solid, n.o.s.

Air Transport IATA:

ICAO/IATA Class:	6.1	ICAO/IATA Subrisk:	None
UN/ID Number:	3462	Packing Group:	II
Special provisions:	A3		

Shipping Name: TOXINS, EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S. *(CONTAINS TUNICAMYCIN)

Maritime Transport IMDG:

IMDG Class:	6.1	IMDG Subrisk:	None
UN Number:	3462	Packing Group:	II
EMS Number:	F-A,S-A	Special provisions:	210 274
Limited Quantities:	500 g		

Shipping Name: TOXINS EXTRACTED FROM LIVING SOURCES, SOLID, N.O.S.(contains tunicamycin)

Section 15 - REGULATORY INFORMATION

tunicamycin (CAS: 11089-65-9) is found on the following regulatory lists;
"US - Hawaii Air Contaminant Limits","US - Oregon Permissible Exposure Limits (Z3)","US OSHA Permissible Exposure Levels (PELs) - Table Z3"

Section 16 - OTHER INFORMATION

LIMITED EVIDENCE

- Skin contact may produce health damage*.
- Inhalation may produce serious health damage*.

* (limited evidence).

Reasonable care has been taken in the preparation of this information, but the author makes no warranty of merchantability or any other warranty, expressed or implied, with respect to this information. The author makes no representations and assumes no liability for any direct, incidental or consequential damages resulting from its use. For additional technical information please call our toxicology department on +800 CHEMCALL.

- Classification of the mixture and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.
A list of reference resources used to assist the committee may be found at:
www.chemwatch.net/references.

- The (M)SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

Issue Date: Apr-3-2010
Print Date:Apr-21-2010

MATERIAL SAFETY DATA SHEET

Cat# 1980-5, Salubrinal **MSDS DATE: Apr 2, 2012**

SECTION 1: PRODUCT AND COMPANY IDENTIFICATION

PRODUCT NAME: Salubrinal

PRODUCT CODES: Cat# 1980-5

MANUFACTURER: BioVision, Inc.
ADDRESS: 155 S. Milpitas Boulevard, Milpitas, CA 95035

EMERGENCY PHONE: 858-373-8066
CHEMTREC PHONE:
OTHER CALLS: 408-493-1800
FAX PHONE: 408-493-1801

SECTION 2: COMPOSITION/INFORMATION ON INGREDIENTS

Component	Description	Volume	Safety Information
Salubrinal	Solid	5 mg	See below

SECTION 3: HAZARDS IDENTIFICATION

Product Name/Chemical Name	CAS Number	EC-No.	MW	Chemical Formula
Salubrinal	405060-95-9	--	479.81	$C_{21}H_{17}Cl_3N_4OS$

Salubrinal:
OSHA Hazards: No known OSHA hazards
GHS Classification: Not a dangerous substance according to GHS
GHS Label elements, including precautionary statements
Pictogram: none
Signal word: none
Hazard statement(s): none
Precautionary statement(s): none
HMIS Classification
Health hazard: 0
Flammability: 0
Physical hazards: 0
NFPA Rating
Health Hazard: 0
Fire: 0
Reactivity Hazard: 0
Potential Health Effects
Inhalation: May be harmful if inhaled. May cause respiratory tract irritation.
Skin: May be harmful if absorbed through skin. May cause skin irritation.
Eyes: May cause eye irritation.
Ingestion: May be harmful if swallowed.

SECTION 4: FIRST AID MEASURES

General advice: Consult a physician. Show this safety data sheet to the doctor in attendance.
If inhaled: If breathed in, move person into fresh air. If not breathing, give artificial respiration.
In case of skin contact: Wash off with soap and plenty of water.
In case of eye contact: Flush eyes with water as precaution.
If swallowed: Never give anything by mouth to an unconscious person. Rinse mouth with water.

5: FIRE-FIGHTING MEASURES

Condition of flammability: Not flammable or combustible.
Suitable extinguishing media: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.
Special protective equipment for fire-fighters: Wear self-contained breathing apparatus for firefighting if necessary.
Hazardous combustion products: Hazardous combustion products formed under fire conditions— not data available.

SECTION 6: ACCIDENTAL RELEASE MEASURES

Personal precautions: Avoid dust formation. Avoid breathing vapors, mist, gas, or dust. Ensure adequate ventilation.
Environmental precautions: Do not let product enter drains.
Methods for cleaning up: Sweep up and shovel. Keep in suitable, closed containers for disposal.

SECTION 7: HANDLING AND STORAGE

Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.
Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.
Recommended storage temperature: -20 °C

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.
Personal protective equipment

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Skin and body protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166 (EU).

Hygiene measures
General industrial hygiene practice.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

Property	Salubrinal
Appearance:	Beige solid
pH:	No data available
Water Solubility:	Insoluble
Other Solubility:	DMSO (100 mM)
Specific Gravity (g/ml):	No data available
Boiling Point (°C):	No data available
Melting Point (°C):	No data available
Flash Point (°C):	No data available
Ignition Temperature (°C):	No data available
Density	No data available

SECTION 10: STABILITY AND REACTIVITY

Property	Salubrinal
Chemical stability	Stable under recommended storage conditions
Conditions to avoid:	No data available
Materials to avoid:	Strong oxidizing agents
Hazardous decomposition products:	Carbon oxides, nitrogen oxides, sulfur oxides, hydrogen chloride gas

SECTION 11: TOXICOLOGICAL INFORMATION

Salubrinal:
Acute toxicity: no data available
Skin corrosion/irritation: no data available
Serious eye damage/eye irritation: no data available
Respiratory or skin sensitization: no data available
Germ cell mutagenicity: no data available
Carcinogenicity:

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

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

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

OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity: no data available
Teratogenicity: no data available
Specific target organ toxicity – single exposure (GHS): no data available
Specific target organ toxicity – repeated exposure (GHS): no data available
Aspiration hazard: no data available
Potential Health Effects
Inhalation: May be harmful if inhaled. May cause respiratory tract irritation.
Skin: May be harmful if absorbed through skin. May cause skin irritation.
Eyes: May cause eye irritation.
Ingestion: May be harmful if swallowed.
Signs and Symptoms of Exposure: To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.
Synergistic effects: no data available
Additional information: RTECS: not available

SECTION 12: ECOLOGICAL INFORMATION

Salubrinal:
Persistence and degradability: no data available
Toxicity: no data available
Bioaccumulative potential: no data available
Mobility in soil: no data available
PBT and vPvB assessment: no data available
Other adverse effects: no data available

SECTION 13: DISPOSAL CONSIDERATIONS

Product: Observe all federal, state, and local environmental regulations.
Contaminated packaging: Dispose of as unused product.

SECTION 14: TRANSPORT INFORMATION

Salubrinal:
DOT (US): Not dangerous goods.
IMDG: Not dangerous goods.
IATA: Not dangerous goods.

SECTION 15: REGULATORY INFORMATION

Salubrinal:
OSHA Hazards: No known OSHA hazards
SARA 302 Components: SARA 302: No chemical in this material are subject to the reporting requirements of SARA Title III, Section 302.
SARA 313 Components: SARA 313: This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title II, Section 313.
SARA 311/312 Hazards: No SARA hazards
Massachusetts Right To Know Components: No components are subject to the Massachusetts Right to Know Act.
Pennsylvania Right To Know Components: No components are subject to the Pennsylvania Right to Know Act.
New Jersey Right To Know Components: No components are subject to the New Jersey Right to Know Act.
California Prop. 65 Components: This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

EU regulations

Component	Risk Phrases	Safety Phrases
Salubrinal	--	--

SECTION 16: OTHER INFORMATION

DISCLAIMER:
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. BioVision, 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

Version 4.5
Revision Date 04/21/2012
Print Date 10/10/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name	:	Dimethyl sulfoxide		
Product Number	:	D5879		
Brand	:	Sigma-Aldrich		
Product Use	:	For laboratory research purposes.		
Supplier	:	Sigma-Aldrich Canada, Ltd 2149 Winston Park Drive OAKVILLE ON L6H 6J8 CANADA	Manufacturer :	Sigma-Aldrich Corporation 3050 Spruce St. St. Louis, Missouri 63103 USA
Telephone	:	+1 9058299500		
Fax	:	+1 9058299292		
Emergency Phone # (For both supplier and manufacturer)	:	1-800-424-9300		
Preparation Information	:	Sigma-Aldrich Corporation Product Safety - Americas Region 1-800-521-8956		

2. HAZARDS IDENTIFICATION

Emergency Overview

Target Organs
Eyes, Skin

WHMIS Classification

B3	Combustible Liquid	Combustible Liquid

GHS Classification
Flammable liquids (Category 4)

GHS Label elements, including precautionary statements

Pictogram	none
Signal word	Warning
Hazard statement(s) H227	Combustible liquid
Precautionary statement(s)	none

HMIS Classification

Health hazard:	0
Chronic Health Hazard:	*
Flammability:	2
Physical hazards:	0

Potential Health Effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Ingestion	May be harmful if swallowed.
Aggravated Medical Condition	Avoid contact with DMSO solutions containing toxic materials or materials with unknown toxicological properties. Dimethyl sulfoxide is readily absorbed through skin

and may carry such materials into the body.,

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : DMSO
Methyl sulfoxide

Formula : C_2H_6OS
Molecular Weight : 78.13 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Dimethyl sulfoxide			
67-68-5	200-664-3	-	-

4. FIRST AID MEASURES

General advice
Consult a physician. Show this safety data sheet to the doctor in attendance.Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability
Flammable in the presence of a source of ignition when the temperature is above the flash point. Keep away from heat/sparks/open flame/hot surface. No smoking.

Suitable extinguishing media
For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sulphur oxides

Explosion data - sensitivity to mechanical impact
no data available

Explosion data - sensitivity to static discharge
no data available

Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid breathing vapors, mist or gas. Remove all sources of ignition. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas.

Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13). Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid inhalation of vapour or mist.
Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

Store under inert gas. hygroscopic

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Immersion protection
Material: Chloroprene
Minimum layer thickness: 0.6 mm
Break through time: > 480 min
Material tested:Camapren® (Aldrich Z677493, Size M)

Splash protection
Material: Nature latex/chloroprene
Minimum layer thickness: 0.6 mm
Break through time: > 30 min
Material tested:Lapren® (Aldrich Z677558, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 873000, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an Industrial Hygienist familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

Eye protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
impervious clothing, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Specific engineering controls
Use mechanical exhaust or laboratory fumehood to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	liquid, clear
Colour	colourless

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 16 - 19 °C (61 - 66 °F)
Boiling point	189 °C (372 °F)
Flash point	87 °C (189 °F) - closed cup
Ignition temperature	301 °C (574 °F)
Autoignition temperature	no data available
Lower explosion limit	3.5 %(V)
Upper explosion limit	42 %(V)
Vapour pressure	0.55 hPa (0.41 mmHg) at 20 °C (68 °F)
Density	1.1 g/mL
Water solubility	completely miscible
Partition coefficient: n-octanol/water	log Pow: -2.03
Relative vapour density	2.70 - (Air = 1.0)
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
Heat, flames and sparks.

Materials to avoid
Acid chlorides, Phosphorus halides, Strong acids, Strong oxidizing agents, Strong reducing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, Sulphur oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
LD50 Oral - rat - 14,500 mg/kg

Inhalation LC50
LC50 Inhalation - rat - 4 h - 40250 ppm

Dermal LD50

LD50 Dermal - rabbit - > 5,000 mg/kg

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity

Genotoxicity in vitro - mouse - lymphocyte
Cytogenetic analysis

Genotoxicity in vitro - mouse - lymphocyte
Mutation in mammalian somatic cells.

Genotoxicity in vivo - rat - Intraperitoneal
Cytogenetic analysis

Genotoxicity in vivo - mouse - Intraperitoneal
DNA damage

Carcinogenicity

Carcinogenicity - rat - Oral
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Skin and Appendages: Other: Tumors.

Carcinogenicity - mouse - Oral
Tumorigenic:Equivocal tumorigenic agent by RTECS criteria. Leukaemia Skin and Appendages: Other: Tumors.

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

Reproductive toxicity
Reproductive toxicity - rat - Intraperitoneal
Effects on Fertility: Abortion.
Reproductive toxicity - rat - Intraperitoneal
Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
Reproductive toxicity - rat - Subcutaneous
Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants). Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).
Reproductive toxicity - mouse - Oral
Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea). Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.

Teratogenicity

Developmental Toxicity - mouse - Intraperitoneal
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Specific Developmental Abnormalities: Musculoskeletal system.

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.
Aggravated Medical Condition	Avoid contact with DMSO solutions containing toxic materials or materials with unknown toxicological properties. Dimethyl sulfoxide is readily absorbed through skin and may carry such materials into the body.,

Signs and Symptoms of Exposure
Effects due to ingestion may include:, Nausea, Fatigue, Headache

Synergistic effects
no data available

Additional Information
RTECS: PV6210000

12. ECOLOGICAL INFORMATION

Toxicity

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

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
This combustible material may be burned in a chemical incinerator equipped with an afterburner and scrubber. Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
NA-Number: 1993 Class: CBL Packing group: III
Proper shipping name: Combustible liquid, n.o.s. (Dimethyl sulfoxide)
Marine pollutant: No
Poison Inhalation Hazard: No

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

WHMIS Classification

B3	Combustible Liquid	Combustible Liquid

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

Further information

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 Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

Material Safety Data Sheet

Version 3.2
Revision Date 12/01/2011
Print Date 10/10/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Caerulein

Product Number : C9026
Brand : Sigma
Product Use : For laboratory research purposes.

Supplier : Sigma-Aldrich Canada, Ltd
2149 Winston Park Drive
OAKVILLE ON L6H 6J8
CANADA

Manufacturer : Sigma-Aldrich Corporation
3050 Spruce St.
St. Louis, Missouri 63103
USA

Telephone : +1 9058299500
Fax : +1 9058299292
Emergency Phone # (For both supplier and manufacturer) : 1-800-424-9300
Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

Target Organs

Gastrointestinal tract, Pancreas.

WHMIS Classification

Not WHMIS controlled.

Not WHMIS controlled.

Not a dangerous substance according to GHS.

HMIS Classification

Health hazard: 0
Chronic Health Hazard: *
Flammability: 0
Physical hazards: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin May be harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion May be harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : pGlu-Gln-Asp-Tyr(SO_3H)-Thr-Gly-Trp-Met-Asp-Phe-NH_2
Ceruletide
Cerulein
Caerulein Sulfated
[Tyr(SO_3H)^4]Caerulein

Formula : $C_{58}H_{73}N_{13}O_{21}S_2$
Molecular Weight : 1,352.4 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
Caerulein			
17650-98-5	-	-	-

4. FIRST AID MEASURES

General advice
Move out of dangerous area.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.

In case of skin contact
Wash off with soap and plenty of water.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

5. FIREFIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NOx), Sulphur oxides

Explosion data - sensitivity to mechanical impact
no data available

Explosion data - sensitivity to static discharge
no data available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Avoid dust formation. Avoid breathing vapors, mist or gas.

Environmental precautions
Do not let product enter drains.

Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature: -20 °C

Keep in a dry place. Keep in a dry place.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
Respiratory protection is not required. Where protection from nuisance levels of dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place., The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
General industrial hygiene practice.

Specific engineering controls
Use mechanical exhaust or laboratory fumehood to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	powder
Colour	white

Safety data

pH	no data available
Melting point/freezing point	no data available
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	ca.1 g/l
Partition coefficient: n-octanol/water	no data available
Relative vapour density	no data available
Odour	no data available

Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong acids, Strong bases

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NOx), Sulphur oxides
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
no data available

Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

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

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	May be harmful if swallowed.
Skin	May be harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

Synergistic effects
no data available

Additional Information
RTECS: Not available

12. ECOLOGICAL INFORMATION

Toxicity

no data available

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

WHMIS Classification

Not WHMIS controlled. Not WHMIS controlled.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

Further information

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 Co., 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

Version 5.3
Revision Date 09/19/2012
Print Date 10/14/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : 3-Deazaneplanocin A hydrochloride

Product Number : SML0305
Brand : Sigma
Product Use : For laboratory research purposes.

Supplier : Sigma-Aldrich Canada, Ltd
2149 Winston Park Drive
OAKVILLE ON L6H 6J8
CANADA

Manufacturer : Sigma-Aldrich Corporation
3050 Spruce St.
St. Louis, Missouri 63103
USA

Telephone : +1 9058299500
Fax : +1 9058299292
Emergency Phone # (For both supplier and manufacturer) : 1-800-424-9300
Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

WHMIS Classification

Not WHMIS controlled.

GHS Classification

Acute toxicity, Oral (Category 4)

GHS Label elements, including precautionary statements

Pictogram

Signal word Warning

Hazard statement(s)
H302 Harmful if swallowed.

Precautionary statement(s) none

HMIS Classification

Health hazard: 1
Flammability: 0
Physical hazards: 0

Potential Health Effects

Inhalation May be harmful if inhaled. May cause respiratory tract irritation.
Skin Harmful if absorbed through skin. May cause skin irritation.
Eyes May cause eye irritation.
Ingestion Harmful if swallowed.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : DZNep hydrochloride
(-)-1-[(1R,4R,5S)-3-(Hydroxymethyl)-4,5-dihydroxy-2-cyclopenten-1-yl]4-

aminoimidazo[4,5-c]pyridine hydrochloride

Formula	:	$C_{12}H_{14}N_4O_3 \cdot HCl$
Molecular Weight	:	298.73 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
3-Deazaneplanocin A hydrochloride			
120964-45-6	-	-	-

4. FIRST AID MEASURES

General advice
Move out of dangerous area.Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration. Consult a physician.

In case of skin contact
Wash off with soap and plenty of water. Consult a physician.

In case of eye contact
Flush eyes with water as a precaution.

If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.

5. FIREFIGHTING MEASURES

Conditions of flammability
Not flammable or combustible.

Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

Special protective equipment for firefighters
Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NOx), Hydrogen chloride gas

Explosion data - sensitivity to mechanical impact
no data available

Explosion data - sensitivity to static discharge
no data available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions
Use personal protective equipment. Avoid dust formation. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Avoid breathing dust.

Environmental precautions
Do not let product enter drains.

Methods and materials for containment and cleaning up
Pick up and arrange disposal without creating dust. Sweep up and shovel. Keep in suitable, closed containers for disposal.

7. HANDLING AND STORAGE

Precautions for safe handling
Avoid contact with skin and eyes. Avoid formation of dust and aerosols.
Provide appropriate exhaust ventilation at places where dust is formed.

Conditions for safe storage
Keep container tightly closed in a dry and well-ventilated place.

Recommended storage temperature: -20 °C

Store with desiccant.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

Personal protective equipment

Respiratory protection
For nuisance exposures use type P95 (US) or type P1 (EU EN 143) particle respirator.For higher level protection use type OV/AG/P99 (US) or type ABEK-P2 (EU EN 143) respirator cartridges. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Hand protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

Eye protection
Safety glasses with side-shields conforming to EN166 Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin and body protection
Complete suit protecting against chemicals, The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

Hygiene measures
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Specific engineering controls
Use mechanical exhaust or laboratory fumehood to avoid exposure.

9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance

Form	solid
Colour	no data available

Safety data

pH	no data available
Melting point/freezing point	no data available
Boiling point	no data available
Flash point	no data available
Ignition temperature	no data available
Autoignition temperature	no data available
Lower explosion limit	no data available
Upper explosion limit	no data available
Vapour pressure	no data available
Density	no data available
Water solubility	no data available
Partition coefficient: n-octanol/water	log Pow: -1.341

Relative vapour density	no data available
Odour	no data available
Odour Threshold	no data available
Evaporation rate	no data available

10. STABILITY AND REACTIVITY

Chemical stability
Stable under recommended storage conditions.

Possibility of hazardous reactions
no data available

Conditions to avoid
no data available

Materials to avoid
Strong oxidizing agents

Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides, nitrogen oxides (NOx), Hydrogen chloride gas
Other decomposition products - no data available

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Oral LD50
no data available

Inhalation LC50
no data available

Dermal LD50
no data available

Other information on acute toxicity
no data available

Skin corrosion/irritation
no data available

Serious eye damage/eye irritation
no data available

Respiratory or skin sensitization
no data available

Germ cell mutagenicity
no data available

Carcinogenicity

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

Reproductive toxicity

no data available

Teratogenicity

no data available

Specific target organ toxicity - single exposure (Globally Harmonized System)
no data available

Specific target organ toxicity - repeated exposure (Globally Harmonized System)
no data available

Aspiration hazard
no data available

Potential health effects

Inhalation	May be harmful if inhaled. May cause respiratory tract irritation.
Ingestion	Harmful if swallowed.
Skin	Harmful if absorbed through skin. May cause skin irritation.
Eyes	May cause eye irritation.

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

Synergistic effects
no data available

Additional Information
RTECS: Not available

12. ECOLOGICAL INFORMATION

Toxicity

no data available

Persistence and degradability
no data available

Bioaccumulative potential
no data available

Mobility in soil
no data available

PBT and vPvB assessment
no data available

Other adverse effects

no data available

13. DISPOSAL CONSIDERATIONS

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
Not dangerous goods

IMDG
Not dangerous goods

IATA
Not dangerous goods

15. REGULATORY INFORMATION

WHMIS Classification

Not WHMIS controlled.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

16. OTHER INFORMATION

Further information

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 Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.

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TOXIN USE RISK ASSESSMENT

Name of Toxin:	Tamoxifen
Proposed Use Dose:	10000 µg
Proposed Storage Dose:	5000000 µg
LD $_{50}$ (species):	3100000 µg

Calculation:

3100000 µg/kg x 50 kg/person

Dose per person based on LD $_{50}$ in µg = 155000000

LD_{50} per person with safety factor of 10 based on LD_{50} in µg =	15500000

Comments/Recommendations:

Western
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TOXIN USE RISK ASSESSMENT

Name of Toxin:	Caerulein (cholecystokinin analogue)
Proposed Use Dose:	**5000** µg
Proposed Storage Dose:	**500000** µg
LD $_{50}$ (species):	20 µg

Calculation:

20 µg/kg x 50 kg/person

Dose per person based on LD $_{50}$ in µg = 1000

LD_{50} per person with safety factor of 10 based on LD_{50} in µg = ***100***

Comments/Recommendations:

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TOXIN USE RISK ASSESSMENT

Name of Toxin:	Tunicamycin
Proposed Use Dose:	10000 µg
Proposed Storage Dose:	100000 µg
LD_{50} (species):	6250 µg

Calculation:

6250 µg/kg x 50 kg/person

Dose per person based on LD_{50} in µg = 312500

LD_{50} per person with safety factor of 10 based on LD_{50} in µg = ***31250***

Comments/Recommendations:

Western
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TOXIN USE RISK ASSESSMENT

Name of Toxin:	Salubrinal
Proposed Use Dose:	5000 µg
Proposed Storage Dose:	50000 µg
LD $_{50}$ (species):	N/A µg

Calculation:

N/A µg/kg x 50 kg/person

Dose per person based on LD $_{50}$ in µg = #VALUE!

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

Comments/Recommendations:

Western
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TOXIN USE RISK ASSESSMENT

Name of Toxin:	DZNep (3-Deazaneplanicin)
Proposed Use Dose:	5000 µg
Proposed Storage Dose:	50000 µg
LD $_{50}$ (species):	N/A µg

Calculation:

N/A µg/kg x 50 kg/person

Dose per person based on LD $_{50}$ in µg = #VALUE!

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

Comments/Recommendations:

Western
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TOXIN USE RISK ASSESSMENT

Name of Toxin:	L-ethionine
Proposed Use Dose:	2000000 µg
Proposed Storage Dose:	10000000 µg
LD_{50} (species):	N/A µg

Calculation:

N/A µg/kg x 50 kg/person

Dose per person based on LD_{50} in µg = #VALUE!

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

Comments/Recommendations:

Western
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TOXIN USE RISK ASSESSMENT

Name of Toxin:	DMSO (Dimethylsulfoxide)
Proposed Use Dose:	100000 µg
Proposed Storage Dose:	1000000 µg
LD_{50} (species):	14500000 µg

Calculation:

14500000 µg/kg x 50 kg/person

Dose per person based on LD_{50} in µg = 725000000

LD_{50} per person with safety factor of 10 based on LD_{50} in µg = 72500000

Comments/Recommendations:

Canadian Centre for Occupational Health and Safety

RTECS Registry of Toxic Effects of Chemical Substances®

Data source: Accelrys, Inc.

CHEMICAL IDENTIFICATION

RTECS Number	EV4400000
Chemical Name	Caerulein
CAS Registry Number	17650-98-5
Last Updated	201103
Data Items Cited	10
Molecular Formula	C58-H73-N13-O21-S2
Molecular Weight	1352.42

Synonyms/Trade Names

Cerulein

HEALTH HAZARD DATA

ACUTE TOXICITY DATA

Type of Test	Route of Exposure or Administration	Species/Test System	Dose Data	Toxic Effects	Reference
TDLo - Lowest published toxic dose	Subcutaneous	Rodent - rat	20 ug/kg	Gastrointestinal - changes in structure or function of endocrine pancreas	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: 293,670,2000
TDLo - Lowest published toxic dose	Subcutaneous	Rodent - rat	80 ug/kg	Gastrointestinal - changes in structure or function of endocrine pancreas Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - multiple enzyme effects	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: 293,670,2000
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	4057 ng/kg/45M	Gastrointestinal - changes in structure or function of endocrine pancreas 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: 139,299,2003
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	10.8 ug/kg/2H	Gastrointestinal - other changes Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - other Enzymes	BJPCBM British Journal of Pharmacology. (Macmillan Press Ltd., Houndmills, Basingstoke, Hants. RG21 2XS, UK) V.34- 1968- Volume (issue)/page/year: 139,299,2003
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	40 ug/kg	Gastrointestinal - changes in structure or function of endocrine pancreas Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol) Biochemical -	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: 18,520,2003

				Enzyme inhibition, induction, or change in blood or tissue levels - other oxidoreductases	
LD60 - Lethal dose	Intraperitoneal	Rodent - mouse	50 ug/kg	Lungs, Thorax, or Respiration - other changes Gastrointestinal - changes in structure or function of endocrine pancreas Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol)	EJPHAZ European Journal of Pharmacology. (Elsevier Science Pub. B.V., POB 211, 1000 AE Amsterdam, Netherlands) V.1- 1967- Volume (issue)/page/year: 549,149,2006
TDLo - Lowest published toxic dose	Subcutaneous	Rodent - rat	40 ug/kg	Gastrointestinal - changes in pancreatic weight Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - other hydrolases Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	PHMCAA Pharmacologist. (American Soc. for Pharmacology and Experimental Therapeutics, 9650 Rockville Pike, Bethesda, MD 20014) V.1- 1959- Volume (issue)/page/year: 72,68,2004
TDLo - Lowest published toxic dose	Intraperitoneal	Rodent - rat	1 ug/kg	Gastrointestinal - changes in structure or function of endocrine pancreas	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
TDLo - Lowest published toxic dose	Subcutaneous	Rodent - rat	80 ug/kg	Gastrointestinal - changes in structure or function of endocrine pancreas Biochemical - Enzyme	BCLPT* Basic & clinical pharmacology & toxicology (Copenhagen, Denmark : Nordic Pharmacological Society Oxford,

				inhibition, induction, or change in blood or tissue levels - other hydrolases Biochemical - Metabolism (Intermediary) - effect on inflammation or mediation of inflammation	UK : Distributed by Blackwell Munksgaard) V.94- 2004- Volume (issue)/page/year: 105,30,2009
TDLo - Lowest published toxic dose	Intravenous	Rodent - rat	10819 ng/kg/2H	Gastrointestinal - changes in structure or function of endocrine pancreas Biochemical - Enzyme inhibition, induction, or change in blood or tissue levels - peptidases 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: 155,865,2008

END OF RECORD

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