

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:	Dr. Ross Feldman
DEPARTMENT:	MED
ADDRESS:	The John P. Robarts Research Institute
PHONE NUMBER:	(519) 931 5777 x.25716
EMERGENCY PHONE NUMBER(S):	
EMAIL:	Ross.Feldman@LHSC.ON.CA

Location of experimental work to be carried out :

Building : RRI	Room(s): 4274
Building : RRI	Room(s): 4244C Cell culture lab
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: **HSFO**

GRANT TITLE(S): **Determinants of Adenylyl Cyclase-Mediated Vascular Responses**

UNDERGRADUATE COURSE NAME(IF APPLICABLE): _____

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

Name	UWO E-mail Address	Date of Biosafety Training
Qingming Ding	qding@robarts.ca	10-April-2012
Jozef Chorazyczewski	jchora@uwo.ca	23-June-2006

All hazardous material are labeled as such; including biohazard, radioactivity, chemical, or a combination of the above. All storage units housing Risk Group 2 organisms or biological material are displaying a biohazard sticker or sign.

All blood sample are bleached.

Dead animals are incinerated.

The adenoviral vectors used in these studies were generated with AdMax adenovirus vector creation kit as per manufacturer's instructions (Microbix BioSystems Inc., Toronto, Ont., Canada). Briefly, green fluorescent protein (GFP, used for control transductions), GPR1, ShGPR1, MR, ShMR and ER α cDNA were generated by PCR using plasmid templates. For all adeno-constructs, the resultant cDNAs were subcloned into shuttle vector pDC316 and purified. The recombinant plasmid was then co-transfected into human embryonic kidney (HEK) 293 cells.

All samples during this process were handled in biosafety cabinet in room 4244C and spun@ 2000rpm in sealed 15 ml conical tubes inside Backman biosafety centrifuge bucket. For gene transfer, vascular smooth muscle cells were infected with adenoviral constructs for 16 h at 37 °C, following which, media were disposed of and replenished. Cells were utilized for experimentation 48 h after gene transfer, with serum starvation for the last 16 h.

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

Estrogens have been increasingly appreciated as important physiological and pathophysiological regulators of cardiovascular functions and as modifiers of cardiovascular outcomes such as those related to coronary artery disease/atherosclerosis. Estradiol (E2) and other steroid hormones like aldosterone were thought to associate with ligand specific-nuclear receptors and function as transcriptional regulators. However, it is now known that these hormones can mediate their actions both via “classical” transcriptional mechanisms as well as via “rapid” (previously denoted as nongenomic) mechanisms. Delineating the mechanisms by which these hormones regulate vascular function will be important in the development of novel therapeutic approaches to selectively modulate their effects. Furthermore, determining whether these mechanisms are regulated in settings of vascular remodelling and with changes in hormonal status may be of critical importance in understanding the role of these systems in the development of vascular disease. This application focuses on i) the recently appreciated G-protein couple steroid receptor, G-protein receptor (aka GPR30), ii) the key hormones which are known to activate G-protein estrogen receptor (GPER1)- viz., estradiol and (as we have recently demonstrated) aldosterone iii) G-protein receptor (GPR30) regulation of apoptotic pathways- a means by which these steroid hormones may regulate vascular remodelling processes and iv) the impact of regulation of G-protein receptor(GPR30) expression on the remodelling response in vivo following vascular injury.

We propose to address the following specific questions:

1. By what mechanism does G-protein receptor (GPR30) expression modify balance between estradiol's (and aldosterone's) pro- vs. anti-apoptotic effects in vascular smooth muscle cells?
2. Does G-protein receptor (GPR30) regulate vascular smooth muscle remodelling processes?

In all studies we will determine:

- time course for the effects to be assayed
- concentration-response relationships for estradiol, aldosterone and G-1.
- potency and effectiveness of other steroid agonist hormones, including progesterone, testosterone and corticosterone and whether they have G-protein receptor (GPR30)-dependent actions.
- potency and effectiveness of the G-protein receptor (GPR30) agonist, G1 and the estrogen receptor(ER α) and (ER β) agonists PPT(4,4',4''-(4-Propyl-[1H]-pyrazole-1,3,5-triyl)trisphenol) and DPN (Diarylpropionitrile)(respectively)
- impact of mineralocorticoid receptor(MR), estrogen receptor(ER α) and estrogen receptor (ER β) knockdown and secondarily of over-expression and of G-protein receptor knockdown (in endothelial cells)
- effect of the G-protein receptor (GPR30)-selective antagonist, G15 (cis-4-(6-Bromo-benzo[1,3]dioxol-5-yl)-3a,4,5,9b-tetrahydro-3H-cyclopenta[c]) on the actions of the steroid agonists listed above (note: several other receptor antagonists previously considered as specific, e.g., eplerenone and ICI 182780, have now been shown to also interact with G-protein receptor (GPR30)(Revankar et al., 2005, Gros et al., 2011)
- effect of representative angiotensin receptor (AT1) antagonists (losartan and irbesartan). These potential G-protein receptor interacting drugs will be tested based on a) the phylogenetic proximity of G-protein receptor and Angiotensin receptor(AT1) and ii) our preliminary studies suggesting the very novel finding that these previously believed AT1- antagonists receptor may also act as G-protein receptor antagonists.If confirmed, this discovery would have a very significant impact on our interpretation of decades of studies using these agents.

Changes to
summary

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
<i>EcoliDH5alpha competent cells</i>	☐ Yes ☒ No	☐ Yes ☒ No	☐ Yes ☒ No	200ml	Invitrogen	☒ 1 ☐ 2 ☐ 2+ ☐ 3
<i>Adenovirus5</i>	☒ Yes ☐ No	☒ Yes ☐ No	☐ Yes ☒ No	50-1000uL	Microbix	☐ 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: _____

Changes made to
1.2

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	rat, mouse smoothmuscle ,endo cells	2009-037
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	Hek 293	1	ATCC
Rodent	☐ Yes ☒ No			
Non-human primate	☐ Yes ☒ No			
Other (specify)	☐ Yes ☒ No			

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

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

Additional Comments: _____

Changes to 2.3

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	patient blood sample	☐ Yes ☒ Unknown		☐ 1 ☒ 2 ☐ 2+ ☐ 3
Human Blood (fraction) or other Body Fluid		☐ Yes ☐ Unknown		☐ 1 ☐ 2 ☐ 2+ ☐ 3
Human Organs or Tissues (unpreserved)	human fat	☐ Yes ☒ Unknown		☐ 1 ☒ 2 ☐ 2+ ☐ 3
Human Organs or Tissues (preserved)		Not Applicable		Not Applicable

Additional Comments: _____

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?
EcoliDH5alpha	pCD316/Adenyly cyclase 1,2,3,5,6	ATCC	transfected, Adenylyl Cyclase type 1,2,3,5,6	NO	NO	overexpression of protein Adenylyl cyclase 1,2,3,5,6

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

** Please attach a plasmid map.

***No Material Safety Data Sheet is required for the following:

<http://www.uwo.ca/humanresources/docandform/docs/ohs/C>

changes to this page

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
Adenovirus5	pCD316	Microbix	GFP,ER,GPER1,MR,ShMR,ShGPER1	overexpresion or knockdown of protein GFP,ER,GPER1,MR,ShMR,ShGPER1 no growth changes occur once the gene is transduced.

* 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: _____

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 **Rat**

7.3 AUS protocol # **2009-037**

7.4 List the location(s) for the animal experimentation and housing. **ACVS**

7.5 Will any of the agents listed in section 4.0 be used in live animals
☒ NO ☐ YES, specify:

7.6 Will the agent(s) be shed by the animal:
☐ YES ☒ NO, please justify:

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:

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

9.2 If YES, please name the toxin(s) or hormones(s) **Aldosterone, Testosterone, Estradiol**
Please attach information, such as a Material Safety Data Sheet, for the toxin(s) used.

9.3 What is the LD₅₀ (specify species) of the toxin or hormone **3.5g/kg(mouse), 20g/kg(rabbit), 1.2g/kg(rat)**

9.4 How much of the toxin or hormone is handled at one time*? **1-2mg**

9.5 How much of the toxin or hormone is stored*? **100mg**

9.6 Will any biological toxins or hormones be used in live animals? ☐ YES ☒ NO
If **YES**, Please provide details:

*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:

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 Feldman Ross **Date:** May 24, 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: **.Feb 14.2012 4274,4244C(TC)**
☐ NO, please certify
☐ NOT REQUIRED for Level 1 containment
- 14.3 Please indicate permit number (not applicable for first time applicants):

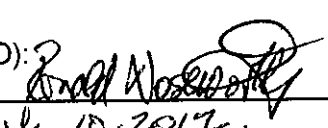
15.0 Procedures to be Followed

- 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:
- 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:
In case of a needlestick, the exposed side must be washed immediately with soap and water after allowing the wound to bleed freely. Accidental splash, wash with water effected aera at the nearest eye wash station for minimum of 10 min. Principal Investigator must be inform. Worker must seek prompt medical attention and accident report must be written.
- 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 Ross Feldman **Date:** 24.04.2012

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: July 10, 2012.

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

HUMAN ADIPOSE TISSUE EXPERIMENTS --- Standard Operating Procedures:

- Laboratory coats, gloves and safety glasses are worn while handling human adipose tissue. Universal level 2 precautions will be observed.
- Human adipose tissues are handled inside the biological safety cabinet (BSC) in room 4244C.
- Isolation of adipocytes for proteins, DNA or RNA are performed via enzymatic digestion in sealed 50 mL conical tubes. All centrifugation steps are done in sealed conical tubes.
- All serological pipettes, pipette tips are decontaminated in a solution of clidox, quatricide or diluted bleach (1:10 dilution of household bleach) for 30 minutes prior to discarding into biohazard waste container.
- Upon completion of digestion/isolation, all work surfaces and equipment used during the handling of human blood products are sprayed with clidox, quatricide or diluted bleach solution followed by a wash with 70% ethanol and air-dried.
- All solid waste materials related to the adenoviral experiments are placed in biohazard waste bag and sealed for disposal (i.e. to be autoclaved).
- Vacuum lines are HEPA filtered prior to entering into the vacuum system. For aspirated liquid waste, aspirate full-strength bleach through the suction tube into the liquid waste container to the approximate final concentration (1 in 10) and soak for 15 minutes and empty entire contents down the drain. Rinse drain and liquid waste flask with 70% ethanol.
- The resultant protein, DNA or RNA samples will be stored at -80 for subsequent use.

APPENDIX

Section 4.2

Transfection of gene:

ACs-1,2,3,5,6

Change that results

Expression of Adenylyl Cyclase
Isoforms 1,2,3,5,6

Section 4.3

Adeno-mediated gene transfer of:

Change that results

Adeno-GFP

Expression of green fluorescent protein

Adeno-MR

Expression of mineralocorticoid receptor

Adeno-GPER1

Expression of G-protein (GPR30) receptor

Adeno-ER

Expression of estrogen receptor

Adeno-ShMR

Knockdown of expression mineralocorticoid
receptor

Adeno-ShGPER1

Knockdown of expression G-protein (GPR30)
receptor

MSDS'

AdMax™ Adenovirus Vector Creation Kits MATERIAL SAFETY DATA SHEET

MATERIAL SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

All pre-made adenovirus made by Microbix **Microbix**

Biopharmaceuticals

Microbix Biosystems Inc.
Corporate Head Offices and
Biopharmaceuticals Manufacturing
115 Skyway Ave
Toronto, Ontario, Canada M9W 4Z4
1-800-794-6694
1-416-234-1624
Fax: 416-234-1626
www.microbix.com

SECTION I - INFECTIOUS AGENT

PRODUCT IDENTIFICATION:

BIOLOGICAL NAME: Adenovirus - Type 5

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

SECTION II - HEALTH HAZARD

PATHOGENICITY: Varies in clinical manifestation and severity; symptoms include fever, rhinitis, pharyngitis, cough and conjunctivitis. The risk from infection by defective recombinant adenoviral vectors depends both on the dose of virus and on the nature of the transgene. Adenovirus does not integrate into the host cell genome but can produce a strong immune response.

HOST RANGE: Humans and animals

INCUBATION PERIOD: from 1-10 days

MODE OF TRANSMISSION: In the laboratory, care must be taken to avoid spread of infectious material by aerosol, direct contact or accidental injection

CHEMICAL LISTED AS CARCINOGEN OR POTENTIAL CARCINOGEN: None

SECTION III - VIABILITY

DRUG SUSCEPTIBILITY: No specific antiviral available

SUSCEPTIBILITY TO DISINFECTANTS: Susceptible to 1% sodium hypochlorite, 2% glutaraldehyde. Recommend use of 1/3 volume of bleach for 30 minutes.

PHYSICAL INACTIVATION: Sensitive to heat; 1 hour at 56°C is used to inactivate virus.

SURVIVAL OUTSIDE HOST: Adenovirus type 5 survived from 3-8 weeks on environmental surfaces at room temperature.

SECTION IV - MEDICAL

SURVEILLANCE: Monitor for symptoms; confirm by serological analysis

FIRST AID/TREATMENT:

Contact: Immediately flush eyes and skin with plenty of water for at least 15 minutes. Call a

physician.

Inhalation: N/A

Ingestion: Wash out mouth with water. Call a physician

Accidental injection: wash area with soap and water. Call a physician.

SECTION V – ACCIDENTAL RELEASE PROCEDURES

Pour 1 volume of Javel water over the leak(s) and wait for 15 minutes.

Wipe up carefully.

Hold for autoclave waste disposal and decontaminate work surfaces with 70% alcohol.

SECTION VI - RECOMMENDED PRECAUTIONS

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

PROTECTIVE CLOTHING: Recombinants Adenovirus: Laboratory coat; gloves.

OTHER PRECAUTIONS:

Access to the laboratory is limited.

Work surfaces are decontaminated before and after each procedure

Mechanical pipetting devices are used for all procedures; mouth pipetting is prohibited.

Eating, drinking, and smoking are not permitted in the laboratory; food is not stored in laboratory

areas.

Laboratory coats are worn in and are removed before leaving the laboratory.

Hands are washed before and after handling virus.

SECTION VII - HANDLING INFORMATION

DISPOSAL: Decontaminate all wastes before disposal; steam sterilization

STORAGE: In sealed containers that are appropriately labeled

SECTION VIII - MISCELLANEOUS INFORMATION

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

Public Health
Agency of CanadaAgence de la santé
publique du Canada

Canada

Home > Laboratory Biosafety and Biosecurity > Biosafety Programs and Resources > Pathogen Safety Data Sheets and Risk Assessment > Adenovirus types 1, 2, 3, 4, 5 and 7 - Material Safety Data Sheets (MSDS)

Adenovirus types 1, 2, 3, 4, 5 and 7 - Material Safety Data Sheets (MSDS)

MATERIAL SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

SECTION I - INFECTIOUS AGENT

NAME: *Adenovirus types 1, 2, 3, 4, 5 and 7*

SYNONYM OR CROSS REFERENCE: ARD, acute respiratory disease, pharyngoconjunctival fever

CHARACTERISTICS: *Adenoviridae*; non-enveloped, icosahedral virions, 70-90 nm diameter, doubled-stranded, linear DNA genome.

SECTION II - HEALTH HAZARD

PATHOGENICITY: Varies in clinical manifestation and severity; symptoms include fever, rhinitis, pharyngitis, tonsillitis, cough and conjunctivitis; common cause of nonstreptococcal exudative pharyngitis among children under 3 years; more severe diseases include laryngitis, croup, bronchiolitis, or severe pneumonia; a syndrome of pharyngitis and conjunctivitis (pharyngoconjunctival fever) is associated with adenovirus infection

EPIDEMIOLOGY: Worldwide; seasonal in temperate regions, with highest incidences in the fall, winter and early spring; in tropical areas, infections are common in the wet and colder weather; annual incidence is particularly high in children; adenovirus types 4 and 7 are common among military recruits (ARD)

HOST RANGE: Humans

INFECTIOUS DOSE: >150 plaque forming units when given intranasally

MODE OF TRANSMISSION: Directly by oral contact and droplet spread; indirectly by handkerchiefs, eating utensils and other articles freshly soiled with respiratory discharge of an infected person; outbreaks have been related to swimming pools; possible spread through the fecal-oral route

INCUBATION PERIOD: From 1-10 days

COMMUNICABILITY: Shortly prior to and for the duration of the active disease

SECTION III - DISSEMINATION

RESERVOIR: Humans

ZOONOSIS: None

VECTORS: None

SECTION IV - VIABILITY

DRUG SUSCEPTIBILITY: No specific antiviral available; cidofovir has shown promise in the treatment of adenoviral ocular infections.

SUSCEPTIBILITY TO DISINFECTANTS: Susceptible to 1% sodium hypochlorite, 2% glutaraldehyde, 0.25% sodium dodecyl sulfate

PHYSICAL INACTIVATION: Sensitive to heat >56°C; unusually stable to chemical or physical agents and adverse pH conditions

SURVIVAL OUTSIDE HOST: Resistance to chemical and physical agents allows for prolonged survival outside of the body. Adenovirus type 3 survived up to 10 days on paper under ambient conditions; adenovirus type 2 survived from 3-8 weeks on environmental surfaces at room temperature

SECTION V - MEDICAL

SURVEILLANCE: Monitor for symptoms; confirm by serological analysis

FIRST AID/TREATMENT: Mainly supportive therapy

IMMUNIZATION: Vaccine available for adenovirus types 4 and 7 (used for military recruits)

PROPHYLAXIS: None available

SECTION VI - LABORATORY HAZARDS

LABORATORY-ACQUIRED INFECTIONS: Ten cases documented up to 1988

SOURCES/SPECIMENS: Respiratory secretions

PRIMARY HAZARDS: Ingestion; droplet exposure of the mucous membrane

SPECIAL HAZARDS: Contact with feces from infected animals

SECTION VII - RECOMMENDED PRECAUTIONS

CONTAINMENT REQUIREMENTS: Biosafety level 2 practices and containment facilities for all activities involving the virus and potentially infectious body fluids or tissues

PROTECTIVE CLOTHING: Laboratory coat; gloves when skin contact with infectious materials is unavoidable

OTHER PRECAUTIONS: None

SECTION VIII - HANDLING INFORMATION

SPILLS: Allow aerosols to settle; wearing protective clothing gently cover the spill with absorbent paper towel and apply 1% sodium hypochlorite starting at the perimeter and working towards the centre; allow sufficient contact time (30 min) before clean up

DISPOSAL: Decontaminate all wastes before disposal; steam sterilization, incineration, chemical disinfection

STORAGE: In sealed containers that are appropriately labelled

SECTION IX - MISCELLANEOUS INFORMATION

Date prepared: November 1999

Prepared by: Office of Laboratory Security, PHAC

Although the information, opinions and recommendations contained in this Material Safety Data Sheet are compiled from sources believed to be reliable, we accept no responsibility for the accuracy, sufficiency, or reliability or for any loss or injury resulting from the use of the information. Newly discovered hazards are frequent and this information may not be completely up to date.

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Date Modified: 2011-02-18

MSDS FOR ANIMAL CELL CULTURES (Biosafety Level 1 or 2)

ATCC cultures are not hazardous as defined by OSHA 1910.1200. However, as live cells they are potential biohazards.

ATCC Emergency Telephone: (703) 365-2710 (24 hours)

Chemtrec: (800) 424-9300

To be used only in the event of an emergency involving a spill, leak, fire, exposure or accident.

Description

Either frozen or growing cells shipped in liquid cell culture medium (a mixture of components that may include, but is not limited to: inorganic salts, vitamins, amino acids, carbohydrates and other nutrients dissolved in water).

SECTION I**Hazardous Ingredients**

Frozen cultures may contain 5 to 10% Dimethyl sulfoxide (DMSO)

SECTION II**Physical data**

Pink or red aqueous liquid

SECTION III**Health hazards****For Biosafety Level 1 Cell Lines**

This cell line is not known to harbor an agent known to cause disease in healthy adult humans. This cell line has **NOT** been screened for Hepatitis B, human immunodeficiency viruses or other adventitious agents. Handle as a potentially biohazardous material under at least Biosafety Level 1 containment.

For Biosafety Level 2 Cell Lines

This cell line is known to contain an agent that requires handling at Biosafety Level 2 containment [U.S. Government Publication **Biosafety in Microbiological and Biomedical Laboratories** (CDC, 1999)]. These agents have been associated with human disease. This cell line has **NOT** been screened for Hepatitis B, human immunodeficiency viruses or other adventitious agents. Cell lines derived from primate lymphoid tissue may fall under the regulations of 29 CFR 1910.1030 Bloodborne Pathogens.

SECTION IV**Fire and explosion**

Not applicable

SECTION V**Reactivity data**

Stable. Hazardous polymerization will not occur.

SECTION VI**Method of disposal**

Spill: Contain the spill and decontaminate using suitable disinfectants such as chlorine bleach or 70% ethyl or isopropyl alcohol.

Waste disposal: Dispose of cultures and exposed materials by autoclaving at 121°C for 20 minutes. Follow all Federal, State and local regulations.

SECTION VII**Special protection information****For Biosafety Level 1 Cell Lines**

Handle as a potentially biohazardous material under at least Biosafety Level 1 containment. Cell lines derived from primate lymphoid tissue may fall under the regulations of 29 CFR 1910.1030 Bloodborne Pathogens.

For Biosafety Level 2 Cell Lines

Handle as a potentially biohazardous material under at least Biosafety Level 2 containment. Cell lines derived from primate lymphoid tissue may fall under the regulations of 29 CFR 1910.1030 Bloodborne Pathogens.

SECTION VIII**Special precautions or comments**

ATCC recommends that appropriate safety procedures be used when handling all cell lines, especially those derived from human or other primate material. Detailed discussions of laboratory safety procedures are provided in **Laboratory Safety: Principles and Practice** (Fleming, et al., 1995) the ATCC manual on quality control (Hay, et al., 1992), the *Journal of Tissue Culture Methods* (Caputo, 1988), and in the U.S. Government Publication, **Biosafety in Microbiological and Biomedical Laboratories** (CDC, 1999). This publication is available in its entirety in the Center for Disease Control Office of Health and Safety's web site at <http://www.cdc.gov/od/ohs/biosfty/bmbl4/bmbl4toc.htm>.

THE ABOVE INFORMATION IS CORRECT TO THE BEST OF OUR KNOWLEDGE. ALL MATERIALS AND MIXTURES MAY PRESENT UNKNOWN HAZARDS AND SHOULD BE USED WITH CAUTION. THE USER SHOULD MAKE INDEPENDENT DECISIONS REGARDING THE COMPLETENESS OF THE INFORMATION BASED ON ALL SOURCES AVAILABLE. ATCC SHALL NOT BE HELD LIABLE FOR ANY DAMAGE RESULTING FROM HANDLING OR CONTACT WITH THE ABOVE PRODUCT.

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February 2002

Cell Biology

ATCC® Number:	CRL-1573™	Order this Item	Price:	\$256.00
Designations:	293 [HEK-293]		Related Links	
Depositors:	FL Graham		NCBI	
Biosafety Level:	2 [CELLS CONTAIN ADENOVIRUS]		Entrez	
Shipped:	frozen		Search	
Medium & Serum:	See Propagation		Cell	
Growth Properties:	adherent		Micrograph	
Organism:	<i>Homo sapiens</i> (human)		Make a	
	epithelial		Deposit	
Morphology:			Frequently	
			Asked	
Source:	Organ: embryonic kidney		Questions	
	Cell Type: transformed with adenovirus 5 DNA		Material	
	In addition to the MTA mentioned above, other ATCC and/or		Transfer	
	regulatory permits may be required for the transfer of this		Agreement	
Permits/Forms:	ATCC material. Anyone purchasing ATCC material is		Technical	
	ultimately responsible for obtaining the permits. Please click		Support	
	here for information regarding the specific requirements for		Related Cell	
	shipment to your location.		Culture	
Restrictions:	These cells are distributed for research purposes only. 293 cells,		Products	
	their products, or their derivatives may not be distributed to			
	third parties.			
	efficacy testing [92587]			
Applications:	transfection host (Nucleofection technology from Lonza			
	Roche FuGENE® Transfection Reagents)			
	viruscid testing [92579]			
Receptors:	vitronectin, expressed			
Tumorigenic:	Yes			
	Amelogenin: X			
	CSF1PO: 11,12			
	D13S317: 12,14			
	D16S539: 9,13			
DNA Profile (STR):	D5S818: 8,9			
	D7S820: 11,12			
	THO1: 7,9.3			
	TPOX: 11			
	vWA: 16,19			

Cytogenetic Analysis:	This is a hypotriploid human cell line. The modal chromosome number was 64, occurring in 30% of cells. The rate of cells with higher ploidies was 4.2 %. The der(1)t(1;15) (q42;q13), der(19)t(3;19) (q12;q13), der(12)t(8;12) (q22;p13), and four other marker chromosomes were common to most cells. Five other markers occurred in some cells only. The marker der(1) and M8 (or Xq+) were often paired. There were four copies of N17 and N22. Noticeably in addition to three copies of X chromosomes, there were paired Xq+, and a single Xp+ in most cells.
Age:	fetus Although an earlier report suggested that the cells contained Adenovirus 5 DNA from both the right and left ends of the viral genome [RF32764], it is now clear that only left end sequences are present. [39768]
Comments:	The line is excellent for titrating human adenoviruses. The cells express an unusual cell surface receptor for vitronectin composed of the integrin beta-1 subunit and the vitronectin receptor alpha-v subunit. [23406] The Ad5 insert was cloned and sequenced, and it was determined that a colinear segment from nts 1 to 4344 is integrated into chromosome 19 (19q13.2). [39768]
Propagation:	ATCC complete growth medium: The base medium for this cell line is ATCC-formulated Eagle's Minimum Essential Medium, Catalog No. 30-2003. To make the complete growth medium, add the following components to the base medium: fetal bovine serum to a final concentration of 10%. Atmosphere: air, 95%; carbon dioxide (CO₂), 5% Temperature: 37.0°C The cell line does not adhere to the substrate when left at room temperature for any length of time, therefore, live cultures may be received with the cells detached. The cells will re-attach to the flask over a period of several days in culture at 37C.

Protocol:

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

Subculturing:

Subcultivation Ratio: 1:10 to 1:20 weekly.

Medium Renewal: Every 2 to 3 days

Preservation:

Freeze medium: Complete growth medium supplemented with 5% (v/v) DMSO

Storage temperature: liquid nitrogen vapor phase

Recommended medium (without the additional supplements or serum described under ATCC Medium): ATCC 30-2003

derivative: ATCC CRL-10852

derivative: ATCC CRL-12006

Related Products:

derivative: ATCC CRL-12007

derivative: ATCC CRL-12013

derivative: ATCC CRL-12479

derivative: ATCC CRL-2029

derivative: ATCC CRL-2368

purified DNA: ATCC CRL-1573D

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- 22282: Graham FL, et al. Characteristics of a human cell line transformed by DNA from human adenovirus type 5. *J. Gen. Virol.* 36: 59-72, 1977. PubMed: [886304](#)
- 22319: Graham FL, et al. Defective transforming capacity of adenovirus type 5 host-range mutants. *Virology* 86: 10-21, 1978. PubMed: [664220](#)
- 22699: Harrison T, et al. Host-range mutants of adenovirus type 5 defective for growth in HeLa cells. *Virology* 77: 319-329, 1977. PubMed: [841862](#)
- 23406: Bodary SC, McLean JW. The integrin beta 1 subunit associates with the vitronectin receptor alpha v subunit to form a novel vitronectin receptor in a human embryonic kidney cell line. *J. Biol. Chem.* 265: 5938-5941, 1990. PubMed: [1690718](#)
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- 28301: Loffler S, et al. CD9, a tetraspan transmembrane protein, renders cells susceptible to canine distemper virus. *J. Virol.* 71: 42-49, 1997. PubMed: [8985321](#)
- 32283: Hu SX, et al. Development of an adenovirus vector with tetracycline-regulatable human tumor necrosis factor alpha gene expression. *Cancer Res.* 57: 3339-3343, 1997. PubMed: [9269991](#)
- 32396: Kolanus W, et al. alphaLbeta2 integrin/LFA-1 binding to ICAM-1 induced by cytohesin-1 a cytoplasmic regulatory molecule. *Cell* 86: 233-242, 1996. PubMed: [8706128](#)
- 32490: Stauderman KA, et al. Characterization of human recombinant neuronal nicotinic acetylcholine receptor subunit combinations alpha 2 beta 4, alpha 3 beta 4 and alpha 4 beta 4 stably expressed in HEK293 cells. *J. Pharmacol. Exp. Ther.* 284: 777-789, 1998. PubMed: [9454827](#)
- 32514: Bartz SR, et al. Human immunodeficiency virus type 1 cell cycle control: Vpr is cytostatic and mediates G2 accumulation by a mechanism which differs from DNA damage checkpoint control. *J. Virol.* 70: 2324-2331, 1996. PubMed: [8642659](#)
- 32726: Sandri-Goldin RM, Hibbard MK. The herpes simplex virus type 1 regulatory protein ICP27 coimmunoprecipitates with anti-sm antiserum, and the C terminus appears to be required for this interaction. *J. Virol.* 70: 108-118, 1996. PubMed: [8572514](#)

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

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

Company/Undertaking Identification

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

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

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

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

For research use only

2. COMPOSITION/INFORMATION ON INGREDIENTS**Hazardous/Non-hazardous Components**

The product contains no substances which at their given concentration, are considered to be hazardous to health. We recommend handling all chemicals with caution.

3. HAZARDS IDENTIFICATION**Emergency Overview**

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

3. HAZARDS IDENTIFICATION

Form
Liquid

Principle Routes of Exposure/ Potential Health effects

Eyes	No information available
Skin	No information available
Inhalation	No information available
Ingestion	May be harmful if swallowed.

Specific effects

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

Target Organ Effects

No information available

HMIS

Health	0
Flammability	0
Reactivity	0

4. FIRST AID MEASURES

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

5. FIRE-FIGHTING MEASURES

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

6. ACCIDENTAL RELEASE MEASURES

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

7. HANDLING AND STORAGE

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

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational exposure controls

Exposure limits

Engineering measures Ensure adequate ventilation, especially in confined areas

Personal protective equipment

Respiratory Protection	In case of insufficient ventilation wear suitable respiratory equipment
Hand protection	Protective gloves
Eye protection	Safety glasses with side-shields
Skin and body protection	Lightweight protective clothing.
Hygiene measures	Handle in accordance with good industrial hygiene and safety practice
Environmental exposure controls	Prevent product from entering drains.

9. PHYSICAL AND CHEMICAL PROPERTIES

General Information

Form Liquid

Important Health Safety and Environmental Information

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

10. STABILITY AND REACTIVITY

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

11. TOXICOLOGICAL INFORMATION

Acute toxicity

Principle Routes of Exposure/

Potential Health effects

Eyes	No information available
Skin	No information available
Inhalation	No information available

Ingestion May be harmful if swallowed.

Specific effects

Carcinogenic effects
Mutagenic effects
Reproductive toxicity
Sensitization

(Long Term Effects)

No information available
No information available
No information available
No information available

Target Organ Effects

No information available

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

No information available.

Mobility

No information available.

Biodegradation

Inherently biodegradable.

Bioaccumulation

Does not bioaccumulate.

13. DISPOSAL CONSIDERATIONS

Dispose of in accordance with local regulations

14. TRANSPORT INFORMATION

IATA

Proper shipping name

Not classified as dangerous in the meaning of transport regulations

Hazard Class

No information available

Subsidiary Class

No information available

Packing group

No information available

UN-No

No information available

15. REGULATORY INFORMATION

International Inventories

U.S. Federal Regulations

SARA 313

This product is not regulated by SARA.

Clean Air Act, Section 112 Hazardous Air Pollutants (HAPs) (see 40 CFR 61)

This product does not contain HAPs.

U.S. State Regulations

California Proposition 65

This product does not contain chemicals listed under Proposition 65

WHMIS hazard class:

Non-controlled

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

16. OTHER INFORMATION

For research use only

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

End of Safety Data Sheet

Material Safety Data Sheet

Version 3.1
Revision Date 10/22/2010
Print Date 04/19/2012

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : Aldosterone

Product Number : A9477

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

Kidney

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 : Reichstein X
11 β ,21-Dihydroxypregn-4-ene-3,18,20-trione
18-Aldocorticosterone
11 β ,21-Dihydroxy-3,20-dioxo-4-pregnen-18-al

Formula : C₂₁H₂₈O₅

Molecular Weight : 360.44 g/mol

CAS-No.	EC-No.	Index-No.	Concentration
---------	--------	-----------	---------------

Aldosterone			
52-39-1	200-139-9	-	-

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. FIRE-FIGHTING 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 fire-fighters

Wear self contained breathing apparatus for fire fighting if necessary.

Hazardous combustion products

Hazardous decomposition products formed under fire conditions. - Carbon 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. Normal measures for preventive fire protection.

Conditions for safe storage

Keep container tightly closed in a dry and well-ventilated 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/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	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

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

Genotoxicity in vivo - rat - Intraperitoneal
 Unscheduled DNA synthesis

Genotoxicity in vivo - rat - Intravenous
 DNA damage

Carcinogenicity

Some steroids show carcinogenic and teratogenic activity.

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.

Signs and Symptoms of Exposure

Some steroids show carcinogenic and teratogenic activity., Aldosterone exerts regulatory influence on metabolism of electrolytes and water.

Synergistic effects

no data available

Additional Information

RTECS: TU4523000

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

DSL Status

This product contains the following components listed on the Canadian NDSL list. All other components are on the Canadian DSL list.

Aldosterone

CAS-No.
52-39-1

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

Copyright 2010 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

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.

SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 02/27/2008
Date Updated: 01/30/2006
Version 1.7

Section 1 - Product and Company Information

Product Name **TESTOSTERONE—DEA SCHEDULE III**
Product Number T1500
Brand SIGMA

Company Sigma-Aldrich
Address 3050 Spruce Street
SAINT LOUIS MO 63103 US

Technical Phone: 800-325-5832
Fax: 800-325-5052
Emergency Phone: 314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
TESTOSTERONE	58-22-0	No

Formula C19H28O2
Synonyms Androlin * Androst-4-en-3-one, 17-hydroxy-,
(17-beta)- * Andronaq *
Androst-4-en-17beta-ol-3-one * delta(sup
4)-Androsten-17(beta)-ol-3-one *
Androst-4-en-3-one, 17-beta-hydroxy- * Andrusol *
Cristerone T * Geno-cristaux gremy * Homosteron *
Homosterone * 17-beta-Hydroxy-delta(sup
4)-androsten-3-one *
17-beta-Hydroxyandrost-4-en-3-one *
17-beta-Hydroxy-4-androsten-3-one *
7-beta-Hydroxyandrost-4-en-3-one * Malestrone
(amps) * Mertestate * Neo-testis * Oreton-F *
Orquisteron * Perandren * Percutacrine
androgenique * Primotest * Primoteston *
Sustanone * Synandrol F * Teslen * Testandrone *
Testiculosterone * Testobase * Testopropon *
Testosteroid * Testosterone * trans-Testosterone *
Testosterone hydrate * Testosterone *
Testoviron schering * Testoviron T * Testrone *
Testryl * Viormone * Virosterone
RTECS Number: XA3030000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Toxic.

May cause cancer. Possible risk of harm to the unborn child.

Target organ(s): Reproductive system. Calif. Prop. 65 carcinogen.

HMIS RATING

HEALTH: 1*

FLAMMABILITY: 0

REACTIVITY: 0

NFPA RATING

HEALTH: 1

FLAMMABILITY: 0

REACTIVITY: 0

*additional chronic hazards present.

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

Section 4 - First Aid Measures

ORAL EXPOSURE

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

INHALATION EXPOSURE

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

DERMAL EXPOSURE

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

EYE EXPOSURE

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

Section 5 - Fire Fighting Measures

FLASH POINT

N/A

AUTOIGNITION TEMP

N/A

FLAMMABILITY

N/A

EXTINGUISHING MEDIA

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

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area. Shut off all sources of ignition.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves. Wear disposable coveralls and discard them after use.

METHODS FOR CLEANING UP

Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material

pickup is complete.

ENVIRONMENTAL PRECAUTION(S)

Avoid contaminating water supply. Avoid contaminating sewers and waterways with this material.

Section 7 - Handling and Storage

HANDLING

User Exposure: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE

Suitable: Keep tightly closed.

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Use only in a chemical fume hood. Safety shower and eye bath.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a 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.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Wash contaminated clothing before reuse. Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Solid	
Property	Value	At Temperature or Pressure
Molecular Weight	288.43 AMU	
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	152 °C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	N/A	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	
Water Content	N/A	
Solvent Content	N/A	
Evaporation Rate	N/A	
Viscosity	N/A	
Surface Tension	N/A	
Partition Coefficient	N/A	
Decomposition Temp.	N/A	
Flash Point	N/A	

Explosion Limits	N/A
Flammability	N/A
Autoignition Temp	N/A
Refractive Index	N/A
Optical Rotation	Degree of Rotation: 10 g/l Solvent: EtOH +133 - +112 (+/-2)

Miscellaneous Data	N/A
Solubility	Solubility in Water: Insoluble.

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.

Materials to Avoid: Strong oxidizing agents.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: May cause skin irritation.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: May cause eye irritation.

Inhalation: May be harmful if inhaled. Material may be irritating to mucous membranes and upper respiratory tract.

Ingestion: May be harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)

Reproductive system.

TOXICITY DATA

Oral

Mammal

> 5000 mg/kg

LD50

CHRONIC EXPOSURE - CARCINOGEN

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

Species: Mouse

Route of Application: Oral

Dose: 6240 MG/KG

Exposure Time: 52D

Frequency: C

Result: Tumorigenic: Neoplastic by RTECS criteria. Tumorigenic

Effects: Ovarian tumors.

Species: Mouse

Route of Application: Subcutaneous

Dose: 30 MG/KG

Exposure Time: 5D

Frequency: I

Result: Tumorigenic Effects: Other reproductive system tumors.
Endocrine: Adrenal cortex tumors. Tumorigenic: Neoplastic by RTECS criteria.

Species: Mouse
Route of Application: Implant
Dose: 400 MG/KG
Exposure Time: 50D
Frequency: C
Result: Tumorigenic: Neoplastic by RTECS criteria. Tumorigenic Effects: Ovarian tumors.

IARC CARCINOGEN LIST

Rating: Group 2A Group 2A

CHRONIC EXPOSURE - TERATOGEN

Result: Possible risk of congenital malformation in the fetus.

Species: Woman
Dose: 34600 UG/KG
Route of Application: Unreported
Exposure Time: (7-13W PREG)
Result: Specific Developmental Abnormalities: Urogenital system.

Species: Rat
Dose: 100 MG/KG
Route of Application: Oral
Exposure Time: (17-20D PREG)
Result: Specific Developmental Abnormalities: Urogenital system.

Species: Rat
Dose: 8 MG/KG
Route of Application: Intramuscular
Exposure Time: (13-20D PREG)
Result: Specific Developmental Abnormalities: Skin and skin appendages. Specific Developmental Abnormalities: Urogenital system.

Species: Guinea pig
Dose: 86 MG/KG
Route of Application: Subcutaneous
Exposure Time: (18-60D PREG)
Result: Specific Developmental Abnormalities: Endocrine system.
Specific Developmental Abnormalities: Urogenital system.

Species: Domestic Animals
Dose: 6398 UG/KG
Route of Application: Implant
Exposure Time: (30-80D PREG)
Result: Specific Developmental Abnormalities: Urogenital system.

Species: Domestic Animals
Dose: 6491 UG/KG
Route of Application: Implant
Exposure Time: (13-20W PREG)
Result: Effects on Embryo or Fetus: Fetal death.

CHRONIC EXPOSURE - MUTAGEN

Species: Human
Dose: 50 UMOL/L
Cell Type: lymphocyte

Mutation test: DNA inhibition

Species: Human
Dose: 100 UG/L
Cell Type: kidney
Mutation test: DNA inhibition

Species: Human
Dose: 100 UG/L
Cell Type: kidney
Mutation test: Cytogenetic analysis

Species: Rat
Route: Parenteral
Dose: 10 MG/KG
Mutation test: Unscheduled DNA synthesis

Species: Rat
Dose: 100 UMOL/L
Cell Type: liver
Mutation test: DNA inhibition

Species: Mouse
Dose: 100 UMOL/L
Cell Type: liver
Mutation test: DNA damage

Species: Hamster
Dose: 5 MG/L
Cell Type: Embryo
Mutation test: Morphological transformation.

Species: Mammal
Dose: 10 UMOL/L
Cell Type: lymphocyte
Mutation test: DNA damage

Species: Mammal
Dose: 1 UMOL/L
Cell Type: liver
Mutation test: DNA damage

CHRONIC EXPOSURE - REPRODUCTIVE HAZARD

Result: Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Species: Man
Dose: 17 MG/KG
Route of Application: Implant
Exposure Time: (26W MALE)
Result: Paternal Effects: Other effects on male. Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count).

Species: Rat
Dose: 64 MG/KG
Route of Application: Oral
Exposure Time: (10D MALE)
Result: Paternal Effects: Prostate, seminal vessicle, Cowper's gland, accessory glands.

Species: Rat

Dose: 25 MG/KG
Route of Application: Subcutaneous
Exposure Time: (17D PREG)
Result: Effects on Newborn: Delayed effects. Effects on Newborn: Physical.

Species: Rat
Dose: 7 MG/KG
Route of Application: Subcutaneous
Exposure Time: (10-16D PREG)
Result: Effects on Fertility: Abortion.

Species: Rat
Dose: 4 MG/KG
Route of Application: Subcutaneous
Exposure Time: (9D PREG)
Result: Effects on Fertility: Post-implantation mortality (e.g., dead and/or resorbed implants per total number of implants).
Maternal Effects: Parturition.

Species: Rat
Dose: 20 MG/KG
Route of Application: Subcutaneous
Exposure Time: (5D PREG)
Result: Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea).

Species: Rat
Dose: 8400 UG/KG
Route of Application: Subcutaneous
Exposure Time: (21D MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.
Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count). Paternal Effects: Prostate, seminal vessicle, Cowper's gland, accessory glands.

Species: Rat
Dose: 1400 UG/KG
Route of Application: Subcutaneous
Exposure Time: (14D PRE)
Result: Effects on Fertility: Other measures of fertility

Species: Rat
Dose: 700 UG/KG
Route of Application: Subcutaneous
Exposure Time: (14D PRE)
Result: Maternal Effects: Ovaries, fallopian tubes. Maternal Effects: Uterus, cervix, vagina.

Species: Rat
Dose: 60 MG/KG
Route of Application: Intramuscular
Exposure Time: (3-7D PREG)
Result: Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea).

Species: Rat
Dose: 280 UG/KG
Route of Application: Intramuscular
Exposure Time: (14D MALE)

Result: Paternal Effects: Prostate, seminal vessicle, Cowper's gland, accessory glands. Paternal Effects: Testes, epididymis, sperm duct.

Species: Rat
Dose: 2500 UG/KG
Route of Application: Parenteral
Exposure Time: (10D PRE)
Result: Maternal Effects: Ovaries, fallopian tubes.

Species: Rat
Dose: 4 MG/KG
Route of Application: Parenteral
Exposure Time: (3W MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.

Species: Rat
Dose: 8 MG/KG
Route of Application: Parenteral
Exposure Time: (3W MALE)
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count).

Species: Rat
Dose: 10440 UG/KG
Route of Application: Implant
Exposure Time: (30D MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.

Species: Rat
Dose: 27 MG/KG
Route of Application: Implant
Exposure Time: (90D MALE)
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count). Effects on Fertility: Male fertility index (e.g., # males impregnating females per # males exposed to fertile nonpregnant females). Paternal Effects: Testes, epididymis, sperm duct.

Species: Rat
Dose: 10920 UG/KG
Route of Application: Implant
Exposure Time: (91D MALE)
Result: Paternal Effects: Prostate, seminal vessicle, Cowper's gland, accessory glands.

Species: Rat
Dose: 33300 UG/KG
Route of Application: Implant
Exposure Time: (15W MALE)
Result: Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea). Paternal Effects: Other effects on male. Effects on Fertility: Litter size (e.g.; # fetuses per litter; measured before birth).

Species: Rat
Dose: 24 MG/KG
Route of Application: Intratesticular
Exposure Time: (30D MALE)
Result: Paternal Effects: Prostate, seminal vessicle, Cowper's gland, accessory glands. Paternal Effects: Testes, epididymis,

sperm duct.

Species: Mouse
Dose: 15 GM/KG
Route of Application: Oral
Exposure Time: (8-12D PREG)
Result: Effects on Newborn: Live birth index (# fetuses per litter; measured after birth). Effects on Newborn: Viability index (e.g., # alive at day 4 per # born alive).

Species: Mouse
Dose: 40 MG/KG
Route of Application: Subcutaneous
Exposure Time: (10D PRE)
Result: Maternal Effects: Uterus, cervix, vagina. Maternal Effects: Other effects.

Species: Mouse
Dose: 168 MG/KG
Route of Application: Subcutaneous
Exposure Time: (3D PRE)
Result: Maternal Effects: Uterus, cervix, vagina.

Species: Mouse
Dose: 10 MG/KG
Route of Application: Subcutaneous
Exposure Time: (5D PRE)
Result: Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated). Maternal Effects: Uterus, cervix, vagina.

Species: Mouse
Dose: 4524 MG/KG
Route of Application: Parenteral
Exposure Time: (19D MALE)
Result: Paternal Effects: Testes, epididymis, sperm duct.

Species: Mouse
Dose: 9583 NG/KG
Route of Application: Parenteral
Exposure Time: (1D PRE)
Result: Maternal Effects: Uterus, cervix, vagina.

Species: Monkey
Dose: 1426 UG/KG
Route of Application: Implant
Exposure Time: (70D MALE)
Result: Paternal Effects: Spermatogenesis (including genetic material, sperm morphology, motility, and count).

Species: Rabbit
Dose: 30 MG/KG
Route of Application: Subcutaneous
Exposure Time: (1-3D PREG)
Result: Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea).

Species: Rabbit
Dose: 6 MG/KG
Route of Application: Unreported

Exposure Time: (1-3D PREG)
Result: Effects on Fertility: Pre-implantation mortality (e.g., reduction in number of implants per female; total number of implants per corpora lutea).

Species: Hamster
Dose: 180 MG/KG
Route of Application: Subcutaneous
Exposure Time: (3-8D PREG)
Result: Effects on Fertility: Female fertility index (e.g., # females pregnant per # sperm positive females; # females pregnant per # females mated).

Species: Domestic Animals
Dose: 13333 UG/KG
Route of Application: Subcutaneous
Exposure Time: (50D PREG)
Result: Effects on Newborn: Behavioral.

Species: Domestic Animals
Dose: 18 UG/KG
Route of Application: Implant
Exposure Time: (7-14W PREG)
Result: Effects on Fertility: Mating performance (e.g., # sperm positive females per # females mated; # copulations per # estrus cycles).

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact the Drug Enforcement Administration concerning the disposal of controlled substances. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

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

IATA

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

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION

Symbol of Danger: T

Indication of Danger: Toxic.

R: 45-63

Risk Statements: May cause cancer. Possible risk of harm to the unborn child.

S: 53-36/37-45

Safety Statements: Avoid exposure - obtain special instructions before use. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Toxic.

Risk Statements: May cause cancer. Possible risk of harm to the unborn child.

Safety Statements: Avoid exposure - obtain special instructions before use. Wear suitable protective clothing and gloves. In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

US Statements: Target organ(s): Reproductive system. Calif. Prop. 65 carcinogen.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: No

TSCA INVENTORY ITEM: Yes

UNITED STATES - STATE REGULATORY INFORMATION

CALIFORNIA PROP - 65

California Prop - 65: This product is or contains chemical(s) known to the state of California to cause cancer. This product is or contains chemical(s) known to the state of California to cause cancer.

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.

DSL: Yes

NDSL: No

Section 16 - Other Information

DISCLAIMER

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

WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale. Copyright 2008 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

1. PRODUCT AND COMPANY IDENTIFICATION

Product name : **β-Estradiol**

Product Number : E8875

Brand : Sigma

Supplier : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO 63103
USA

Telephone : +1 800-325-5832

Fax : +1 800-325-5052

Emergency Phone # (For both supplier and manufacturer) : (314) 776-6555

Preparation Information : Sigma-Aldrich Corporation
Product Safety - Americas Region
1-800-521-8956

2. HAZARDS IDENTIFICATION

Emergency Overview

OSHA Hazards

Carcinogen, Target Organ Effect, Teratogen, Reproductive hazard

Target Organs

Female reproductive system., Male reproductive system. Female reproductive system., Male reproductive system.

GHS Classification

Carcinogenicity (Category 2)

Reproductive toxicity (Category 1A)

Effects on or via lactation

GHS Label elements, including precautionary statements

Pictogram



Signal word

Danger

Hazard statement(s)

H351

Suspected of causing 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.

P281

Use personal protective equipment as required.

P308 + P313

IF exposed or concerned: Get medical advice/ attention.

HMIS Classification

Health hazard:

0

Chronic Health Hazard:

*

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.

3. COMPOSITION/INFORMATION ON INGREDIENTS

Synonyms : 3,17 β -Dihydroxy-1,3,5(10)-estratriene
1,3,5-Estratriene-3,17 β -diol
Dihydrofolliculin
17 β -Estradiol

Formula : C₁₈H₂₄O₂
Molecular Weight : 272.38 g/mol

Component		Concentration
Estradiol		
CAS-No.	50-28-2	-
EC-No.	200-023-8	-

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

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 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.

Keep in a dry place.

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.

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.

9. PHYSICAL AND CHEMICAL PROPERTIES**Appearance**

Form	powder
Colour	white

Safety data

pH	no data available
Melting point/freezing point	Melting point/range: 176 - 180 °C (349 - 356 °F) - lit.
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

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

Genotoxicity in vitro - rat - Other cell types

DNA damage

Genotoxicity in vivo - rat - Oral

Morphological transformation.

Carcinogenicity

The National Toxicology Program (Tenth Report on Carcinogens) has determined that steroidal estrogens are known to be human carcinogens based on sufficient evidence of carcinogenicity in humans, which indicates a causal relationship between exposure to steroidal estrogens and human cancer. This is or contains a component that has been reported to be carcinogenic based on its IARC, OSHA, ACGIH, NTP, or EPA classification.

Suspected human carcinogens

- 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: Known to be human carcinogen (Estradiol)
- 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

Known human reproductive toxicant Effects on or via lactation May damage fertility. Suspected of damaging the unborn child.

Teratogenicity

Suspected human reproductive toxicant Damage to fetus cannot be excluded.

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.

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: KG2975000

12. ECOLOGICAL INFORMATION

Toxicity

Toxicity to fish LC50 - Oncorhynchus mykiss (rainbow trout) - > 0.5 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

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

OSHA Hazards

Carcinogen, Target Organ Effect, Teratogen, Reproductive hazard

SARA 302 Components

SARA 302: No chemicals 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 III, Section 313.

SARA 311/312 Hazards

Chronic Health Hazard

Massachusetts Right To Know Components

	CAS-No.	Revision Date
Estradiol	50-28-2	1993-04-24

Pennsylvania Right To Know Components

	CAS-No.	Revision Date
Estradiol	50-28-2	1993-04-24

New Jersey Right To Know Components

	CAS-No.	Revision Date
Estradiol	50-28-2	1993-04-24

California Prop. 65 Components

	CAS-No.	Revision Date
WARNING! This product contains a chemical known to the State of California to cause cancer.	50-28-2	2007-09-28
Estradiol		

16. OTHER INFORMATION

Further information

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TOXIN USE RISK ASSESSMENT

Name of Toxin:	Aldosterone
Proposed Use Dose:	2000 µg
Proposed Storage Dose:	100000 µg
LD ₅₀ (species):	3500000 µg

Calculation:

$$3500000 \text{ µg/kg} \quad \times \quad 50 \text{ kg/person}$$

$$\text{Dose per person based on LD}_{50} \text{ in µg} = 175000000$$

$$\text{LD}_{50} \text{ per person with safety factor of 10 based on LD}_{50} \text{ in µg} = 17500000$$

Comments/Recommendations:



Western
UNIVERSITY • CANADA

TOXIN USE RISK ASSESSMENT

Name of Toxin:	Testosterone
Proposed Use Dose:	2000 µg
Proposed Storage Dose:	100000 µg
LD₅₀ (species):	20000000 µg

Calculation:

20000000 µg/kg x 50 kg/person

Dose per person based on LD₅₀ in µg = 1000000000

LD₅₀ per person with safety factor of 10 based on LD₅₀ in µg = 100000000

Comments/Recommendations:



Western
UNIVERSITY • CANADA

TOXIN USE RISK ASSESSMENT

Name of Toxin:	Estradiol
Proposed Use Dose:	2000 µg
Proposed Storage Dose:	100000 µg
LD₅₀ (species):	1200000 µg

Calculation:

1200000 µg/kg x 50 kg/person

Dose per person based on LD₅₀ in µg = 60000000

LD₅₀ per person with safety factor of 10 based on LD₅₀ in µg = 6000000

Comments/Recommendations: