THE UNIVERSITY OF WESTERN ONTARIO
BIOLOGICAL AGENTS REGISTRY FORM
Approved Biohazards Subcommittee: October 14, 2010
Biosafety Website: www.uwo.ca/humanresources/biosafety/

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

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

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

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

PRINCIPAL INVESTIGATOR	Dr. Michael Rieder
DEPARTMENT	Biotherapeutics / Paediatrics
ADDRESS	100 Perth Drive, RRI, Room 2226
PHONE NUMBER	519-931-5777 x 24209
EMERGENCY PHONE NUMBER(S)	519-931-5777 x 24209
EMAIL	mrieder@uwo.ca

Location of experimental work to be carried out: Building(s) X RRI; Room(s) 2226

*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: Adept Chemicals
GRANT TITLE(S):
Point-of-care diagnosis of *Listeria monocytogenes*

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

Name	UWO E-mail Address	Date of Biosafety Training
Anda Marcu	amarcu2@uwo.ca	19-July-2006
Abdelbaset Elzagallai	aelzagal@uwo.ca	14-May-2007

X

Subject: **Fwd: Re: Listeria Project**
To: amarcu2@uwo.ca

Date: 05/06/11 03:30 PM
From: Michael J Rieder <mrieder@uwo.ca>

Re: Listeria Project.eml (3kB)

Subject: Re: Listeria Project
From: Susan Koval <skoval@uwo.ca>
Reply-To: skoval@uwo.ca
Date: Fri, 06 May 2011 12:45:29 -0400
To: Michael J Rieder <mrieder@uwo.ca>

Hello Michael,
I suggest you contact one of my bacteriology colleagues who works with pathogens and has a BSL 2 laboratory: Drs. Creuzenet, Heinrichs, McCormick, McGavin, or Valvano. My laboratory is an 'original', unrenovated room in the Dental Sciences Building and is only a BSL 1 facility. This is fine, as I don't work with BSL 2 organisms.

Regards,
Susan

On 5/6/2011 11:07 AM, Michael J Rieder wrote:
>Hello Susan:
>
>With respect to this project, we are looking at point-of-care diagnostics for Listeria, so the culture will be to provide a source of Listeria for our experiments, which will use various antibody/signaling combinations
>
>Anda, my tech, has been trained to work with pathogenic bacteria as has one of my post-docs
>
>That being said, further to you suggestion we are happy to collaborate with colleagues in M & I - who would you suggest?
>
>Best wishes
>
>MJR

--
****
Susan F. Koval
Dept. of Microbiology and Immunology
University of Western Ontario
London, Ontario N6A 5C1
Canada
Tel: (519) 661-3439
Fax: (519) 661-3499
email: skoval@uwo.ca
****

Please explain the biological agents and/or biohazardous substances used and how they will be stored, used and disposed of. Projects without this description will not be reviewed.

Listeria monocytogenes will be handled under biosafety level 2 (according to PHAC) and the personnel informed about the hazard (Material Safety Data Sheet).

- use of biosafety cabinets for activities generating aerosols; laboratory coat, gloves and eye protection worn

- stored in sealed containers that are appropriately labeled; stored in the laboratory by a method that minimizes or eliminates transfer (i.e. in glycerol stored at -80C)

- in case of accidental spills: allow aerosols to settle, wear protective clothing, gently cover spill with paper towels and apply 1% sodium hypochlorite starting at the perimeter and working towards the centre, allow sufficient contact time (30 min) before clean up.

- disposal: all materials autoclaved; used glassware and other supplies in contact with infectious materials are to be place in sturdy, heat resistant container and autoclaved; disposable materials (gloves, tissue paper, etc) are collected as biohazardous waste and autoclaved

Heat Killed *L. monocytogenes* will be handled and disposed of following the same procedures outlined above.

Please include a one page research summary or teaching protocol.

Dr. Uma Mahesh Babu – project co-leader (Hygea Life Sciences liaison)
Expertise – development of rapid diagnostic kits

Dr. K. Adeyanju – post-doctoral fellow
Expertise – immunology

Dr. Abdelbaset Ezagallaai – post-doctoral fellow
Expertise – *in vitro* diagnostics

Project description

Objective: Develop a "Proof of Principle" Model (POP) which demonstrates the contemporaneous testing of a single liquid sample for the presence of multiple marker proteins, using a single test device. A qualitative (yes/no) visual test to determine positive or negative (control spot will show) results within 2 minutes.

The design for the "POP model" is to develop a 2 spot *Listeria monocytogenes* test and to complete lab development with gold standards, within an 8 month window. The field clinical trials would follow and be completed in a further 2-3 months.

Test Action: A liquid sample (from a swab or a wash) is applied to the test area and through gravitational force and surface tension, moves down to the protein marker layer embedded in the test structure. Thereafter a drop of a selected reagent is applied so that it covers the visible portion of the active surface area and its role is to operatively bind to any marker protein that may have been immobilized.

Specificity is conferred by the selection of appropriate antibodies. The amino acid sequence in the tips of the "Y" varies greatly among different antibodies. This variable region, composed of 110-130 amino acids, give the antibody its specificity for binding a specific antigen, in this case to *Listeria*. (Initial phase of the project will involve working with heat killed *L. monocytogenes*)

This is an **antigen** detection test. It has the potential to test other species other than *Listeria*. In order to detect an antigen in the sample, a pair of highly specific antibodies are needed. One part of the pair is immobilized in the Test area as a spot. The other part of the pair is chemically attached to a visual nanopartical called conjugate. The antigen is literally sandwiched between these two parts in the pair and gives rise to a visually detectable spot. Developing the 'harmony' of various antigens within the same protein layer to respond to the same sample, at the same time, requires extensive analysis and lab experimentation to achieve the desired functionality.

Timeline

The test's evolution will be designed to use the following **2 phase** timing model:

The **first phase** will incrementally add the desired first part of the antibody pair for *Listeia* into one combination spot. If this is, then the spot will activate. If none are

1.0 Microorganisms

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

Do you use microorganisms that require a permit from the CFIA? Ox YES O NO
If YES, please give the name of the species. _*Listeria monocytogenes*_____
What is the origin of the microorganism(s)? _____
Please describe the risk (if any) of escape and how this will be mitigated: **SPILLS**: Allow aerosols to settle; wear protective clothing; gently cover spill with paper towels 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 before disposal; steam sterilization, chemical disinfection, incineration. **STORAGE**: in sealed containers that are appropriately labeled.

Please attach the CFIA permit.

1.2 Please complete the table below:

Name of Biological Agent(s)* (Be specific)	Is it known to be a human pathogen? YES/NO	Is it known to be an animal pathogen? YES/NO	Is it known to be a zoonotic agent? YES/NO	Maximum quantity to be cultured at one time? (in Litres)	Source/ Supplier	PHAC or CFIA Containment Level
Listeria monocytogenes	O XYes O No	O XYes O No	OX Yes O No	0.1-0.3 L	ATCC	O 1 OX 2 O 2+ O 3
Heat Killed L. monocytogenes	O Yes ⊗ No	O Yes ⊗ No	O Yes ⊗No	0.1-0.3L	Invivogen	O 1 O 2 O 2+ O 3
	O Yes O No	O Yes O No	O Yes O No			O 1 O 2 O 2+ O 3
	O Yes O No	O Yes O No	O Yes O No			O 1 O 2 O 2+ O 3

*Please attach a Material Safety Data Sheet or equivalent from the supplier.

2.0 Cell Culture

2.1 Does your work involve the use of cell cultures? O YES OX NO
If no, please proceed to Section 3.0

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

Cell Type	Is this cell type used in your work?	Source of Primary Cell Culture Tissue	AUS Protocol Number
Human	O Yes O No		Not applicable
Rodent	O Yes O No		
Non-human primate	O Yes O No		
Other (specify)	O Yes O 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	O Yes O No			
Rodent	O Yes O No			
Non-human primate	O Yes O No			
Other (specify)	O Yes O No			

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

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

3.0 Use of Human Source Materials

3.1 Does your work involve the use of human source materials? O YES OX 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		O Yes O Unknown		O 1 O 2 O 2+ O 3
Human Blood (fraction) or other Body Fluid		O Yes O Unknown		O 1 O 2 O 2+ O 3
Human Organs or Tissues (unpreserved)		O Yes O Unknown		O 1 O 2 O 2+ O 3
Human Organs or Tissues (preserved)		Not Applicable		Not Applicable

4.0 Genetically Modified Organisms and Cell lines

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

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

Bacteria Used for Cloning *	Plasmid(s) **	Source of Plasmid	Gene Transfected	Describe the change that results from transformation or tranfection

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

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

Virus Used for Vector Construction	Vector(s) *	Source of Vector	Gene(s) Transduced	Describe the change that results from transduction

* Please attach a Material Safety Data Sheet or equivalent.

4.4 Will genetic sequences from the following be involved?

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

4.5 Will virus be replication defective? O YES OX NO

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

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

5.0 Human Gene Therapy Trials

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

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

5.2 Will the biological agent be able to replicate in the host? O YES O NO

5.3 How will the biological agent be administered? _____

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

5.5 Has human ethics approval been obtained? O YES, number: _____ O NO O PENDING

6.0 Animal Experiments

6.1 Will live animals be used? O YES OX NO If no, please proceed to section 7.0

6.2 Name of animal species to be used_____

6.3 AUS protocol # _____

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

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

_____

_____

7.0 Use of Animal species with Zoonotic Hazards

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

7.2 Will live animals be used? O YES O No

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

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

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

_____

8.0 Biological Toxins

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

8.2 If YES, please name the toxin(s)_____
Please attach information, such as a Material Safety Data Sheet, for the toxin(s) used.

8.3 What is the LD_{50} (specify species) of the toxin_____

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

8.5 How much of the toxin is stored*? _____

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

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

9.0 Insects

9.1 Do you use insects? O YES OX NO If no, please proceed to Section 10.0

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

9.3 What is the origin of the insect? _____

9.4 What is the life stage of the insect? _____

9.5 What is your intention? O Initiate and maintain colony, give location: _____
O "One-time" use, give location: _____

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

_____

_____

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

_____

_____

10.0 Plants

10.1 Do you use plants? O YES OX NO If no, please proceed to Section 11.0

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

10.3 What is the origin of the plant? _____

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

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

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

_____

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

_____

_____

_____

July 13, 2011 - per RSN
No permits for these agents.

Lab will seek permit for L. monocytogenes when location is determined.

11.0 Import Requirements

11.1 Will any of the above agents be imported? OX YES, please give country of origin_U.S. ATCC O NO
If no, please proceed to Section 12.0

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

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

11.4 Has the import permit been sent to OHS? OX YES, please provide permit # C-2010-0033-4 O NO

12.0 Training Requirements for Personnel Named on Form

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

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

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

SIGNATURE _____

13.0 Containment Levels

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

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

O YES, date of most recent biosafety inspection: _____

O NO, please certify

O NOT REQUIRED for Level 1 containment

13.3 Please indicate permit number (not applicable for first time applicants): BIO-RRI-003

14.0 Procedures to be Followed

14.1 Please describe additional risk reduction measures will be taken beyond containment level 1, 2, 2+ or 3 measures, that are unique to this agent.

_We are following containment level 2 biosafety guidelines.

_____

14.2 Please outline what will be done if there is an exposure to the biological agents listed, such as a needlestick injury or an accidental splash:

____Squeeze the area surrounding the needle stick injury to expel nlood, wash the wand with cold running water, apply antiseptic & band-aid, contact health services

_____

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

SIGNATURE _____ Date: 08/7/2011

15.0 Approvals

1) UWO Biohazards Subcommittee: SIGNATURE: _____

Date: _____

2) Safety Officer for the University of Western Ontario

SIGNATURE: _____

Date: _____

3) Safety Officer for Institution where experiments will take place (if not UWO):

Heat Killed work only at Robarts RN

SIGNATURE: Ronald Woserdt

Date: July 08, 2011

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

Special Conditions of Approval:

Material Safety Data Sheets (MSDS)

MATERIAL SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

SECTION I - INFECTIOUS AGENT

NAME: ***Listeria monocytogenes***

SYNONYM OR CROSS REFERENCE: Listeriosis, Listerella

CHARACTERISTICS: Gram-positive, non-spore forming, aerobic bacilli; hemolytic and catalase positive; tendency to form chains and palisades, growth at 4° C, intracellular; food-borne human pathogen usually caused by serovars 1/2a, 1/2b and 4b

SECTION II - HEALTH HAZARD

PATHOGENICITY: Opportunistic pathogen manifested in the elderly, in neonates and or among immunocompromised individuals as meningoencephalitis and/or septicemia; inapparent infection at all ages with consequence only during pregnancy; perinatal infections occur transplacentally and can result in abortion, stillbirth; meningitis, endocarditis, septicemia, and disseminated granulomatous lesions in adults

EPIDEMIOLOGY: Uncommonly diagnosed infection; typically sporadic; few recent outbreaks associated with food; nosocomial acquisition; 40% of clinical cases occur in infants; in adults infection occurs mainly after age 40; European studies have disclosed large numbers of human carriers; case fatality rate in newborns is 50%

HOST RANGE: Mammals, birds, fish, crustaceans and insects

INFECTIOUS DOSE: Not known

MODE OF TRANSMISSION: In neonates, transmission from mother to fetus *in utero* or during passage through infected birth canal; direct contact with infectious material or soil contaminated with infected animal feces can result in papular lesions on hands and arms; ingestion of contaminated food (vegetables and dairy products have been reported); venereal contact and inhalation of the organism is possible; nursery outbreaks via hands of medical staff

INCUBATION PERIOD: Variable, outbreak cases have occured 3-70 days following a single exposure to an implicated product, median incubation is estimated at 3 weeks

COMMUNICABILITY: Mothers of infected newborn infants may shed the agent for 7-10 days after delivery; infected individuals can shed organism in the stool for several months

SECTION III - DISSEMINATION

RESERVOIR: Infected domestic and wild mammals, fowl and humans; infection of foxes produces an encephalitis simulating rabies; asymptomatic fecal carriage in man (5%) and animals; frequently found in free-living water and mud; seasonal use of silage as fodder is frequently followed by an increased incidence of listeriosis in animals

ZOONOSIS: Yes, all domestic and wild animals are susceptible; proper precautions by farmers and veterinarians in handling aborted fetuses are recommended

VECTORS: None

SECTION IV - VIABILITY

DRUG SUSCEPTIBILITY: Sensitive to penicillin, ampicillin, aminoglycosides, tetracyclines (resistance has been observed), chloramphenicol

SUSCEPTIBILITY TO DISINFECTANTS: Moderately susceptible to disinfectants - 1% sodium hypochlorite, 70% ethanol, glutaraldehyde

PHYSICAL INACTIVATION: Sensitive to moist heat (121° C for at least 15 min) and dry heat (160-170° C for at least 1 hour); able to grow at low temperatures (-0.4 to -0.1° C); sensitive to short wave UV and gamma irradiation

SURVIVAL OUTSIDE HOST: Survives well in soil, water, food, feces

SECTION V - MEDICAL

SURVEILLANCE: Found in feces, CSF, blood; routine smear from all newborn infants examined for *L. monocytogenes*

FIRST AID/TREATMENT: Antibiotic therapy, penicillin or ampicillin alone or together with aminoglycosides; resistant to cephalosporins including third generation cephalosporins

IMMUNIZATION: None

PROPHYLAXIS: None

SECTION VI - LABORATORY HAZARDS

LABORATORY-ACQUIRED INFECTIONS: Not a common laboratory-associated infection; 2 reported infections

SOURCES/SPECIMENS: Cerebrospinal fluid, blood, placental or fetal tissue, genital tract secretions, amniotic fluid

PRIMARY HAZARDS: Experimentally infected animals are a risk factor to laboratory workers; ingestion is the common mode of exposure, however may cause eye and skin infection following direct exposure; parenteral inoculation, ingestion, exposure to highly concentrated aerosols

SPECIAL HAZARDS: None

SECTION VII - RECOMMENDED PRECAUTIONS

CONTAINMENT REQUIREMENTS: Biosafety level 2 practices, containment equipment and facilities for all activities involving clinical materials or cultures; biosafety cabinets should be used for activities likely to generate aerosols

PROTECTIVE CLOTHING: Laboratory coat; gloves and eye protection when direct contact with infectious materials is unavoidable

OTHER PRECAUTIONS: Pregnant women should avoid contact with infected materials

SECTION VIII - HANDLING INFORMATION

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

DISPOSAL: Decontaminate before disposal - steam sterilization, chemical disinfection, incineration

STORAGE: In sealed containers that are appropriately labelled

SECTION IX - MISCELLANEOUS INFORMATION

Date prepared: March, 2001

Prepared by: Office of Laboratory Security, PHAC

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

Date Modified: 2011-02-18

Section 1 - Product and Company Information

Product name: **HKLM**

Cat. code: tlrl-hklm

Company identification:

InvivoGen, 3950 Sorrento Valley Blvd, Suite 100
San Diego, California 92121, USA
(+1) 858 457 5873

Cayla-InvivoGen, 5 rue Jean Rodier
31400 Toulouse, FRANCE
+33 (0) 5 62 71 69 39

Emergency number: (+1) 888 457 5873 (Monday - Friday, 8.00 am – 6.00 pm)

Disclaimer: All InvivoGen products are supplied for research and laboratory use only. Not for drug, household or other uses.

Section 2 - Hazards Identification

Emergency Overview
OSHA Hazards No known OSHA hazards.

Not a dangerous substance according to GHS.

GHS Label elements, including precautionary statements

Pictogram	None
Signal word	None
Hazard statement	None
Precautionary statements	None

HMIS Classification Health Hazard **0** Flammability Hazard **0** Reactivity Hazard **0**
NFPA Rating Health Hazard **0** Fire **0** Reactivity Hazard **0**

Potential Health Effects
- Eye contact: May cause eye irritation.
- Skin contact: May cause skin irritation.
- Skin absorption: May be harmful if absorbed through the skin.
- Inhalation: May be harmful if inhaled. May cause respiratory tract irritation.
- Ingestion: May be harmful if swallowed.

Section 3 – Composition/Information on Ingredient

Substance Name: Heat killed *Listeria monocytogenes*
CAS Number: Not available

Section 4 – First Aid Measures

General advice: Consult a physician. Show this material safety data sheet to the doctor in attendance.
After skin contact: Immediately wash skin with soap and plenty of water. Consult a physician.
After swallowing: Never give anything by mouth to an unconscious person. Rinse mouth with water provided person is conscious. Consult a physician.
After inhalation: Remove to fresh air. If not breathing give artificial respiration. Consult a physician.
After eye contact: Immediately flush eyes with plenty of water for at least 15 minutes. Consult a physician.

Section 5 – Fire Fighting Measures

Suitable extinguishing media: Water spray, carbon dioxide, dry chemical powder or appropriate foam.
Special Firefighting Procedures: Wear self-contained breathing apparatus for fire fighting if necessary.

Section 6 – Accidental Release Measures

Personal precautions:
Wear protective equipment. Keep unprotected persons away. Avoid dust formation.
Method for Cleaning Up:
Sweep up and place in closed containers for disposal. Dispose contaminated material as waste according to section 13. Ventilate area and wash spill site after material clean-up is complete.

Section 7– Handling and Storage

Handling: Avoid contact with eyes, skin and clothing. Avoid prolonged or repeated exposure.
User exposure: Avoid Inhalation. Use personal protective equipment (i.e. impermeable gloves, lab coat or apron).
Storage: Store at 4°C.

Section 8 – Exposure Controls / PPE

Engineering measures: Ensure adequate ventilation, especially in confined areas.

Personal Protective Equipment
Hand: Protective gloves to prevent skin contact. **Eye:** Chemical safety goggles
General hygiene measures: Wash hands thoroughly after handling.

Section 9 – Physical / Chemical Properties

Appearance: Light brown color
Physical state: Solid (lyophilized cells)

Section 10 – Stability and Reactivity

Stability: Stable
Hazardous polymerization: Will not occur
Materials to avoid: Strong oxidizing agents
Hazardous decomposition products: Nature of decomposition products are not hazardous.

Section 11 – Toxicological Information

Acute toxicity: No data available.
Skin irritation/corrosion: No data available.
Serious eye damage/eye irritation: No data available.
Respiratory or skin sensitization: No data available.
Additional toxicological information: No data available.

Section 12 – Ecological Information

Ecotoxicity: No data available.
Persistence and degradability: No data available.
Bioaccumulative potential: No data available.
Mobility in soil: No data available.

Section 13 – Disposal Considerations

Product:
Observe all federal, state and local environmental regulations. Contact a licensed professional waste disposal service to dispose of this material. Must not be disposed of together with household garbage.
Contaminated packaging:
Dispose of as unused product.

Section 14 – Transport Information

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

Section 15 – Regulatory Information

OSHA HAZARDS (US) No known OSHA Hazards
DSL Status: This product contains the following components that are not on the Canadian DSL nor NDSL lists.
Heat killed *Listeria monocytogenes* CAS number: not available
SARA 302 Component: None of the ingredients are listed.
SARA 313 Component: None of the ingredients are listed.
SARA 311/312 Hazards: None of the ingredients are listed.

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

Labeling and risk phrase according to EU Directives
The product does not need to be labeled in accordance with EC directives or respective national laws.

Section 16 – Other Information

The information contained in this MSDS relates only to the material(s) designated and does not relate to use(s) in combination with any other material, process(es) and/or chemical reaction(s). InvivoGen provides this information in good faith and is based on our present knowledge. This MSDS is provided without warranty of any kind. The recipient is responsible for ensuring that, where applicable, existing laws and guidelines are observed.