THE UNIVERSITY OF WESTERN ONTARIO
BIOHAZARDOUS AGENTS REGISTRY FORM
Approved Biohazards Subcommittee: June 26, 2009
Biosafety Website: www.uwo.ca/humanresources/biosafety/

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

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

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

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

PRINCIPAL INVESTIGATOR: Beth MacDougall-Shackleton
SIGNATURE: Beth MacDougall-Shackleton
DEPARTMENT: BIOLOGY
ADDRESS: BIOL + GEOL SCIENCES BLDG
PHONE NUMBER: [redacted] x 81206
EMERGENCY PHONE NUMBER(S): 519-639-1534
EMAIL: emacdoug@uwo.ca

Location of experimental work to be carried out: Building(s) AFAR and field sites off campus. Room(s) 216

*For work being performed at Institutions affiliated with the University of Western Ontario, the Safety Officer for the Institution where experiments will take place must sign the form prior to its being sent to the University of Western Ontario Biosafety Officer (See Section 12.0, Approvals).

FUNDING AGENCY/AGENCIES: NSERC
GRANT TITLE(S): [redacted] Mating signals, gene flow and disease resistance in songbirds

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

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

Shawn Kubli
Jenna Kewin

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

1.0 Microorganisms

1.1 Does your work involve the use of biological agents? ☑ YES ○ NO
(including but not limited to 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)? VWR
Please describe the risk (if any) of escape and how this will be mitigated:
Microorganisms are shipped and stored freeze-dried and reconstituted immediately before use. After use, waste will be autoclaved as biohazardous waste.
Please attach the CFIA permit.
Please describe any CFIA permit conditions:

1.2 Please complete the table below:

Name of Biological agent(s)*	Is it known to be a human pathogen? YES/NO	Is it known to be an animal pathogen? YES/NO	Is it known to be a zoonotic agent? YES/NO	Maximum quantity to be cultured at one time? (in Litres)	Source/ Supplier	PHAC or CFIA Containment Level
Escherichia coli (ATCC# 8739)	○ Yes ☑ No	○ Yes ☑ No	○ Yes ☑ No	0.1	VWR	☑ 1 ○ 2 ○ 3
E. coli (ATCC# 51813)	○ Yes ☑ No	○ Yes ☑ No	○ Yes ☑ No	0.1	VWR	☑ 1 ○ 2 ○ 3
Candida albicans (ATCC# 10231)	○ Yes ☑ No	○ Yes ☑ No	○ Yes ☑ No	0.1	VWR	☑ 1 ○ 2 ○ 3
	○ Yes ○ No	○ Yes ○ No	○ Yes ○ No			○ 1 ○ 2 ○ 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? ○ 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		
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)*	Supplier / Source
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 3

3.0 Use of Human Source Materials

3.1 Does your work involve the use of human source materials? O 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 Known to Be Infected With An Infectious Agent? YES/NO**	**Name of Infectious Agent (If applicable)**	**PHAC or CFIA Containment Level (Select one)**
Human Blood (whole) or other Body Fluid		O Yes O No		O 1 O 2 O 3
Human Blood (fraction) or other Body Fluid		O Yes O No		O 1 O 2 O 3
Human Organs or Tissues (unpreserved)		O Yes O No		O 1 O 2 O 3
Human Organs or Tissues (preserved)		O Yes O No		O 1 O 2 O 3

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 ⊘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

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

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

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

* Please attach a Material Safety Data Sheet or equivalent.

4.4 Will genetic sequences from the following be involved?

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

4.5 Will virus be replication defective? O YES O NO

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

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

5.0 Human Gene Therapy Trials

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

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

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

5.3 How will the biological agent be administered? _____

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

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

6.0 Animal Experiments

6.1 Will live animals be used? O YES ⊘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 be used in live animals O YES, specify: _____ O NO

7.0 Use of Animal species with Zoonotic Hazards

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

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

8.0 Biological Toxins

8.1 Will toxins of biological origin be used? O YES ☑ 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*? _____

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

9.0 Insects Requiring CFIA Permits

9.1 Do you use insects that require a permit from the CFIA? O YES ☑ NO
If no, please proceed to Section 10.0

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

9.3 What is the origin of the insect? _____

9.4 What is the life stage of the insect? _____

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

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

_____
_____
_____

9.7 Please attach the CFIA permit.

9.8 Please describe any CFIA permit conditions:

_____
_____
_____

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

10.0 Plants Requiring CFIA Permits

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

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

10.3 What is the origin of the plant? _____

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

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

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

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

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

10.9 Please describe any CFIA permit conditions:
_____
_____
_____

11.0 Import Requirements

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

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

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

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

12.0 Training Requirements for Personnel Named on Form

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

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

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

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

SIGNATURE Bell MacDougall Sm.

13.0 Containment Levels

11.1 For the work described in sections 1.0 to 9.0, please indicate the highest HC or CFIA Containment Level required. ☑ 1 ○ 2 ○ 3

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

○ YES, permit # if on-campus_____
○ NO, please certify
☑ NOT REQUIRED for Level 1 containment

14.0 Procedures to be Followed

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

SIGNATURE Bell MacDougall Sm. Date: 16 Oct 2009.

15.0 Approvals

UWO Biohazard Subcommittee: SIGNATURE: _____
Date:_____

Safety Officer for Institution where experiments will take place: SIGNATURE:_____
Date:_____

Safety Officer for University of Western Ontario (if different from above): SIGNATURE:_____
Date:_____

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

Special Conditions of Approval:

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

Microbicidal assays to measure constitutive immune function in song sparrows (*Melospiza melodia*)

Overview We propose that male fitness and overall condition, measured through song repertoire size, may play a role in the trade-offs modulating constitutive immune function within the breeding season. In order to quantify constitutive levels of immune function in male song sparrows (*Melospiza melodia*), we will be using a microbicidal assay that requires whole live blood. This microbicidal assay measures the response capabilities of whole blood against potential pathogen exposure (Millet et al. 2007).

Study Site Field studies will be performed on a population of song sparrows breeding near Newboro, Ontario at the Queens University Biological Station (QUBS). An animal use permit has been secured (#2008-054-05). Other investigations concerning duration of whole blood viability ex vivo, and plasma killing ability, will be carried out at the Advanced Facility for Avian Research (AFAR) at the University of Western Ontario.

Microbicidal Assays This assay measures the bactericidal activity of leucocytes, natural antibodies and complement in whole blood. Due to individual variation in killing potentials, it is best to use a variety of different strains. In accordance with methods described by Millet et al. (2007), we propose the use of two strains of *Escherchia coli* (*E. coli*) American Type Culture Collection (ATCC) # 8739 and ATCC # 51813), and one strain of *Candida albicans* (*C. albicans*) ATCC #10231). These three strains proposed for use are all **Biosafety Level 1**.

Whole blood samples will be mixed with a known dilution of bacteria or yeast within CO_2 independent media. The blood-bacteria mixture will be incubated appropriately (Table.1), then plated and incubated over night. The differential capability of individuals to kill a pathogen will be indexed as a result of the reduced bacterial growth relative to controls. Thus, the quantification of killing potential is based on the relative bacterial/yeast growth compared to control plates.

All assays run at AFAR will be done under a laminar flow hood. The assays run in the field will be done in a smooth surfaced dead air box (Fig.1). Surfaces will be thoroughly wiped with 70% ethanol. Working solutions with microorganisms will be contained within sealed tubes and agar plates. Stock solutions will be contained within a sealed 50ml tube at 4°C. Both at AFAR and QUBS, all waste will be immediately placed in a biohazard waste sac, to be autoclaved prior to disposal. An approximate maximum total of 40 assays will be run, dependent on this 30-40 breeding pair population.

Methods

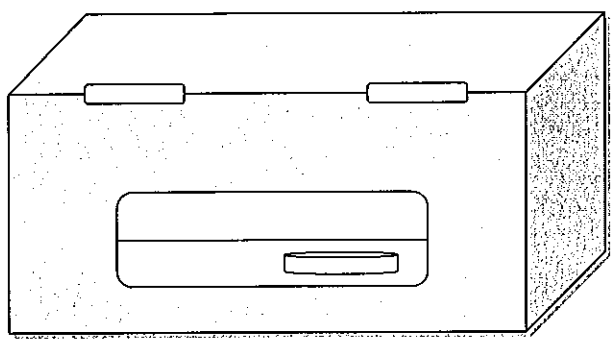
- Agar plates are prepared and stored properly
- Lyophilized pellets will be reconstituted according to manufactures instructions immediately before use.
- Proper dilutions and working solutions are determined by running test plates.
- Whole blood and bacteria working solutions are mixed and incubated for the appropriate amount of time prior to plating (Table.1).
- Control and experimental solutions are plated and incubated for a minimum of 12 hours.
- Colonies are counted and recorded.

Table.1

Strain	Incubation time	Comments
E.coli ATCC #8739	15-30 min	Bacterial killing is complement dependent. Assays may be run using serum or plasma.
E.coli ATCC #51813	90 min	Bacterial killing is mostly complement independent and requires phagocytosis. Whole live blood is needed.
C.albicans ATCC #10231	4 hrs	Bacterial killing is mostly by phagocytosis. Requires whole live blood.

As noted above, killing potentials are moderated through different pathways depending on the strain. Using multiple strains thus yields the necessary important information concerning integrated constitutive immune function.

Fig.1



Dead air box: will have air-tight seals at junctions, and smooth internal surfaces. There will be a whole cut in the front panel for access to plates and blood/ bacterial cultures. Hinges on the front panel will allow access for thorough cleaning with 70% ethanol.

References

Millet, S., Bennett, J., Lee, K.A., Hau, M. & Klasing K.C. 2007 Quantifying and comparing constitutive immunity across avian species. Developmental and Comparative Immunology **31**, 188-201.

Juul-Madsen, H.R., Viertlboeck, B., Smith, A.L. and Gobel, T.W.F. 2008 Avian innate immune responses. Pp. 129-158 *in* F. Davison, B. Kaspers and K.A. Schat, eds. *Avian Immunology*. Elsevier, Amsterday.

Fungi ,Yeasts and Yeast Genetic Stock
ATCC® Number: **10231™**

Organism :	***Candida albicans* (Robin) Berkhout, anamorph**
Designations :	3147 [CBS 6431, CCY 29-3-106, CIP 48.72, DSM 1386, IFO 1594, NCPF 3179, NCYC 1363, NIH 3147, VTT C-85161]
Isolation :	man with bronchomycosis
Depositors :	CW Emmons
History :	ATCC <<-- CW Emmons<<-- Wright
Biosafety Level:	1
Shipped :	freeze-dried

Growth Conditions:

ATCC medium 200: YM agar or YM broth
Temperature: 25.0°C

Permits/Forms:

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

Antigenic Properties: serotype A [19210]

Applications:

assay of amphotericin B fungizone [58605] assay of antimicrobial preservatives [11020] [21514] [21603] assay of haloprogin [58605] assay of nystatin fungicidin [58605] detection of [92841] media testing [21613] [11019] [92390] [92845] [92428] [21569] [11018] [21509] [21529] membrane filter testing [92565] preparatory test control [21613] produces D-arabinolactone oxidase [20456] produces DNA topoisomerase [17682] produces aspartic proteinases aspartyl proteinases [20538] produces estrogen-binding protein [1694] produces lanosterol synthase 2,3-oxidosqualene lanosterol cyclase [20455] produces phenethyl alcohol [594] produces polyamine oxidase [57063] [54167] produces tryptophol [594] quality control strain [92096] [92144] [92409] sterility testing [21604] [58442] [92306] [92277] testing [92402] [92307] [92305] [92403] testing fungicides [92789] [92802] [92837] [92824] [92831] [92784] [92836] [92443] produces farnesoic acid, an autoregulatory substance capable of regulating morphological transition [53041]

Comments:

This strain is recommended by ATCC for use in the tests described in ASTM Standard Test Method E979-91 where only the taxon is specified. For sterility testing, not more than five passages from the ATCC culture should be used. Growth and invasiveness in mouse [19748] Steroid interference with antifungal activity [19749] Cell wall hydrophobicity enhances corticosterone incorporation. [20319] Ultraviolet microscopy [20321] Calcification [20476] Morphology and physiology of strain sectors [20157] Use of impedance for preservative efficacy testing [1968] Fungitoxicity of alcohols and fatty acids [16096] Esterase activity [19297] Lipid composition [20072] Effect of antineoplastic drugs [19796]

Related Products: genomic DNA: ATCC 10231D-5

Subcollection: Yeasts

References:

594: Lingappa BT, et al. Phenethyl alcohol and tryptophol: autoantibiotics produced by the fungus Candida albicans. Science 163: 192-194, 1969. PubMed: 5762768

1694: Skowronski R, Feldman D. Characterization of an estrogen-binding protein in the yeast Candida albicans. Endocrinology 124: 1965-1972, 1989. PubMed: 2647470

1968: Connolly P, et al. The use of impedance for preservative efficacy testing of pharmaceuticals and cosmetic products. J. Appl. Bacteriol. 76:

68-74, 1994. PubMed: 8144407
2024: Klig LS, et al. Comparison of INO1 gene sequences and products in Candida albicans and Saccharomyces cerevisiae. Yeast 10: 789-800, 1994. PubMed: 7975896
4101: ASTM International Standard Test Method for Preservatives in Water-Containing Cosmetics. West Conshohocken, PA
11018: British Pharmacopoeia Commission Test for sterility. London, UK:British Pharmacopoeia Commission;British Pharmacopoeia Appendix XVI A, 2003
11019: British Pharmacopoeia Commission Tests for microbial contamination. London, UK:British Pharmacopoeia Commission;British Pharmacopoeia Appendix XVI B, 2003
11020: British Pharmacopoeia Commission Efficacy of antimicrobial preservation. London, UK:British Pharmacopoeia Commission;British Pharmacopoeia Appendix XVI C, 2003
16096: Gershon H, Shanks L. Antifungal properties of n-alkanols, alpha, omega-n-alkanediols, and omega-chloro-alpha-alkanols. J. Pharm. Sci. 69: 381-384, 1980. PubMed: 7373528
17682: Shen LL, et al. DNA topoisomerases from pathogenic fungi: targets for the discovery of antifungal drugs. Antimicrob. Agents Chemother. 36: 2778-2784, 1992. PubMed: 1336349
19210: Wagner T, et al. pH-dependent denaturation of extracellular aspartic proteinases from Candida species. J. Med. Vet. Mycol. 33: 275-278, 1995. PubMed: 8531028
19297: Rudek W. Esterase activity in Candida species. J. Clin. Microbiol. 8: 756-759, 1978. PubMed: 370150
19748: Phillips AW, Balish E. Growth and invasiveness of Candida albicans in the germ-free and conventional mouse after oral challenge. Appl. Microbiol. 14: 737-741, 1966. PubMed: 5970461
19749: Zygmunt WA, Tavormina PA. Steroid interference with antifungal activity of polyene antibiotics. Appl. Microbiol. 14: 865-869, 1966.
19796: Ghannoum MA, Al-Khars A. Effect of antineoplastic agents on the growth and ultrastructure of Candida albicans. Mykosen 27: 452-464, 1984. PubMed: 6438503
20072: . . Dev. Ind. Microbiol. 21: 373-378, 1980.
20157: Saltarelli CG. Morphological and physiological variations between sectors isolated from giant colonies of Candida albicans and C. stellatoidea. Mycopathol. Mycol. Appl. 34: 209-220, 1968.
20319: Braun PC. Surface hydrophobicity enhances corticosterone incorporation in Candida albicans. Infect. Immun. 62: 4087-4090, 1994. PubMed: 8063431
20321: Balish E, Svihla G. Ultraviolet microscopy of Candida albicans. J. Bacteriol. 92: 1812-1820, 1966. PubMed: 5958110
20455: Balliano G, et al. Inhibition of sterol biosynthesis in Saccharomyces cerevisiae and Candida albicans by 22,23-epoxy-2-aza-2,3-dihydrosqualene and the corresponding N-oxide. Antimicrob. Agents Chemother. 38: 1904-1908, 1994. PubMed: 7810997
20456: Huh WK, et al. Characterisation of D-arabinono-1,4-lactone oxidase from Candida albicans ATCC 10231. Eur. J. Biochem. 225: 1073-1079, 1994. PubMed: 7957197
20476: Ennever J, Summers FE. Calcification by Candida albicans. J. Bacteriol. 122: 1391-1393, 1975. PubMed: 238948
20538: Lerner CG, Goldman RC. Stimuli that induce production of Candida albicans extracellular aspartyl proteinase. J. Gen. Microbiol. 139: 1643-1651, 1993. PubMed: 7690395
21509: European Pharmacopoeia Commission Microbial contamination of products not required to comply with the test for sterility (total viable aerobic count). Strasbourg, France:European Pharmacopoeia Commission;European Pharmacopoeia EP 2.6.12, 1997
21514: European Pharmacopoeia Commission Efficacy of antimicrobial preservation. Strasbourg, France:European Pharmacopoeia Commission;European Pharmacopoeia EP 5.1.3, 1997
21529: CLSI Quality Control for Commercially Prepared Microbiological Culture Media; Approved Standard - 3rd Edition. Wayne, PA:Clinical and Laboratory Standards Institute;CLSI M22-A3.
21569: US Food & Drug Administration. GENERAL BIOLOGICAL PRODUCTS STANDARDS; General Provisions; Sterility Code of Federal Regulations Title 21: 21CFR610.12, Subpart B, 2005
21603: U.S. Pharmacopeia General Chapters:<51> ANTIMICROBIAL EFFECTIVENESS TESTING. Rockville, MD:U.S. Pharmacopeia;USP USP28-NF23, 2005
21604: U.S. Pharmacopeia General Chapters: <71> STERILITY TESTS. Rockville, MD:U.S. Pharmacopeia;USP USP28-NF23, 2005
21613: U.S. Pharmacopeia Dietary Supplement Chapters: <2021> MICROBIAL ENUMERATION TESTS-NUTRITIONAL AND DIETARY SUPPLEMENTS . Rockville, MD:U.S. Pharmacopeia;USP USP28-NF23, 2005
40135: Kondoh O, et al. Cloning of the RHO1 gene from Candida albicans and its regulation of beta-1,3-glucan synthesis. J. Bacteriol. 179: 7734-7741, 1997. PubMed: 9401032
43501: Huh WK, Kang SO. Molecular cloning and functional expression of alternative oxidase from Candida albicans. J. Bacteriol. 181: 4098-4102, 1999. PubMed: 10383980
53041: Oh KB, et al. Purification and characterization of an autoregulatory substance capable of regulating the morphological transition in Candida albicans. Proc. Natl. Acad. Sci. USA 98: 4664-4668, 2001. PubMed: 11274356
54167: et al., Isobe K. Differential determination procedure for putrescine, spermidine and spermine with polyamine oxidase from fungi and putrescine oxidase. Agric. Biol. Chem. 45: 727-733, 1981.
57063: et al., Yamada H. Oxidation of polyamines by fungal enzymes. Agric. Biol. Chem. 44: 2469-2476, 1980.
58442: Bowman FW, et al. Collaborative study of aerobic media for sterility testing by membrane filtration. J. Pharm. Sci. 60: 1087-1088, 1971. PubMed: 5000479
58605: Harrison EF, Zygmunt WA. Haloprogin: Mode of action studies in Candida albicans. Can. J. Microbiol. 20: 1241-1245, 1974. PubMed: 4608935
92096: Applied Biosystems MicroSeq Pharmaceutical Panel #1. :Applied Biosystems;MicroSeq
92144: Biolog YT MicroPlate. :Biolog;Biolog
92277: Supplemental assay method for testing for preservative interference with sterility tests. :US Department of Agriculture;USDA, Center for Veterinary Biologics STSAM0903.01, 1999
92287: Efficacy of Preservation on Non-Eye Area Water-Miscible Cosmetic and Toiletry Formaulations. Gaithersburg, MD:AOAC International;AOAC "Official Methods of Analysis of the AOAC International" 998.10.
92305: Microbial limit test for crude drugs. Tokyo, Japan:Japanese Pharmacopoeia;JP JP14e.part I.36.
92306: Sterility test, Growth promotion test. Tokyo, Japan:Japanese Pharmacopoeia;JP JP14e.part I.54.
92307: Preservatives-effectiveness test. Tokyo, Japan:Japanese Pharmacopoeia;JP JP14e.part II.12.
92390: Microbiology of food and animal feeding stuffs--Guidelines on preparation and production of culture media-- Part 2: Practical guidelines on performance testing of culture media.. Geneva (Switzerland):International Organization for Standardization/ANSI;ISO ISO 11133-2:2003.

92402: Ophthalmic optics--Contact lens care products--Microbiological requirements and test methods for products and regimens for hygienic management of contact lenses. Geneva (Switzerland):International Organization for Standardization/ANSI;ISO ISO 14729:2001.
92403: Ophthalmic optics--Contact lens care products--Antimicrobial preservative efficacy testing and guidance on determining discard date. Geneva (Switzerland):International Organization for Standardization/ANSI;ISO ISO 14730:2000.
92409: Applied Biosystems MicroSeq PHL Panel #1. :Applied Biosystems;MicroSeq
92428: Medical microbiology -- Culture media -- Part 2: Ready-to-use blood culture systems. Berlin, Germany:Deutsches Institut fur Normung;DIN DIN 58942-2: 2004, 2004
92443: Chemical disinfectants and antiseptics -- Quantitative suspension test for the evaluation of fungicidal activity of chemical disinfectants and antiseptics used in food, industrial, domestic and institutional areas -- Test method and requirements (phase 2, step 1). London, UK:British Standards Institution;British Standard BS EN 1650:1998.
92565: Standard Test Method for Confirming the Sterility of Membrane Filters. West Conshohocken, PA:ASTM International;ASTM Standard Test Method D 4196-05.
92575: Standard Test Method for Efficacy of Fungal Control Agents as Preservatives for Aqueous-Based Products Used in the Paper Industry. West Conshohocken, PA:ASTM International;ASTM Standard Test Method E 0875-00 (Reapproved 2005).
92784: Chemical disinfectants and antiseptics - Preservation of test organisms used for the determination of bactericidal, sporicidal and fungicidal activity. London, UK:British Standards Institution;British Standard BS EN 12353:2006.
92789: Chemical disinfectants and antiseptics --- Quantitative non-porous surface test for the evaluation of bactericidal and/or fungicidal activity of chemical disinfectants used in food, industrial, domestic and institutional areas --- Test method and requirements without mechanical action (phase 2/step 2). London, UK:British Standards Institution;British Standard BS EN 13697:2001.
92802: Chemical disinfectants and antiseptics --- Quantitative suspension test for the evaluation of fungicidal activity of chemical disinfectants for instruments used in the medical area --- Test method and requirements (phase 2, step 1). London, UK:British Standards Institution;British Standard BS EN 13624:2003.
92824: Chemical disinfectants and antiseptics --- Quantitative suspension test for the evaluation of basic fungicidal or basic yeasticidal activity of chemical disinfectants and antiseptics --- Test method and requirements (phase 1). London, UK:British Standards Institution;British Standard BS EN 1275:2005.
92831: Chemical disinfectants and antiseptics --- Quantitative carrier test for the evaluation of fungicidal or yeasticidal activity for instruments used in the medical area --- Test method and requirements (phase 2, step 2). London, UK:British Standards Institution;British Standard BS EN 14562:2006.
92836: Chemical disinfectants and antiseptics --- Quantitative suspension test for the evaluation of fungicidal or yeasticidal activity of chemical disinfectants and antiseptics used in the veterinary area --- Test method and requirements (phase 2, step 1). London, UK:British Standards Institution;British Standard BS EN 1657:2005.
92837: Chemical disinfectants and antiseptics --- Application of European Standards for chemical disinfectants and antiseptics. London, UK:British Standards Institution;British Standard BS EN 14885:2006.
92841: Cosmetics --- Microbiology --- Enumeration of yeast and mould. London, UK:British Standards Institution;British Standard Draft ISO 16212:2007.
92845: Microbiology of food and animal feeding stuffs --- Guidelines on preparation and production of culture media --- Part 2: Practical guidelines on performance testing of culture media - Annex B: Recommended test microorganisms for commonly used culture media. London, UK:British Standards Institution;British Standard DD CEN ISO/TS 11133:2003.

Bacteria
ATCC® Number: **8739™**

Organism:	***Escherichia coli* (Migula) Castellani and Chalmers**
Designations:	Crooks
Isolation:	feces
Depositor:	IC Gunsalus
History:	ATCC <<--IC Gunsalus<<--G.C. Crooks
Biosafety Level :	1
Shipped:	freeze-dried

Growth Conditions:

ATCC medium3: Nutrient agar or nutrient broth
Temperature: 37.0°C

Permits/Forms:

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

Cross References: Escherichia coli C str. ATCC 8739 finished genomeJGI Project ID4002730

Nucleotide (GenBank) : CP000946 Escherichia coli ATCC 8739, complete genome

Comments: Genome sequenced strain

Applications:

assay of [92287] assay of antimicrobial preservatives [4101] [11020] [21514] [21603] bioresistance testing [92589] detection of [92381] [92805] [92834] efficacy testing [92779] media testing [11019] [21509] [21511] [21613] [92345] [92390] [92845] preparatory test control [21613]
quality control strain [92096] testing [92304] [92305] [92307] [92349] [92403] testing antimicrobial handwashing formulations [32196] reduces dehydroascorbic acid [6118] quality control strain for Biosynth and Difco products

Related Products: also available as SafeTsource™:ATCC 8739NA , purified DNA: ATCC 8739D-5

References:

4101: ASTM International Standard Test Method for Preservatives in Water-Containing Cosmetics. West Conshohocken, PA 6118: J. Biol. Chem. 141: 853, 1941.
11019: British Pharmacopoeia Commission Tests for microbial contamination. London, UK:British Pharmacopoeia Commission;British Pharmacopoeia Appendix XVI B, 2003
11020: British Pharmacopoeia Commission Efficacy of antimicrobial preservation. London, UK:British Pharmacopoeia Commission;British Pharmacopoeia Appendix XVI C, 2003
21509: European Pharmacopoeia Commission Microbial contamination of products not required to comply with the test for sterility (total viable aerobic count). Strasbourg, France:European Pharmacopoeia Commission;European Pharmacopoeia EP 2.6.12, 1997
21511: European Pharmacopoeia Commission Microbial contamination of products not required to comply with the test for sterility (tests for specified micro-organisms). Nutritive and selective properties of the media and validity of the test for specified micro-organisms. Strasbourg, France:European Pharmacopoeia Commission;European Pharmacopoeia EP 2.6.13, 1997
21514: European Pharmacopoeia Commission Efficacy of antimicrobial preservation. Strasbourg, France:European Pharmacopoeia Commission;European Pharmacopoeia EP 5.1.3, 1997
21603: U.S. Pharmacopeia General Chapters:<51> ANTIMICROBIAL EFFECTIVENESS TESTING. Rockville, MD:U.S. Pharmacopeia;USP USP28-NF23, 2005
21613: U.S. Pharmacopeia Dietary Supplement Chapters: <2021> MICROBIAL ENUMERATION TESTS-NUTRITIONAL AND DIETARY SUPPLEMENTS . Rockville, MD:U.S. Pharmacopeia;USP USP28-NF23, 2005
32185: Jones CB, Platt JH. Propofol composition containing edetate. US Patent 5,714,520 dated Feb 3 1998
32196: Fendler EJ, et al. Antimicrobial cleansing composition containing chlorhexidine, an amphoteric surfactant, and an alkyl polyglucoside.

US Patent 5,719,113 dated Feb 17 1998
92096: Applied Biosystems MicroSeq Pharmaceutical Panel #1. :Applied Biosystems;MicroSeq
92287: Efficacy of Preservation on Non-Eye Area Water-Miscible Cosmetic and Toiletry Formaulations. Gaithersburg, MD:AOAC International;AOAC "Official Methods of Analysis of the AOAC International" 998.10.
92304: Microbial limit test. Tokyo, Japan:Japanese Pharmacopoeia;JP Jp14e.part I.35.
92305: Microbial limit test for crude drugs. Tokyo, Japan:Japanese Pharmacopoeia;JP JP14e.part I.36.
92307: Preservatives-effectiveness test. Tokyo, Japan:Japanese Pharmacopoeia;JP JP14e.part II.12.
92345: Food microbiology. Method 12.3: Microbiology of food and animal feeding stuffs -- Horizontal method for the enumeration of coagulase-positive staphylococci (Staphyloccus aureus and other species)--Detection and MPN technique for low numbers. Sydney, NSW, Australia:Standards Australia;Standards Australia AS 5013.12.3:2004.
92349: Antimicrobial products - Test for antimicrobial activity and efficacy. Tokyo, Japan:Japanese Standards Association;JIS Z 2801, 2000
92381: Microbiology of food and animal feeding stuffs-- Horizontal method for the enumeration of coagulase-positive staphylococci (Staphylococcus aureus and other species)--Part3: Detection and MPN technique for low numbers. Geneva (Switzerland):International Organization for Standardization/ANSI;ISO ISO 6888-3:2003.
92390: Microbiology of food and animal feeding stuffs--Guidelines on preparation and production of culture media-- Part 2: Practical guidelines on performance testing of culture media.. Geneva (Switzerland):International Organization for Standardization/ANSI;ISO ISO 11133-2:2003.
92403: Ophthalmic optics--Contact lens care products--Antimicrobial preservative efficacy testing and guidance on determining discard date. Geneva (Switzerland):International Organization for Standardization/ANSI;ISO ISO 14730:2000.
92589: Standard Practice for Evaluating Water-Miscible Metalworking Fluid Bioresistance and Antimicrobial Pesticide. West Conshohocken, PA:ASTM International;ASTM Standard Test Method E 2275-03E01.
92779: Cosmetics - Microbiology - Enumeration and detection of aerobic mesophilic bacteria. London, UK:British Standards Institution;British Standard BS ISO 21149:2006.
92805: Cosmetics --- Microbiology --- Detection of Escherichia coli. London, UK:British Standards Institution;British Standard BS ISO 21150:2006.
92834: Microbiology of food and animal feeding stuffs --- Horizontal method for the determination of low numbers of presumptive Bacillus cereus --- Most probable number technique and detection method. London, UK:British Standards Institution;British Standard BS EN ISO 21871:2006.
92845: Microbiology of food and animal feeding stuffs --- Guidelines on preparation and production of culture media --- Part 2: Practical guidelines on performance testing of culture media - Annex B: Recommended test microorganisms for commonly used culture media. London, UK:British Standards Institution;British Standard DD CEN ISO/TS 11133:2003.

Bacteria
ATCC® Number: **51813™**

Organism :	***Escherichia coli* (Migula) Castellani and Chalmers**
Designations :	DG1H9
Isolation :	food, Minnesota
Depositor :	3M Health Care
Biosafety Level:	**1**
Shipped :	freeze-dried

Growth Conditions:

ATCC medium3: Nutrient agar or nutrient broth
Temperature: 37.0°C

Permits/Forms:

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

Comments: Quality control of 3M products

http://www.atcc.org/

Candida albicans
Permits/Forms
ATCC Number: 10231
Country: Canada

- No additional permits and/or forms are required.

Choose the ultimate destination from the drop down box below for a list of the specific requirements. If your ultimate destination is not listed then ATCC does not currently ship to your country. **Information about permits is provided as a courtesy to ATCC customers.** While we use reasonable efforts to include accurate and up-to-date information on this page, we make no warranties or representation as to its accuracy.

Escherchia coli
Permits/Forms
ATCC Number: 51813
Country: Canada

- No additional permits and/or forms are required.

Choose the ultimate destination from the drop down box below for a list of the specific requirements. If your ultimate destination is not listed then ATCC does not currently ship to your country. **Information about permits is provided as a courtesy to ATCC customers.** While we use reasonable efforts to include accurate and up-to-date information on this page, we make no warranties or representation as to its accuracy.

Escherchia coli
Permits/Forms
ATCC Number: 8739
Country: Canada

- No additional permits and/or forms are required.

Choose the ultimate destination from the drop down box below for a list of the specific requirements. If your ultimate destination is not listed then ATCC does not currently ship to your country. **Information about permits is provided as a courtesy to ATCC customers.** While we use reasonable efforts to include accurate and up-to-date information on this page, we make no warranties or representation as to its accuracy.

http://www.atcc.org/

-------- Original Message --------
Subject: Re: Biohaz agents registry question
Date: Fri, 16 Oct 2009 12:57:32 -0400
From: Jennifer Stanley <jstanle2@uwo.ca>
To: Beth MacDougall-Shackleton <emacdoug@uwo.ca>
References: <0KP800LB2XIZLY10@zeppo.mail.uwo.pri>
<0KRM002212HHAW50@zeppo.mail.uwo.pri>

Hi Beth
I am not in the office today so I can not answer this fully.
However, I know that the Staph and Candida organisms will need CFIA and PHAC permits. They will require Level 2 certification.
For more information, please take a look at the biosafety manual available from www.uwo.ca/humanresources/biosafety
Jennifer

----- Original Message -----
From: Beth MacDougall-Shackleton <emacdoug@uwo.ca>
Date: Friday, October 16, 2009 10:20 am
Subject: Biohaz agents registry question
To: 'Jennifer' <jstanle2@uwo.ca>

> Hi Jennifer,
> I'm in the process of updating my BAR form to get permission to work with small quantities of microbes, ideally E coli (American Type Culture Collection #8739 and 5183), Candida albicans (ATCC 10231) and eventually Staph aureus (ATCC 6538). Can you tell me whether any or all of these require CFIA permits?
> Thanks, Beth
>

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

Canada

Candida albicans - Material Safety Data Sheets (MSDS)

MATERIAL SAFETY DATA SHEET - INFECTIOUS SUBSTANCES

SECTION I - INFECTIOUS AGENT

NAME: *Candida albicans*

SYNONYM OR CROSS REFERENCE: Candidiasis, Thrush, Moniliasis

CHARACTERISTICS: Oval, budding yeast, produces pseudohyphae in culture and in tissues and exudates

SECTION II - HEALTH HAZARD

PATHOGENICITY: Mycosis of superficial layers of skin or mucous membranes (oral thrush, vulvovaginitis, paronychia, onychomycosis, intertrigo); ulcers or pseudomembranes in esophagus, gastrointestinal tract or bladder; hematogenous dissemination may produce lesions in kidney, spleen, lung, liver, prosthetic cardiac valve, eye, meninges, brain

EPIDEMIOLOGY: Worldwide

HOST RANGE: Humans

INFECTIOUS DOSE: Unknown

MODE OF TRANSMISSION: Endogenous spread (part of normal human flora); by contact with excretions of mouth, skin, and feces from patients or carriers; from mother to infant during childbirth; disseminated candidiasis may originate from mucosal lesions, unsterile narcotic injections, catheters

INCUBATION PERIOD: Variable

COMMUNICABILITY: Communicable for duration of lesions

SECTION III - DISSEMINATION

RESERVOIR: Humans (normal human flora)

ZOONOSIS: None

VECTORS: None

SECTION IV - VIABILITY

DRUG SUSCEPTIBILITY: Sensitive to nystatin, clotrimazole, ketoconazole, fluconazole, amphotericin B for invasive candidiasis

DRUG RESISTANCE: Resistant strains have been described for all the above antifungal drugs

SUSCEPTIBILITY TO DISINFECTANTS: Sensitive to 1% sodium hypochlorite, 2% glutaraldehyde, formaldehyde; only moderately sensitive to 70% ethanol (phenolic may be substituted)

PHYSICAL INACTIVATION: Inactivated by moist heat (121°C for at least 15 min)

SURVIVAL OUTSIDE HOST: [illegible]

SECTION V - MEDICAL

SURVEILLANCE: [illegible]

FIRST AID/TREATMENT: [illegible] therapy as indicated

IMMUNIZATION: None

PROPHYLAXIS: None

SECTION VI - LABORATORY HAZARDS

LABORATORY-ACQUIRED INFECTIONS: [illegible] reported laboratory-acquired infections with Candida

SOURCES/SPECIMENS: Sputum, bronchial washings, stool, urine, mucosal surfaces, skin, wound exudates, CSF, blood

PRIMARY HAZARDS: Accidental parenteral inoculation; exposure to [illegible] droplets and aerosols; ingestion

SPECIAL HAZARDS: None

SECTION VII - RECOMMENDED PRECAUTIONS

CONTAINMENT REQUIREMENTS: Biosafety level 2 practices, containment equipment and facilities for the manipulation of this organism

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

OTHER PRECAUTIONS: None

SECTION VIII - HANDLING INFORMATION

SPILLS: Allow aerosols to settle, wearing protective clothing, gently cover spill with absorbent paper towel 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: November 1999

Prepared by: Office of Laboratory Security, PHAC

Date Modified: 2001-01-23