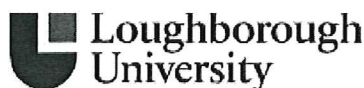


Insert BA Categorisation (Hazard Group 1 or 2 or GMO Class 1):
Hazard Group 1



Health & Safety Unit Use Only	
Ref No:	
Department Use Only	
Ref No:	CBE/BRA/039

## RISK ASSESSMENT OF WORK WITH BIOLOGICAL AGENTS

Please note the following before completing this form:

- University Health and Safety Policy requires that risk assessment of all work with biological agents (BAs) must be carried out in advance of work commencing. A key requirement of The Control of Substances Hazardous to Health Regulations (COSHH) is to assess the risks associated with any work activity involving the use of biological materials may contain biological agents.
- YOU SHOULD COMPLETE ALL OF PART A, THE APPROPRIATE SECTION(S) OF PART B, AND ALL OF PART C. ALL RISK ASSESSMENTS MUST BE REVIEWED BY THE DEPT/SCHOOL BIOLOGICAL SAFETY ADVISOR AND, WHERE HAZARD GROUP 2 BIOLOGICAL MATERIAL IS INTENDED TO BE USED EXPLICIT APPROVAL IS ALSO REQUIRED FROM THE UNIVERSITY BIOLOGICAL SAFETY OFFICER. THIS FORM SHOULD BE SUBMITTED TO THE HEALTH, SAFETY & ENVIRONMENT UNIT FOR REVIEW VIA YOUR DEPARTMENTAL SAFETY OFFICER.
- It is the responsibility of the Principal Investigator to ensure compliance to these requirements and that this risk assessment remains valid.
- This risk assessment form **IS NOT** for assessing the risks associated with **Genetically Modified Organism activities**.

Date Submitted:	24 Oct 2011	Date Approved:	24 Oct 2011
Version Number:	1.0	Supersedes (insert version number if applicable)	—

### PART A: Please provide the following general information:

<b>School/Department</b>			
Healthcare Engineering, Centre for Biological Engineering (CBE)			
<b>Title of Project</b>			
GE Collaboration -			
Project Reference Number:			
<b>Person responsible for this work (Principle Investigator)</b>			
Name:	Dr Rob Thomas	Position:	Lecturer
Department:	Healthcare Engineering	University School:	Wolfson School of Mechanical and Manufacturing Engineering / CBE
<b>Person conducting this assessment</b>			
Name:	Dr Victoria Workman Dr Katie Glen	Position:	Research Scientists
Department:	CBE	Date Risk Assessment Undertaken:	10 <sup>th</sup> October 2011
Proposed Project Start Date:	27 <sup>th</sup> October 2011	Proposed Project End Date:	30 <sup>th</sup> September 2012

Review History: required at least once a year or immediately following any significant change to the project. Significant revisions must be detailed on a revision form. The person responsible must ensure that this RA remains valid.

	Review 1	Review 2	Review 3	Review 4	Review 5
Due Date					
Date Conducted					

## A1 PROJECT SUMMARY

### A1.1 Scientific Goals of the Project.

*This provides a useful background for the reviewer and reader. It need only be brief and should provide an overview of the scientific goals.*

The collaboration is focused on Quality by Design approaches to characterise critical elements of the manufacture process. Primarily the work aims to define the operating space for cardiomyocyte cell differentiation from hES cells. A further objective of the work is to optimise the differentiation process.

### A1.2 Description of the Experimental Procedures

*Describe laboratory procedures to be used and highlight any non-standard laboratory operations. This may need cross reference to supporting documentation i.e. protocols.*

hES cells will be cultured in tissue culture treated plastic vessels (e.g. T-25's, T-175's) and cultured at 37°C, 5% CO<sub>2</sub>, followed by enzyme digestion and subsequent subculture. Flow cytometry, growth factor addition and subculture will be performed at various points in the process. Manual cell culture will be performed using a Class II Biological Safety Cabinet (BSC) and incubator. All procedures will be conducted in accordance with the laboratory Quality Management System (QMS) requirements, Good Cell Culture Practice, Good Aseptic Technique, the local Code of Practice (COP) and the Loughborough University Biological Safety Policy.

**PART B:** Please provide information in one or more of the following sections, as appropriate. Only sections which you complete should be submitted:

*Section 1: micro-organisms (prions, viruses, bacteria, fungi, parasites in ACDP category 2 and pathogens controlled by the Department for the Environment, Food and Rural Affairs).  
[Work with ACDP category 3 and 4 pathogens is not currently permitted in the University.]*

*Section 2: cell cultures, tissues, blood, body fluids or excreta*

*Section 3: plants and plant material*

*Section 4: animals and animal tissues*

## SECTION 2: CELL CULTURES, TISSUES, BLOOD, BODY FLUIDS OR EXCRETA

### B2.1 HAZARD & RISK IDENTIFICATION : NATURE OF CELLS, TISSUES OR BODY FLUIDS

*This information gives an indication of the **potential** harm that the biological material may cause*

#### B2.1.1 List all cells or tissues to be used. *For cells indicate if primary, continuous or finite.*

Indicate in the adjacent box if Not Relevant (N/R)			
Cell or tissue type and ID	Organ Source	Species	From where will it be obtained?
H1 hESC	Embryos	Human	GE Healthcare Life Sciences, Cardiff, UK

#### B2.1.2 List all blood, body fluids or excreta to be used

Indicate in the adjacent box if Not Relevant (N/R)		N/R
Material type	Species	From where will it be obtained?

#### B2.1.3 Has any material listed in section B2.1.1 been genetically modified in any way?

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	NO
If Yes, complete Genetically Modified Organisms (GMO) Risk Assessment Form	

#### B2.1.4 Will material be screened for infectious agents? (if from a cell culture collection answer B2.1.6 instead)

Indicate in the adjacent box as: Yes, No or Not Relevant (N/R)	Yes
<p>If Yes, provide details of the types of screening and agents screened for:  Mycoplasma testing will be carried out at GE before transportation of cells. In addition, cells were originally obtained from WiCell Research Institute. WiCell demonstrate that the starting cell material has not been contaminated with potential microorganisms or viral pathogens from the starting cell material, murine feeders, media or other raw materials.</p>	

#### B2.1.5 Will any clinical history (if relevant) be provided with this material?

Indicate in the adjacent box as: Yes, No or Not Relevant (N/R)	N/R
If yes give details:	
If yes, will a policy of rejection of samples from diseased patients be adopted? Explain	
If yes, how will the information be disseminated in the course of the project?	

If yes, will this information be anonymised?

**B2.1.6 If obtained from a cell culture collection, is safety information provided?**

Indicate in the adjacent box as: Yes, No or Not Relevant (N/R)

YES

If Yes, summarise here:

Cells were originally obtained from WiCell Research Institute. WiCell demonstrate that the starting cell material has not been contaminated with potential microorganisms or viral pathogens from the starting cell material, murine feeders, media or other raw materials. However, appropriate bio-safety precautions should be followed when working with these cells.

**B2.1.7 Has any of the material listed in section B2.1.1 been identified in the list of cross-contaminated or misidentified cell lines, available on HPA website**

([http://www.hpacultures.org.uk/media/E50/3B/Cell\\_Line\\_Cross\\_Contaminations\\_v6\\_0.pdf](http://www.hpacultures.org.uk/media/E50/3B/Cell_Line_Cross_Contaminations_v6_0.pdf))

Indicate in the adjacent box as: Yes, No or Not Relevant (N/R)

NO

If Yes, provide details of the route of provenance back to the originator of the cell line together with a Certificate of Analysis; identifying the methods used to qualify the cell type.

**B2.2 RISK TO HUMANS**

**B2.2.1 What is the likelihood of infection of this material? Indicate as None, Low Risk, Medium Risk, High Risk, Known Infected\***

Cell type and ID	Risk Category	Justification for Selection
Human embryonic stem cells (H1)	None	Well authenticated/characterised cell line from a reputable banking source. The cells have documented provenance of screening as described in section B2.1.6. Classified as Hazard Group 1 requiring baseline containment level CL1 as a precautionary measure, but will be handled in a CL2 laboratory.

*If none proceed to section B2.2.4*

*\*see [The Managing the risks in laboratories and healthcare premises](http://www.hse.gov.uk/biosafety/biologagents.pdf) – available at*

*<http://www.hse.gov.uk/biosafety/biologagents.pdf>*

**B2.2.2 If low, medium or high risk (section B2.2.1), name and classify the Biological Agents this material could be infected with. List the biological agents and indicate the ACDP hazard group classification\***

Name of Agent	Classification

\*see *The Approved List of Biological Agents – available on the Health & Safety website or* <http://www.hse.gov.uk/pubns/misc208.pdf>.

**B2.2.3 Describe the route(s) of infection (in humans) for these adventitious agents (place a 'X' in the relevant box)**

Percutaneous	Mucocutaneous	Inhalation	Ingestion	N/R
Details:				

**B2.2.4 Are there any other biological hazards (other than adventitious infectious risk) associated with the materials e.g. aggressive tumourigenic cell lines**

Indicate in the adjacent box as: Yes, No or Not Relevant (N/R)	YES
If Yes, describe:	
<p>Teratoma caused by engraftment of injected cells. Extremely low likelihood as no sharp instruments will be used within the BSC to reduce the risk of puncture wounds and PPE will prevent direct contact. Additionally, should hES cells accidentally be introduced to the blood stream they should be recognised by the immune system as foreign and destroyed.</p>	

## B2.3 HUMANS AT INCREASED RISK OF INFECTION

**B2.3.1 Do any of the agents listed in section 2.1 present an overt risk to humans at increased risk (including immunocompromised workers, pregnant workers, breast feeding mothers)?**

Indicate in the adjacent box as: Yes, No or Not Relevant (N/R)	No
If yes, Occupational Health must be consulted:	

## B2.4. PROPAGATION OR CONCENTRATION OF ADVENTITIOUS AGENTS

**B2.4.1 Will any culturing of this material take place?**

Indicate in the adjacent box as: Yes, No or Not Relevant (N/R)	Yes
If yes, identify the cells and the conditions these will grow:	
<p>hES cells cultured in T25 or T75 flasks in cell culture media in a 37°C humidified incubator</p>	

**B2.4.2 If culturing, will CD4+ cells be present. Describe what cells and for how long these cultures will be allowed to grow**

Indicate in the adjacent box as: Yes, No or Not Relevant (N/R)	No
If yes; explain:	

**B2.4.3 If culturing, what is the maximum volume of culture grown?**

Indicate in the adjacent box if Not Relevant (N/R)	
----------------------------------------------------	--

Per Flask ~1 - 10×10 <sup>6</sup> cells Seeding density range; ~4×10 <sup>4</sup> – 1.4×10 <sup>5</sup> / cm <sup>2</sup>	Per experiment ~200 ×10 <sup>6</sup> cells
------------------------------------------------------------------------------------------------------------------------------------	-----------------------------------------------

**B2.4.4 Will the cells be manipulated in any way that could result in a concentration of any adventitious biological agent present?**

Indicate in the adjacent box as: Yes, No or Not Relevant (N/R)	No
If yes, explain:	

**B2.5 WORKING WITH MATERIAL DONATED BY YOURSELF OR COLLEAGUES :  
Persons MUST NOT work with their own cells.**

**B2.5.1 Will any cells be donated by persons working in or has access to the lab?**

Indicate in the adjacent box as: Yes, No or Not Relevant (N/R)	No
If yes, explain what precautions are to be taken to prevent that person being exposed to the cells:	
If yes, where will this material be collected:	
If yes, provide justification for not using a safer source:	
If yes, how will confidentiality be assured:	
If yes, has Ethics Committee approval been obtained:	

**B2.6 ENVIRONMENTAL CONSIDERATIONS:**

**B2.6.1 Are any of the agents capable of causing disease or other harm in animals, fish or plants?**

Indicate in the adjacent box as: Yes, No or Not Relevant (N/R)	No
If yes, describe:	

**B2.6.2 Will there be any other environmental risks?**

Indicate in the adjacent box as: Yes, No or Not Relevant (N/R)	No
If yes, describe:	

**B2.7 OTHER HAZARDS**

**B2.7.1 Are there any other hazards associated with this work?** For example, hazardous chemicals (especially carcinogens, mutagens, substances toxic to reproduction, cytotoxins), cryogenic gases ionising radiation.

Indicate in the adjacent box as: Yes, No or Not Relevant (N/R)	No
----------------------------------------------------------------	----

If yes, identify these:

If yes, have these been risk assessed and any necessary approval obtained?

## PART C: CONTROL MEASURES

### C1. CONTROL MEASURES

The risk of exposure must be prevented or adequately controlled to minimise the chance of harm arising. COSHH Regulations require minimum containment measures for laboratories handling organisms from the different ACDP hazard groups (<http://www.hse.gov.uk/pubns/misc208.pdf>)  
The hazard group number typically indicates the level of containment (includes physical measures & working practices) that must be used for its handling).

#### C1.1 Preventing Exposure

##### C1.1.1 Substitution with a Safer Alternative

*Is substitution with a safer alternative practical, by for example, replacement of a clinical strain or pathogen with one that is lab adapted? Provide reasons for your answer:*

No. Use of embryonic stem cells of this type is critical to the value of the research.

##### C1.1.2 Isolation/Segregation

*(i) Is/Are the laboratory(s) to be used for this work to be shared with other workers not directly involved in this activity?*

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)

Yes

If yes, provide details:

Access to the Containment Level 2 CBE Laboratory Unit is restricted to authorised laboratory workers with appropriate training in accordance with documented local Code of Practice (COP) and Quality Management System (QMS) requirements for Containment Level 2 work activities involving biological materials (CL1 & 2).

The laboratories are locked at all times outside of normal working hours to ensure safe storage of biological agents and unauthorised entry. Keys to the laboratories are only issued to authorised users. Access is also restricted to the building (swipe card) and CBE (key entrance) during normal working hours. Out of Hours/Lone working is logged and permitted subject to risk assessment.

No cleaning personnel are permitted in the CBE Laboratory Unit. Access by other Non-Laboratory or maintenance personnel is subject to risk assessment and Permit-to-Work system documented in the local COP

*(ii) Is access to the laboratory(s) to be used for this work restricted?*

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)

Yes

If yes, provide details:

Access is restricted to people with documented training (authorised access documented in each individual's training record) in accordance with the COP and QMS



**C1.2 Controlling Exposure**

**C1.2.1 Are sharps (needles, blades, scissors, forceps, glass or capillary tubes) to be used at any stage during this activity?**

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	No
If yes, list the sharps:	
If yes, justify there use – is there an alternative?	
If yes, describe there use and disposal:	
If yes, describe any additional precautions employed to reduce risk:	

**C1.2.2 Containment and Ventilation**

<i>(i) Is the use of BSC required for the protection of the worker i.e. do the work procedures generate aerosols or splashes that pose a risk to workers?</i>	
Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	Yes
If yes, specify the type(s) and when they will be used:	
A Class II Biological Safety Cabinet will be used for all manipulations that may produce aerosols or splashes but is primarily used to ensure protection of research materials as part of a quality assurance discipline. Procedures to be carried out according to the following SOPs:	
1) SOP104, "Use and Maintenance of HERASAFE KS Class II re-circulating BSCs"	
<i>(ii) Are there any requirements for room ventilation e.g. negative pressure, temperature control?</i>	
Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	No
If yes, specify:	

**C1.2.3 Transport and Storage within the laboratory**

<i>How and where are materials to be stored?</i>
Material listed in B2.1.1 will be stored in designated cell culture incubators according to the following SOPs:
1) SOP005, "Storage and Transport of Biological Materials"
2) SOP008, "Receipt of Hazardous Biological Material"
3) SOP110, "Use and Maintenance of SANYO MCO-19M (UV) CO2/O2/N2 InCu Safe and UV Decontamination System CO2 Incubators"
Storage units are located in Laboratories H21 and H23 of the CBE Laboratory Unit

*How will this material be transported within the laboratory e.g. between BSC and incubator? Detail the containment measures which will be used to prevent or contain accidental splashes or spills.*

Cells will always be transferred in closed secondary containers large enough to carry the designated material. Appropriate spill response procedures are posted in the lab and documented in detail in the following SOPs:

- 1) SOP005, "Storage and Transport of Biological Material"
- 2) SOP038, "Biological Spill Response"

#### C1.2.4 Local transport out of the laboratory

*How will this material be transported on-site (e.g. research material between labs on campus or movement of waste containing viable agents e.g. to a remote autoclave)? Detail the containment measures which will be used to prevent or contain accidental splashes or spills*

Transfer outside the CBE Laboratory Unit is not anticipated but any requirement is likely to be constrained within the University site. All transport will be subject to controlled procedures according to the local COP and SOP005 (see below). For example, if necessary, transfers will use double containment procedures. Transport of research material between laboratories is done using sealed containers which are put into tube racks and trays and transported using trolleys according to the following SOPs. Waste potentially containing viable agents is not removed from the laboratories until it has been autoclaved.

- 1) SOP003, "Disposal of Biological Waste"
- 2) SOP005, "Storage and Transport of Biological Material"
- 3) SOP038, "Biological Spill Response"

#### C1.2.5 Shipment of Biological Material

<i>Will this material be shipped elsewhere in the UK or abroad?</i>					
Indicate in the adjacent box as No, Yes or Not Relevant (N/R)					NO
If yes, give details to support compliance to the relevant regulation (e.g. category of material, correct packaging instruction):					
Description of material to be shipped ( <i>indicate in available boxes</i> ). Is this:					
Category A		UN2814		UN2900	<i>Packaging instruction 602 or 620 must be followed</i>
<i>Or?</i>					
Category B		UN3373			<i>Packaging instruction 650 must be followed</i>
<i>Or?</i>					
Non-hazardous					<i>Should be packaged to protect sample</i>

#### C1.2.6 Receipt of material

*If material will be received from other sites or organisations, what precautions are being taken to ensure that the material is shipped correctly?*

Cells will be received from GE Healthcare Life Sciences, Cardiff. Cells will be transported by GE staff or a courier chosen by them. The cells will be double contained and be clearly labeled with Biohazard stickers. When the cells arrive at CBE "SOP008 – Receipt of Hazardous Biological Material" will be followed.

### C1.2.7 Centrifugation

<i>(i) If material is to be centrifuged will sealed buckets and rotors be used?</i>	
Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	YES
<i>(ii) Where will these rotors/buckets be opened?</i>	
Sealed buckets will be opened within the Containment Level 2 (CL2) Laboratory Unit, unless there is evidence of a potential spillage, in which case the sealed buckets will be opened in the BSC (SOP009, "Use and Maintenance of HERASAFE KS Class II BSC").	
The centrifuge is operated and maintained according to the following SOPs: 1) SOP122, "Use and Maintenance of Sigma Refrigerated Centrifuge 3-16PK2" 2) SOP038, "Biological Spill Response" 3) SOP111, "Use and maintenance of Sigma MicroCentrifuge 1-14 Microcentrifuge"	
<i>(iii) Describe the procedures in place to deal with leaks and spillages in the centrifuge</i>	
Procedures to prevent, contain and respond to leakages and spillages in the centrifuge are detailed in the following SOPs:  1) SOP122, "Use and Maintenance of Sigma Refrigerated Centrifuge 3-16PK2" 2) SOP038, "Biological Spill Response" 3) SOP111, "Use and maintenance of Sigma MicroCentrifuge 1-14 Microcentrifuge"	
Labelled Biological Spill kits are located in each laboratory within the CBE Laboratory Unit. Signs are posted throughout the Laboratory Unit to enable workers to locate the nearest biological (and chemical) spill kits. Posters are also displayed in each laboratory where a centrifuge is located to advise on spill response and reporting procedures.	

### C1.2.8 Incubators

<i>If incubators are to be used, what type of incubator (e.g. shaking, static) is used and describe procedures to prevent and contain spillages.</i>
Static incubators are used. Procedures to prevent, contain and respond to spillages in the incubators are detailed in the following SOPs:  1) SOP110, "Use and Maintenance of SANYO MCO-19M (UV) CO2/O2/N2 InCu Safe and UV Decontamination System CO2 Incubators" 2) SOP038, "Biological Spill Response"

### C1.2.9 Disinfection

Specify the type and concentration of disinfectants to be used:
The disinfectants were carefully chosen for effectiveness in use. The number of disinfectants in use is strictly limited to avoid errors and ambiguities in use and accidental mixing of compounds that may give rise to hazardous reactions or the formation of toxic products. Unless there are compelling reasons to do otherwise, Virkon (1% w/v) is the sole disinfectant used in the laboratories other than 70% IMS which is used for general disinfection cleaning (SOP004) where Virkon cannot be used; for example stainless steel surfaces.
Virkon has a wide range of bactericidal, virucidal, fungicidal and sporocidal activities. Representative viruses from all the major virus families are inactivated by Virkon. Working solutions of 1% w/v have low toxicity

and no irritancy. Selection and procedures detailed in the following SOPs:

- 1) SOP004, "General Laboratory Housekeeping"
- 2) SOP006, "Selection and Use of Virkon Disinfectant"
- 3) SOP039, "Storage, Handling and Disposal of Chemicals"

COSHH Risk Assessment reference for Virkon SAF/MM/1745

Have these disinfectants been validated for use with the recipient biological material?

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)

Yes

If yes, describe the procedure:

For Hazard Group 1 and 2 Biological agents it is normally sufficient to rely on the manufacturers' data, providing the recommended concentrations and contact times are used. Hence Virkon (1%) is used as per manufacturers' instruction and according to standard procedures detailed in the COP and the following SOP:

- 1) SOP006, "Selection and Use of Virkon Disinfectant"

#### C1.2.10 Personal Protective Equipment (PPE)

*(i) What type of lab coats will be worn and where will they be stored?*

Side fastening Howie type lab coats are worn. They are stored outside the laboratories in purposely designed change rooms. Proper use of PPE is described in the following SOP: SOP037, "Use of Personal Protective Equipment (PPE)"

*(ii) What type of gloves will be worn and where will they be stored?*

1. Autoclave gloves, which will be stored in close proximity to the autoclave equipment in the Autoclave Room (H31) and the Automated Cell Culture Suite (H21/H22).
2. Latex, powder free gloves for general use, which will be stored in the change rooms and point of entry to each laboratory within the CBE Laboratory Unit.

Correct use of PPE is described in SOP037, "Use of Personal Protective Equipment (PPE)"

*(iii) Describe any other PPE to be used:*

1. Laboratory safety glasses (including those for spectacle wearers)

Correct use of the above PPE is described in SOP037, "Use of Personal Protective Equipment (PPE)"

#### C1.2.11 Hygiene Measures

*Describe the hygiene facilities available and where they are located*

1. Designated hand washing facilities are located in each laboratory change room and in the Analytical Laboratory (H23).
2. Eye Wash stations are located next to each 'hand washing only' sink in each laboratory change room and in the Analytical Laboratory (H23).

#### C1.2.12 Vaccination

Are effective vaccines available against any of the agents listed in Section 1, 2, 3, or 4 of Part B?

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)

N/R

If yes, describe:

**C1.2.13 Waste Treatment before Disposal**

*How must waste be treated before disposal and how has it been validated as being effective?*

Type of Waste	Treatment before disposal	Validation of this treatment
Liquid waste	Virkon sterilise (SOP003 – Disposal of biological waste)	According to manufacturers' instructions; see section C2.1.9
Solid waste	Autoclave sterilise (SOP003 – disposal and disinfection of biological waste)	Treatment Cycle (4) validated according to SOP024, "Use and maintenance of the Systec Autoclave"

**C1.2.14 Autoclave sterilisation**

*If waste is treated by autoclave sterilisation then this section must be completed. If this section is not relevant then hatch the box*

Type of Waste	Composition of waste	Autoclave cycle (temp, cycle time)	Treatment monitor
Liquid waste	N/A		
Solid waste	Cell Culture consumables	121°C for 15 minutes (under cyclical vacuum)	Designated Autoclave tape monitors
Location of autoclave	Servicing details	Location of back-up autoclave	Designated area for storage of unsterilised waste
Autoclave CBE-044 in Autoclave Room (H31) within the CBE Laboratory Unit i.e. same location as intended work	Annual	Autoclave CBE-045 in Autoclave Room (H31)	In secure cage within the Autoclave Room (H31)

**C1.2.15 Liquid Waste Disposal**

*How will liquid waste be disposed of?*

To the drain?  
 Yes: With copious amounts of water in accordance with SOP003 – " Disposal of biological waste"

As solid waste?  
 No

Other?  
 None

**C1.2.16 Solid Waste Disposal**

Describe the waste category and disposal route. (For guidance refer to <http://www.environment-agency.gov.uk>)

Colour Code	Categorisation	Hatch relevant box(es)	Disposal Method

Yellow	Sharps (not contaminated with cytotoxic/cytostatic material)		Yellow Sharps bin > autoclave sterilisation if known or potentially infected > clinical waste disposal (incineration)
Purple/Yellow Special case, contact DSO	Sharps (contaminated with cytotoxic/cytostatic material)		Purple/Yellow lidded Sharps bin > clinical waste disposal (incineration @ 1000C)
Yellow	Human body parts, organs, including blood bags and blood preserves and excreta (unless identified as medium or high risk or known infected in Section 2.2.1 of this RA in which case they must be pre-treated before disposal)		Yellow rigid one way sealed tissue bins > clinical waste disposal (incineration)
Yellow	Animal body carcasses or recognisable parts ((unless identified as medium or high risk or known infected in Section 2.2.1 of this RA in which case they must be pre-treated before disposal)		Yellow rigid one way sealed tissue bins > clinical waste disposal (incineration)
Special Case – Contact DSO	Potentially or known infected lab wastes (including sharps) of HG2, GM Class 2, DEFRA Cat 2 or higher, that have not been pre-treated before leaving the site.		This is not a route of preference and is subject to special requirements
Orange	Infected or potentially infected lab wastes that have been pre treated before leaving the site		Disinfection or sterilisation (as identified in C1.2.14) in the laboratory suite > orange clinical waste bags > clinical waste disposal (incineration)
Yellow	Infected or potentially infected animal or human body parts, organs or excreta that have been pre treated before leaving site		Disinfection or sterilisation (as identified in C1.2.14) in the laboratory suite > yellow one way sealed tissue bins > clinical waste disposal (incineration)

**C1.2.17 Work with Animals or Vectors (if none proceed to Section C1.2.18)**

(i) Are animals or vectors to be infected with any of these biological agents?	
Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	No
If yes, describe the procedure and describe where this aspect of the work will be conducted:	
(ii) Is shedding of infectious materials by the infected animals possible or expected?	
Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	N/R
If yes, describe the routes of shedding, risk periods for such shedding and the additional precautions required to control exposure:	
(iii) Who will perform the inoculations of animals/vectors? What training have they received?	
Indicate in the adjacent box if Not Relevant (N/R)	N/R

Provide details of the training required:

**C1.2.18 Bioreactor/Fermenters (if none proceed to Section C1.2.19)**

Will a bioreactor/fermenter be used to culture a biological agent?

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)

No

If yes, describe the size, and type of the bioreactor/fermenter.

(ii) Are any supplementary containment measures required, for example, the use of a BSC or spill tray.

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)

N/R

If yes, describe:

**C1.2.19 Other Control Measures Required?**

None

**C1.3 Emergency Procedures**

**C1.3.1 Describe the procedures in place for dealing with spillages (specify disinfectants and any special containment for large volumes)**

Within the BSC:

Procedures for dealing with small and large spillages are detailed in the following SOPs:

- 1) SOP006, "Selection and use of Virkon Disinfectant"
- 2) SOP104, "Use and Maintenance of HERASAFE KS Class II recirculating BSC"
- 3) SOP038, "Biological Spill Response"
- 4) SOP052, "Use and Maintenance of Bioquell Advanced Microflow Biosafety Cabinet"

Labelled Biological Spill kits are located in each laboratory within the CBE Laboratory Unit. Signs are posted throughout the Laboratory Unit to enable workers to locate the nearest biological (and chemical) spill kits. Posters are also displayed in each laboratory within the Unit where a BSC is located to advise on spill response (inside the BSC) and reporting procedures.

Within the laboratory but outside the control measure e.g. BSC, spill tray

Procedures for dealing with small and large spillages are detailed in the following SOPs:

- 1) SOP006, "Selection and use of Virkon Disinfectant"
- 2) SOP038, "Biological Spill Response"

Labelled Biological Spill kits are located in each laboratory within the CBE Laboratory Unit. Signs are posted throughout the Laboratory Unit to enable workers to locate the nearest biological (and chemical) spill kits. Posters are also displayed in each laboratory within the Unit to advise on spill response (outside the BSC) and reporting procedures.

Outside the laboratory e.g. during transport

Procedures for dealing with small and large spillages are detailed in the COP and the following SOPs:

- 1) SOP005, "Storage and Transport of Biological Material"
- 2) SOP006, "Selection and use of Virkon Disinfectant"
- 3) SOP038, "Biological Spill Response"

*Describe the procedures in place for an accidental exposure (if necessary describe different procedures for different types of exposure e.g. eye splash or percutaneous inoculation)*

1. Procedures to respond to accidental exposure are detailed in SOP038, "Biological Spill Response" and the local COP. These are detailed in spill response posters located in each laboratory within the Unit. Accident procedures in the case of glass or sharps injury are described in the local COP and displayed in posters located in each laboratory within the Unit
2. Designated hand washing facilities are located in each laboratory change room and in the Analytical Laboratory (H23).
3. Eye Wash stations are located next to each 'hand washing only' sink in each laboratory change room and in the Analytical Laboratory (H23).
4. A First Aid Kit is located outside the Laboratory Unit. Signs are posted throughout the Laboratory Unit to enable workers to locate the nearest Medical Kit. Contact details for First Aiders are posted in each laboratory within the Unit
5. Essential and Emergency Contact details are posted in each laboratory within the Unit.

## **C2 ASSIGNMENT OF CONTAINMENT LEVEL**

*The laboratory Containment Level is directly related to each of the 4 Hazard Groups; organisms categorised as HG1 (lowest hazard rating) should normally be handled in CL1 facilities (minimum level of containment), and likewise up to HG4 (highest hazard rating) in CL4 facilities (maximum level of containment). Where the identity or presence of a biological agent is not known the following rules apply: a) where uncertainty exists over the presence of pathogenic biological agent – minimum of CL2; b) where the presence of a pathogenic biological agent is known or suspected – minimum of Containment Level appropriate to the agent, where the assessment is inconclusive but where the activity might involve serious risk – minimum CL3*

**C2.1. What containment level is required for this work?** (see COSHH Schedule 3, Part II for a list of criteria)

The work activities within this project involve biological agents (BAs) assessed as Hazard Group 1, requiring Containment Level 1, but all procedures will be carried out under Containment level 2 (CL2) within the CL2 CBE Laboratory Unit.

**C2.2. Describe extra controls or derogation from certain controls:**

## **C3 FACILITIES**

**C3.1 Where will this work take place?**

Room(s)	Building	Campus	Person in Control of area
CBE Laboratory Unit ( <i>self</i> )	Centre for Biological	Holywell Park,	Carolyn Kavanagh



<i>contained suite of laboratories and ancillary rooms within the CBE), primarily within the Automated cell culture suite (H21, H22)</i>	Engineering	Loughborough University	Bob Temple Chris Hewitt
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**C4 PERSONNEL**

**C4.1 Names of Personnel involved in the Project**

Surname	Initials	University ID	Position
Thomas	RT	5007730	Lecturer
Workman	VL	5016911	Research Associate
Glen	KE	5016796	Research Associate

**C4.2 Information, Instruction and Training**

*Describe the training that will be given to all those affected (directly or indirectly) by the work activity. Instruction should include the 'Local Rules' or 'Local Codes of Practice' which focus on the working instructions to be followed by all persons involved in the work activity to control or prevent exposure to hazardous biological agent(s). These should be written and readily available to all workers working at Containment Level 2. A formal record of training should be kept for all individuals working at Containment Level 2.*

Identified personnel are trained in required procedures and equipment. Formal records of training are kept for all workers authorised to work at Containment Level 2 (CL2) within the CBE CL2 Laboratory Unit. Instruction against local Code of Practice and QMS i.e. SOPs is provided.

**C4.3 Relevant Experience/Training:**

Surname	Experience/Training
Thomas	Documented in Personal Training File
Workman	Documented in Personal Training File
Glen	Documented in Personal Training File

**C4.4 Other people who may be at risk from the activity e.g. cleaners, maintenance workers or other workers in shared laboratory**

Details:  
 NONE: Cleaners and Maintenance workers are not authorised to enter the laboratory. All laboratory cleaning is undertaken by authorised personnel (i.e. CBE staff). Access for non-laboratory workers is subject to local permit-to-work procedures. If access is needed for essential maintenance of equipment, for example, a clean down and decontamination of the laboratories will be performed. This will be documented with decontamination certificates and the maintenance worker fully supervised according to SOP004 "General Laboratory Housekeeping" and the local Code of Practice. Two laboratory shut downs occur every year for a week for maintenance work to be done in the CBE Laboratory Unit. Prior to these shut down weeks a full deep clean decontamination will be performed in the all laboratory areas.

All other workers in the CBE Laboratory Unit are authorised personnel, this work poses no additional risk to them.

## C5 OCCUPATIONAL HEALTH

### C5.1 Vaccination

Is an effective vaccination available for any of the pathogens associated with this work? Advice can be obtained from the Occupational Health Adviser (OHA) if required. All workers involved with handling unscreened blood, blood products and other tissues are recommended to have Hepatitis B immunization

Certificate and status of Hepatitis B immunization documented in personal training file of all named personnel

### C5.2 Health Surveillance

Is health surveillance required? (Health surveillance is typically applied if working with a hazardous substance that: a) produces an identifiable disease or adverse health effect that can be related to exposure; b) there is a reasonable likelihood that the disease or effect may occur under the conditions of work, and c) there are valid techniques for detecting indications of the disease or effect).

None required. Self-monitoring of health is sufficient. Medical referral if puncture wounds are sustained within the BSC.

## C6. NOTIFICATIONS: Human Tissue Act

### C6.1.1 Relevant material covered by the Human Tissue Act

Are any of the cells, tissues or fluids to be used covered by the Human Tissue Act?

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)

No

### C6.1.2 Does This Work Have Ethical Approval? If Yes, Provide Details

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)

Yes

Approval number:	Letter attached		
Date obtained:	08/2007	Ethics committee name:	MRC Steering Committee for Stem Cell Use

C6.1.3 Are other registrations/notifications required for this work? For example HSE notification under COSHH, Home Office notification under anti-terrorism, crime and security act etc

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)


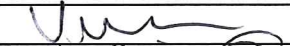


No

If Yes, give details:

## 7. LICENSING REQUIREMENTS FOR ANIMAL PRODUCTS

**C7.1.1 Are there any licensing requirements for this work?**

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	N/R
<p>The regulations covering the import of animal products (including tissue cultures, tissues, body fluids or fractions thereof) are in a state of flux. Current procedures to be followed:</p> <ul style="list-style-type: none"> <li>If you wish to import any animal products that you know are not infected with an animal pathogen, or have good reason to expect that they are not infected with an animal pathogen, from within or outside of the EC you must apply for a Research Sample Licence using the Defra form IAPPO1. Follow this link to download the form <a href="http://www.defra.gov.uk/corporate/docs/forms/ahealth/iappo1.htm">http://www.defra.gov.uk/corporate/docs/forms/ahealth/iappo1.htm</a></li> <li>If you wish to import such an animal product but it is known or suspected of being infected with an animal pathogen then you must use DEFRA form IM137. Follow this link to download the form <a href="http://www.defra.gov.uk/corporate/docs/forms/ahealth/inttrade/im137.htm">http://www.defra.gov.uk/corporate/docs/forms/ahealth/inttrade/im137.htm</a></li> <li>If you wish to import an animal pathogen listed under the Specified Animal Pathogens Order then you must use DEFRA form PATH1. Follow this link to download the form <a href="http://www.defra.gov.uk/corporate/docs/forms/ahealth/path1.htm">http://www.defra.gov.uk/corporate/docs/forms/ahealth/path1.htm</a></li> </ul> <p>In all cases the instructions for their submission is stated on the forms themselves.</p> <p>ALL APPLICATIONS SHOULD BE REVIEWED BY THE DEPARTMENTAL SAFETY OFFICER AND THE UNIVERSITY BIOLOGICAL SAFETY OFFICER BEFORE SUBMISSION.</p>	



<p><b>8. DECLARATION</b>  <i>The declaration must be signed <b>before</b> submitting this assessment to the Departmental Safety Officer and University Biological Safety Officer</i></p>		
<p>I, the undersigned:</p> <ul style="list-style-type: none"> <li>confirm that all information contained in this assessment is correct and up to date</li> <li>will ensure that <b>suitable and sufficient instruction, information and supervision</b> is provided for all individuals working on the activity</li> <li>will ensure that no work will be carried out until this <b>assessment has been completed and approved</b> and that all necessary control measures are in place</li> <li>that all information contained in this assessment must remain correct and up to date (the assessment should be <b>reviewed once a year</b> and whenever any <b>significant changes</b> to the work activity occur)</li> <li>will re-submit the assessment for approval if any significant changes occur</li> </ul>		
<p><b>Name:</b> Person conducting assessment</p>	<p><b>Signature:</b></p> 	<p><b>Date:</b> 25.10.11</p>
<p><b>Name(s):</b> All named persons involved in the project <i>(add additional rows below, as required)</i></p>	<p><b>Signatures(s):</b></p>  	<p><b>Date:</b> 1.11.11 1/11/11</p>
<p><b>Name:</b> Principal Investigator/Supervisor</p>	<p><b>Signature:</b></p> 	<p><b>Date:</b> 25/10/11</p>

<b>Name:</b> Other signature (s) (if required – please state position e.g. <i>Quality Manager</i> )	<b>Signature:</b>	<b>Date:</b>
P. Hourd		24/10/11

### 9. APPROVAL

For work involving **Hazard Group 1** biological agents approval will usually be required by the Departmental Safety Officer before the work begins

For work with **Hazard Group 2** biological agents, explicit approval is required from the Departmental Safety Officer and the University Biological Safety Officer. Approval may be provided by email

<b>Name:</b> Departmental Biological Safety Advisor (BGMSA)	<b>Signature</b>	<b>Date</b>
<b>Name:</b> Departmental Safety Officer (DSO)	<b>Signature</b>	<b>Date</b>
R1 Temple		01/11/2011
<b>Name:</b> University Biological Safety Officer (or Deputy)	<b>Signature</b>	<b>Date</b>
R1 Temple		01/11/2011