CBE/BRA/005

FORM LU/HE/BRA

Version 1.0 Oct 08

For Health and Safety Unit Use only ASSESSMENT NO.

LOUGHBOROUGH UNIVERSITY

RISK ASSESSMENT OF WORK WITH BIOLOGICAL MATERIALS

Please note the following before completing this form:

1. University Health and Safety Policy requires that risk assessment of all work with biological materials 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 that may contain biological agents.
2. YOU SHOULD COMPLETE ALL OF PART A, THE APPROPRIATE SECTION(S) OF PART B, AND ALL OF PART C. THIS FORM SHOULD BE SUBMITTED TO THE HEALTH AND SAFETY UNIT FOR REVIEW (VIA YOUR DEPARTMENTAL SAFETY OFFICER)
3. It is the responsibility of the Principal Investigator to ensure compliance to these requirements and that this risk assessment remains valid.
4. This risk assessment form **IS NOT** for assessing the risks associated with **Genetically Modified Organism activities**.

Date Submitted:	19/11/08	Date Approved:	28/11/08

PART A: Please provide the following general information:

School/Department

Wolfson School of Mechanical and Manufacturing Engineering, Tissue Engineering

The Project

Title of Project:

IN VITRO TESTING OF LASER SURFACE TREATED BIO-IMPLANT MATERIALS

Project Reference Number:

Person responsible for this work (*Principle Investigator*):

Name: Dr. Jonathan Lawrence	Position: Senior Lecturer
Department: Wolfson School of Mechanical and Manufacturing Engineering	University School: Wolfson School of Mechanical and Manufacturing Engineering

Person conducting this assessment

Name: David Waugh/Carolyn Thomas		Position: PhD Researcher/Laboratory Manager	
Department: Wolfson School of Mechanical and Manufacturing Engineering		Date Risk Assessment Undertaken: 12/11/08	
Proposed Project Start Date: 1/12/08		Proposed Project End Date: 01/06/10	

Assessment Review: *required at least once a year or immediately following any significant change to the project*				
	Review 1	Review 2	Review 3	Review 4
Due Date	12/11/09			
Date Conducted				

A1 PROJECT SUMMARY

A1.1 Scientific Goals of the Project *Brief yet clear outline only*

- To test in vitro the surfaces of laser treated polymers for enhanced bioactivity.
- To determine whether surface modification by use of a laser will further promote cell adhesion and proliferation.
- To determine the optimized parameters for surface modification for enhanced bioactivity in terms of laser surface modification.
- To determine if different processing gases during laser surface modification will affect the resulting cell adhesion and proliferation.

A1.2 Description of the Experimental Procedures

Describe laboratory procedures to be used and highlight any non-standard laboratory operations

In vitro osteoblast cell adhesion and proliferation testing on untreated and laser treated samples with human osteoblastic cell line hFOB 1.19:

This testing does require a BSC which shall be used at all times to ensure sterilization and a safe working environment. In order to uphold a safe working enviroment Standard Operating Procedure SOP009 will be adhered to at all times. In addition to this, the Standard Operating Procedure SOP012 which highlights safe procedures for the handling and use of human osteoblasts will be complied with to ensure that safe experimental protocol is strictly maintained. Prior to cell adhesion experiments all samples will be sterilized using an autoclave which will safeguard all those and their experiments within the laboratory.

For all instances an operating procedure will be devised to guarantee safe and repeatable experimental protocol. These operating procedures will be produced and agreed upon by those who are concerned. All work carried out will be documented as advised by the Standard Operating Procedure SOP002. Also, any additional materials required will be ordered and dealt with by Carolyn Thomas at which will comply with the biohazardous material Standard Operating Procedure underlined in SOP008.

All training required for the biological experimentation will be carried out by Carolyn Thomas prior to any experiments being carried out. In addition an authorized user will be present at all times in order to supervise the work carried out.

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 1: MICRO-ORGANISMS

B1.1 HAZARD AND RISK IDENTIFICATION: NATURE OF MICRO-ORGANISMS

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

B1.1.1 List all micro-organisms to be used

Name	Strain	ADCP cat*	Source
		1	
		1	
		1	

see The Approved List of Biological Agents – available on the Health & Safety website

B1.1.2 Has any strain been genetically modified in any way?

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

B1.2 DESCRIPTION OF RISK TO HUMANS

B1.2.1 The disease(s) caused to humans

Describe the type and severity of effects or disease(s) on human health (including colonisation, infection, allergy, toxin-mediated disease) by each of the agents or strains to be used

Indicate in the adjacent box if Not Relevant (N/R)		
Name	Type	Severity

B1.2.2 What is the likelihood of infection of this material? Indicate as None, Low Risk, Medium Risk, High Risk, Known Infected

Name of agent	Risk Category	Justification for Selection
		If none proceed to section B1.3

B1.2.3 Infectivity to humans

Describe ALL the route(s)of infection (relevant to the laboratory setting) and the minimum infectious dose(s) if known (eg percutaneous, mucocutaneous, inhalation, ingestion)

Name of agent(s)	**Route(s) of infection**	**Minimum infectious dose**

B1.2.4 Drug resistance
Is there any known or suspected drug resistance amongst the strains to be used? Identify & describe.

B1.2.5 Attenuation or increased virulence
Are the strains attenuated or do they have an increased virulence in any way?

Identify and describe:

B1.2.6 Ability to survive
In what form is the agent present eg spores or vegetative bacteria, and are there any issues about the agents robustness, including any resistance to chemical disinfectants?

Identify and describe:

B1.2.7 Most hazardous procedure?
Identify and describe the most hazardous procedure(s) to be used.

B1.3 HUMANS AT INCREASED RISK OF INFECTION

B1.3.1 Are there any pre-existing medical conditions that increase the risk associated with this agents listed in section 1.1 (including immunocompromised workers, pregnant workers, breast feeding mothers, diabetic workers)?

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

B1.4. PROPAGATION OR CONCENTRATION OF ADVENTITIOUS AGENTS

B1.4.1 Give details of the volumes and concentrations of organisms to be used

Name & Strain	Volume	Concentration

B1.5 ENVIRONMENTAL CONSIDERATIONS:

B1.5.1 Are any of the agents capable of causing disease or other harm in animals, fish or plants?

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	
If yes, describe briefly here (A separate risk assessment may be required if the agent to be used poses a significant risk to the environment):	

B1.5.2 Will there be any other environmental risks?

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	
If yes, describe briefly here (NOTE: A separate risk assessment may be required if the agent to be used poses a significant risk to the environment):	

B1.6 OTHER HAZARDS

B1.6.1 Are there any other hazards associated with this work? For example, hazardous chemicals, cryogenic gases ionising radiation.

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	
If yes, identify these:	
If yes, have these been risk assessed and any necessary approval obtained?	

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

B2.1 HAZARD AND 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?
1) Human Osteoblast like cell line (HOS)	Bone	Human	Lonza, UK Continuous cell line

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

Indicate in the adjacent box if Not Relevant (N/R)			
Material type and ID	Organ Source	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)?

Indicate in the adjacent box as: Yes, No or Not Relevant (N/R)	Yes
If Yes, provide details of the types of screening and agents screened for: Each donor is tested and found non-reactive by an FDA approved method for the presence of HIV-1, Hepatitis B Virus and Hepatitis C Virus by the supplier. Refer to Lonza Material Safety Data Sheet*. Cultured cells in-house tested for mycoplasma.	

- *(All Material Safety Data Sheets will be held in a folder in the Healthcare Engineering Research Office*

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)	No
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 anonomised?

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)	N/R
If Yes, summarise here:	

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 Osteoblast like cell line (HOS)	Low	Well authenticated/characterised continuous cell line . Has documented provenance and screened for the most serious human pathogens. Screened as described in section B2.1.6. Baseline containment level CL1
		If low risk or none proceed to section B2.2.4

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

B2.2.2 If 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 routes of infection (in humans) for these adventitious agents (place a 'X' in the relevant box)

Percutaneous	Mucocutaneous	Inhalation	Ingestion	N/R
				X
Details:				

B2.2.4 Are there any other biological hazards (other than adventitious infectious risk) associated with the materials e.g. tumourogenic cells

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

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: Human Osteoblasts like cell line (HOS) are cultured using manual techniques in tissue culture flasks in cell culture media in a 37 degree Celsius humidified incubator. Cells will be seeded onto a polymer, placed into six well plates and incubated for two weeks. During this time the cells will be fed and monitored.	

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 $6x10^6$ (75ml flask)	Per experiment Each well/polymer in the six well plates will be seeded with 2ml of 1x10^5 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, cryogenic gases ionising radiation.

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

If yes, identify these:

1) Cryogenic processing with Liquid Nitrogen
2) Trypan Blue for generic cell viability testing
3) Use of Glutaraldehyde
4) LDH-Cytotoxicity Assay kit
5) Alkaline Phosphatase Staining kit
6) Generic and specific hazardous non-biological materials

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

1) Liquid Nitrogen.- Procedures will be carried out by trained personnel in accordance with SOP013 "Use and Maintenance of Liquid Nitrogen Stores". Risk Assessment Reference: SAF/MM/1638
2) Trypan Blue - Procedures will be carried out by trained personnel in accordance with SOP029 " Handling and disposal of Trypan blue". Risk (COSHH) Assessment Reference SAF/MM/1745
3) Glutaraldehyde – Risk (COSHH) assessment Reference SAF/MM/2750
3) All Hazardous non-biological materials used in this project are subjected to COSHH assessment.

SECTION 3: PLANTS, PLANT TISSUE OR MATERIAL, PLANT PATHOGENS

B3.1 HAZARD AND RISK IDENTIFICATION: NATURE OF PLANT, PLANT TISSUE OR MATERIAL, PLANT PATHOGENS

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

B3.1.1 List all plant or plant tissues to be used

B3.1.2 Is any of the material listed in B3.1.1 infected with pathogen?

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	
If yes, also complete Section 1	

B3.1.3 Is any material listed in B3.1.1 transgenic?

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	
If Yes, complete GM Risk Assessment Form	

B3.2 RISK TO HUMANS

B3.2.1 The disease(s) caused to humans

Describe the type and severity of effects or disease(s) on human health (including irritation, allergy, effect of toxins) by each of the materials to be used

Name of plant/plant tissue	Type	Severity

B3.2.2 What is the likelihood of infection of this material? Indicate as None, Low Risk, Medium Risk, High Risk, Known Infected

Name of plant/tissue	Risk Category	Justification for Selection
		If none proceed to section B3.3

B3.2.3 Describe the routes of that the effects described in section B3.2.1 are transmitted (place a 'X' in the relevant box)

Percutaneous	Mucocutaneous	Inhalation	Ingestion	N/R
Details:				

B3.3 HUMANS AT INCREASED RISK OF INFECTION

B3.3.1 Do any of the agents listed in section 4.1 present an overt risk to humans at increased risk (including immunocompromised workers, pregnant workers, breast feeding mothers)?

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

B3.4 ENVIRONMENTAL CONSIDERATIONS: Risk to other plants

B3.4.1 Will there be any risk other plants?

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

B3.4.2 Will there be any other environmental risks?

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

B3.4.3 Is the plant to be used controlled by the Department for the Environment, Food and Rural Affairs?

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	
If yes, approval will not be granted until a copy of the DEFRA licence has been submitted to the Biological Safety Group:	

B3.5 OTHER HAZARDS

B3.5.1 Are there any other hazards associated with this work? For example, hazardous chemicals, cryogenic gases ionising radiation.

Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	
If yes, identify these:	
If yes, have these been risk assessed and any necessary approval obtained?	

SECTION 4: ANIMALS AND ANIMAL TISSUES

B4.1 HAZARD AND RISK IDENTIFICATION: NATURE OF ANIMALS OR TISSUE

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

B4.1.1 List all animals or animal tissues to be used

Species	Sex	Source	Anatomical Site	Origin or geographical source
Foetal Calf Serum (FCS)	Unknown	Bovine Foetus	Foetus	Commercial supplier: Cambrex, UK. Sourced from South America according to data sheet

B4.1.2 Is the animal or tissue/body fluid to be worked with infected or to be infected?

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

If Yes, complete Section 1 of this form

FCS product contains material of animal origin. The material contains no hazardous or toxic substances. The material is supplied by a commercial company and sent through the post in secure packaging. Material is liquid and stored frozen at -20C.

B4.1.3 Is a carcinogen, drug or other substance to be administered to the animal(s) or present in the tissue?

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

If Yes, complete the appropriate Chemical COSHH Assessment

B4.1.4 Have the investigators that will be performing the work on animals obtained the appropriate Home Office Licence?

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

If No, consult the H&S Office.

B4.1.5 Have Standard Operating Procedures (SOPs) for the proposed work been approved?

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

If No, consult the H&S Office. If Yes attach the signed approval.

B4.2 RISK TO HUMANS

B4.2.1 The disease(s) caused to humans
Describe the type and severity of effects or disease(s) on human health (including infection, allergy, bites and scratches)

Name of animal/animal tissue	Type	Severity
Foetal calf serum	Under EC regulations (Directive 1999/45/EC), contains no hazardous or toxic substances according to the supplier. Likelihood that it contains substances hazardous to health is low. Animal proteins may be a potential contact irritant	Potential contact irritant

B4.2.2 What is the likelihood of infection of this material? INDICATE as None, Low Risk, Medium Risk, High Risk, Known Infected

Name of agent	Risk Category	Justification for Selection
Non categorised (refer to MSDS)	None	FCS product contains no hazardous or toxic substances that requires Cambrex to distribute a MSDS according to EC regulations. Well authenticated/characterised product from commercial source. Baseline containment level CL1
		If none proceed to section B4.3

B4.2.3 Describe the routes of that the effects described in section B4.2.1 are transmitted (place a 'X' in the relevant box)

Percutaneous	Mucocutaneous	Inhalation	Ingestion	N/R
Details:				

B4.3 HUMANS AT INCREASED RISK OF INFECTION

B4.3.1 Do any of the agents listed in section B4.1 present an overt risk to humans at increased risk (including immunocompromised workers, pregnant workers, breast feeding mothers, workers repeatedly handling or multiply dosing animals)?

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

B4.4. PROPAGATION OR CONCENTRATION OF ADVENTITIOUS AGENTS

B4.4.1 Will any culturing of this material take place?

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

If yes, complete Section 2 of this form:

B4.4.2 How many animals will be used?

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

B4.5 ENVIRONMENTAL CONSIDERATIONS: Risk to other animals

B4.5.1 Will there be any risk other animals?

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

B4.5.2 Will there be any other environmental risks?

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

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 as it is required to determine whether osteoblast cells will adhere better and proliferate on the polymer samples
Use of these specific human cells is critical to the value of the research. Cells are sourced from established commercial suppliers according to SOP048 " Generation of Risk Assessments for New Materials and Processes."

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 restricted to authorised lab workers with appropriate training in accordance with documented Code of Practice (COP) and Quality Management System (QMS) requirements for Containment Level 2 work (CL2).

The laboratories are locked at all times when not in use to ensure safe storage of biological agents. Keys to the labs are only issued to authorised users.

There are a number of students and researchers working on their own projects. All tests will be kept separate from any other work.

All students and researchers who are not fully trained will be fully supervised at all times by an authorised user of the laboratory.

(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:
Only authorized users have access to the laboratory.

All students and researchers who are not fully trained will be fully supervised at all times by an authorised user of the laboratory.

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) Is the use of BSC required for the protection of the worker ie do the work procedures generate aerosols or splashes that pose a risk to workers?

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:

BSC will be used for seeding and feeding the cells on the sample substrates. This will ensure that no cell culture can be ingested or splashed.

A Class II Biological Safety Cabinet will be used for all manipulations according to the following SOPs

1) SOP009, "Use and Maintenance of BSC-G2000 Vertical Laminar Airflow Cabinet"

(ii) Are there any requirements for room ventilation e.g. negative pressure, temperature control?

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

How and where are materials to be stored?

The Human osteoblast cell line will be stored in a cryobank or temporary storage in designated cell culture incubators according to the following SOPs :

1) SOP005, "Storage and Transport of Biological Agents"
2) SOP013, "Use and maintenance of Liquid Nitrogen Stores"
3) SOP017, "Use and maintenance of the Galaxy-R Incubator"
4) SOP031, "Cryopreservation and Storage of Mammalian Cell Lines"
5) SOP053, "Use and maintenance of the Sanyo CO2 Incubator

Foetal Calf Serum will be stored in Fridges and Freezers according to the following SOP's:

1) SOP016 " Use and Maintenance of fridges and freezers"
2) SOP005 " Storage and Transport of Biological Agents "
3) SOP039 " Storage, Handling and disposal of Chemicals"

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 Agents"
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 laboratory is to be constrained within the Wolfson building . The materials will be transported using double containment procedures and will only be removed from the lab to dry the samples using a CPD or to analyze the samples

. Waste potentially containing viable agents is not removed from the laboratories until it has been autoclaved. These procedures will be carried out according to procedures detailed in SOP's:

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

C1.2.5 Shipment of Biological Material

Will this material be shipped elsewhere in the UK or abroad?	
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):	

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?

The Human Osteoblast cells are shipped frozen in a dry shipper or double packed by courier. The procedure for the safe receipt of packages containing potentially biohazardous material and their delivery to the appropriate recipient or other designated personnel is documented in SOP008; "Receipt of Purchased Biohazardous Material". This SOP is intended to minimize the consequences that could result from the failure of packaging methods and materials used to ship biohazardous materials

C1.2.7 Centrifugation

(i) If material is to be centrifuged will sealed buckets and rotors be used?	
Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	Yes

(ii) Where will these rotors/buckets be opened?

Sealed buckets will be opened within the Containment Level 2 (CL2) laboratory, 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 BSC-G2000 Vertical Laminar Airflow Cabinet").

The centrifuge is operated and maintained according to the following SOPs:
1) SOP015, "Use and maintenance of BOECO U032R Centrifuge"
2) SOP038, "Biological Spill Response"

(iii)Describe the procedures in place to deal with leaks and spillages in the centrifuge

Procedures to prevent, contain and respond to leakages and spillages in the centrifuge are detailed in the following SOPs:
1) SOP015, "Use and maintenance of BOECO U032R Centrifuge"
2) SOP038, "Biological Spill Response"

The spill kit is located under the sink in the laboratory Foyer. A second Spill Kit is available in Goods Inwards Posters are also displayed around the laboratory to advise on spillages.

C1.2.8 Incubators

If incubators are to be used, what type of incubator (e.g. shaking, static) is used and describe procedures to prevent and contain spillages.

Static incubators are used. Procedures to prevent, contain and respond to spillages in the incubators are detailed in the following SOPs:
1) SOP017, "Use and maintenance of the Galaxy-R Incubator""
2) SOP053, "Use and maintenance of Sanyo C02 Incubator"
3) 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 Maintenance and cleaning
2) SOP006 Selection and Use of Disinfectants
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 be 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 following SOP:

1) SOP006, "Selection and Use of Disinfectants

C1.2.10 Personal Protective Equipment (PPE)

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

Side fastening lab coats are worn which have elasticated cuffs. They are stored outside the laboratory.. Proper use of PPE is described in the following SOP: SOP037, "Use of Personal Protective Equipment"

(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
2. Cryogenic gloves, which will stored in close proximity to the Liquid Nitrogen storage containers
3. Latex powder free gloves for general use, which will be stored in the laboratory

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

(iii) Describe any other PPE to be used:

(iv)

1. Laboratory safety glasses (including those for spectacle wearers)
2. Face Shields (primarily for handling liquid nitrogen)
3. Shoe covers, in case of a spillage
4. Aprons or disposable lab coats for extra protection over laboratory coat.

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

C1.2.11 Hygiene Measures

Describe the hygiene facilities available and where they are located

1) Eye Wash station located in the laboratory foyer
2) Hand washing facilities located in the laboratory foyer

C1.2.12 Vaccination

Are effective vaccines available against any of the agents listed in Section1, 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 to be treated before disposal and how has it been validated as being effective?

	Treatment before disposal	Validation

Liquid waste	Virkon sterilise (SOP003 – disposal and disinfection 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 validated according to SOP010, " Use and maintenance of Boxer 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	*Autoclave cycle (temp, cycle time)*	*Treatment monitor*
Liquid waste			
Solid waste	Cell Culture consumables e.g pipette tips and flasks.	121°C for 1 hour	Designated autoclave tape monitors
Location of autoclave	*Servicing details*	*Location of back-up autoclave*	*Designated area for storage of unsterilised waste*
Laboratory T208B i.e. same location as intended work	Annual	Lab 207	On designated benches adjacent to the autoclave

C1.2.15 Liquid Waste Disposal

How will liquid waste be disposed of?
To the drain? With copious amounts of water in accordance with SOP003 – " Disposal and disinfection 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)

European Waste Catalogue Code	Categorisation		Disposal Method
		Hatch relevant box(es)	
18 01 01	Sharps		Sharps bin>autoclave sterilisation if known or potentially infected >clinical waste disposal (incineration)
18 01 02 [human]	Human body parts, organs, including blood bags and blood preserves and excreta (unless identified as medium or high risk or known infected in Section 2.16 of this RA in which case they must be pre-treated before disposal and classified 18 01 04 [sealed bins])		Rigid one way sealed tissue bins>incineration only

18 01 02 [animal]	Animal body carcases or recognisable parts ((unless identified as medium or high risk or known infected in Section 2.16 of this RA in which case they must be pre-treated before disposal and classified 18 01 04 [sealed bins])		Rigid one way sealed tissue bins > incineration only
18 01 03	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
18 01 04 [bags]	Infected or potentially infected lab wastes that have been pre treated before leaving the site		Disinfection or sterilisation (as identified in C1.2.13) in the lab suite > placement in yellow clinical waste bags > clinical waste disposal (incineration)
18 01 04 [sealed bins]	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 C1.2.13) in the lab suite > placement in yellow one way sealed tissue bins > 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)	No
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)	No
Provide details of the training required:	

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

Will a fermenter be used to culture a pathogen?	
Indicate in the adjacent box as No, Yes or Not Relevant (N/R)	No
If yes, describe the size, and type of the 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)	No
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 Disinfectants"
2) SOP009, "Use and Maintenance of BSC-G2000 Vertical Laminar Airflow Cabinet"
3) SOP038, "Biological Spill Response"

A spill kit is located under the sink in the laboratory Foyer. A second Spill Kit is available in 'Goods Inwards' Posters displayed within the laboratory detail what to do in the event of a spillage.

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 Disinfectants"
2) SOP038, "Biological Spill Response"

A spill kit is located under the sink in the laboratory Foyer. A second Spill Kit is available in 'Goods Inwards'

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 Agents"
2) SOP006, "Selection and use of Disinfectants"
3) SOP038, "Biological Spill Response

The spill kit is located under the sink in the laboratory Foyer. A second Spill Kit is available in 'Goods Inwards'

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)

Procedures to respond to accidental exposure are detailed in the following SOP:

1) SOP038, "Biological Spill Response"

Handwashing facilities, an eye wash station, First Aid Kit and contact details for First Aiders are available in the laboratory Foyer.

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?

All procedures will be carried out under Containment level 2 (CL2).

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

None

C3 FACILITIES

C3.1 Where will this work take place?

Room(s)	Building	Campus	Person in Control of area
T208B	Wolfson Building	Loughborough University	Carolyn Thomas

C4 PERSONNEL

C4.1 Names of Personnel involved in the Project

Surname	Initials	ID	Position
Waugh	D.G.	A736918	PhD Researcher
Thomas	C.L.	5011765	Laboratory Manager
Lawrence	J.	5006147	Senior Lecturer

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.

Formal records of training are kept for all workers at Containment Level 2 (CL2). Instruction against local QMS ie SOPs and the local COP is provided. Including Specific training for the Compact Select

All students and researchers who are not fully trained will be fully supervised at all times by an authorised user. All necessary training will be given by the laboratory manager. Entry to the laboratory is forbidden without prior arrangement and full supervision of work.

C4.3 Relevant Experience/Training:

Surname	Experience/Training
Waugh DG	Will be given full supervision after initial training of use of the equipment needed for the work
Thomas CL	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:

Cleaners and Maintenance workers are not authorised to enter the laboratory. If access is needed for essential maintenance of equipment 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 Maintenance and cleaning" Two laboratory shut downs occur every year for a week for maintenance work to be done in the laboratory. Prior to these shut down weeks a full deep clean decontamination will be performed in the laboratory areas.

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 if required. All workers involved with handling unscreened blood, blood products and other tissues are recommended to have Hepatitis B immunization

Certificate for Hepatitis B Immunization documented in personal training file

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).

No

C6. NOTIFICATIONS: Human Tissue Act

C6.1.1 Relevant material covered by the Human Tissue Act

Are any of the cell, 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: 08/H0406/122	
Date obtained: 19.08.08	Ethics committee name: NHS Research Ethics Committee: Leicestershire, Northampton & Rutland EC1

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)	N/R
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
NOTE: The regulations covering the import of animal products (including tissue cultures, tissues, body fluids or fractions thereof) are in a state of flux. See the DEFRA website for details. UNLESS THIS SECTION IS NOT RELEVANT (N/R) ie THE INTENDED WORK DOES NOT USE ANIMAL PRODUCTS - CONSULT THE LU H&S OFFICE TO REVIEW APPLICATION REQUIREMENTS BEFORE ANY SUBMISSIONS	

8. DECLARATION

*The declaration must be signed **before** submitting this assessment to the Departmental Safety Officer and University Biological Safety Officer*

I, the undersigned:

- confirm that all information contained in this assessment is correct and up to date
- will ensure that **suitable and sufficient instruction, information and supervision** is provided for all individuals working on the activity
- will ensure that no work will be carried out until this **assessment has been completed and approved** and that all necessary control measures are in place
- accept that for some Containment Level 2 and all CL3 activities **a statutory notification period of 20 days** may be required before work can commence
- that all information contained in this assessment must remain correct and up to date (the assessment should be **reviewed once a year** and whenever any **significant changes** to the work activity occur)
- will re-submit the assessment for approval if any significant changes occur

Name: Person conducting assessment	**Signature**	**Date**
	P.G.J	19/11/08

David Waugh	D.G.W	19/11/08
Carolyn Thomas	cthomas	19/11/08.
Paul Hourd	P Hourd	24/11/08
Name: Principal Investigator	**Signature**	**Date**
Jonathan Lawrence	J. Lawrence	19-11-08

9.APPROVAL		
Name: Departmental Safety Officer	**Signature**	**Date**
R I TEMPLE	RI Temple	25/11/08
Name: University Biological Safety Officer	**Signature**	**Date**
	C. M. Moore.	28/11/08.