Standard Operating Procedure **SOP037**

Title: Use Of Personal Protective Equipment

Location: CBE Laboratory Unit

1. PURPOSE

This SOP describes the requirements for the use of Personal Protective Equipment (PPE) in the CBE Laboratory Unit in order to minimise risk of exposure to aerosols, splashes, accidental inoculation and minimise cross contamination between laboratories within the unit.

2. SCOPE

This SOP details the PPE requirements for work in the laboratories of the Centre for Biological Engineering (CBE) and its personnel. The clothing and equipment selected is dependent on the nature of the work performed and the characteristics of the biological agent (i.e. mode of transmission, infectivity) or chemical used. This SOP should therefore be read in conjunction with the relevant Risk Assessment that will identify the appropriate PPE for the material, process or equipment.

3. RESPONSIBILITES

CBE Laboratory Users **:**

It is the responsibility of the laboratory staff to:

(i) Ensure that they comply with minimum PPE requirements and to inform any colleague sharing the work environment of the level of hazard of current processes and the corresponding PPE required.
(ii) Review the relevant Risk Assessment forms to ensure the appropriate selection of PPE for the task.
(iii) Comply with any requirement of PPE as highlighted in the Risk Assessment.
(iv) Be familiar with the location and correct use of PPE including spill kits, eye wash bottle stations and First Aid and report the need for replacements to the Laboratory Manager.

Responsible Person (RP)/Laboratory Manager (LM)

It is the responsibility of the Responsible person/ Laboratory Manager to:

(i) Ensure the availability of clean PPE and that it the PPE is stored and maintained in an appropriate location. Replace as required.
(ii) Ensure that each employee is trained in the appropriate and correct use of PPE and that this is documented in the individual training records.
(iii) Ensure that the minimum PPE requirement is adhered to at all times and that this requirement is displayed and clearly visible to anyone entering the laboratory.

(iv) Be familiar with the University policy on action to protect staff who are allergic to natural rubber latex and ensure that new personnel who have a pre-existing allergy are identified

4. EQUIPMENT AND MATERIALS

(i) Various sizes of Howie Style side fastening white/coloured laboratory coats with elasticated sleeves, located in H32 . Visitors disposable lab coats are also available.
(ii) Laboratory Safety Glasses (including those suitable for spectacle wearers)
(iii) Various sized gloves (unless unisize) for the following specifications:
- Autoclave gloves (orange colour): Gloves Scienceware Clavies biohazard autoclave cotton terry cloth 130mm length 330mm overall length pair
- Cryogenic gloves (blue colour): Gloves withstand low temperatures and protects against freezer burn 300mm length -190°C to 80°C temperature range size 7.5 to 8 small pack of 2
- Latex protein free Rubber gloves (with soft cotton lining) (Green colour):SAR-734-050Q PVC, chemical resistant, length 300mm. Medium size, Pack of 12.
- Disposable Gloves for general use in various sizes: Gloves, PPE, Extra protection latex powder free textured fingertips, 300mm length.
- Disposable gloves (aloe)
- Dissection gloves

(iv) A face shield (primarily for handling liquid nitrogen)
(v) A full length apron. (primarily for autoclave use)
(vi) Biological Spill Kit
(vii) Chemical Spill kit
(viii) First Aid boxes
(ix) Eye Wash Stations (located next to hand wash facilities).
(x) Shoe covers
(xi) Face Masks
(xii) Beard nets
(xiii) Oxygen Monitors

5. PROCEDURE

5.1. Minimum PPE Requirements

The minimum PPE that all laboratory staff are required to wear in the CBE Laboratory Unit is:

1. Laboratory Coat
2. Gloves
3. Enclosed shoes

4. Safety Glasses in specified areas or for certain activities (Refer to section 5.3 & 5.5)
5. Shoe covers

The following additional PPE is provided and MUST be used when identified as a requirement in the risk assessment for the work activity; this includes:

- Face shields/visor
- Face mask or respirator
- Cryogenic Gloves
- Autoclave Gloves

5.2. Laboratory Coats/Gowns

5.2.1 Authorised Laboratory Personnel

Each person carrying out work in the designated CBE laboratories will be issued with a laboratory coat .

(i) **Fastened laboratory coats must be worn at all times while working in the laboratory.**

a. **White laboratory coats** MUST be donned on entering the 1st change area (H32) in the CBE
b. **Green Laboratory Coats** must be worn for microbial work and changed in appropriate change room/area.
c. **Blue laboratory coats** must be donned on entering the Tissue Engineering Laboratory (T208).

d. Other coloured lab coats are available to be used if required to reduce cross contamination in specific shared areas (change of lab coat in appropriate change room).

(ii) Aprons or disposable lab coats should be worn over laboratory coats if required for extra protection against spillage of biological materials or chemicals. These MUST be autoclaved and disposed of after use.

(iii) Laboratory clothing MUST be cleaned regularly. If a spill occurs on the clothing, it MUST be decontaminated before reuse. Laboratory clothing MUST never be washed with other non-laboratory clothing.

(iv) Laboratory coats MUST be autoclaved before leaving the laboratory for cleaning (*unless a specialist contract cleaner is used*). Laboratory coats should be cleaned at least once a month or more frequently depending on usage.

(v) Disposable clothing should be considered when working with highly toxic materials, carcinogens, mutagens, or teratogens. Consult the Laboratory Manager.

(vi) Before each use, clothing is to be inspected for damage, deterioration, contamination. If deficiencies are noted, the clothing should be cleaned, repaired, or replaced before use.

NOTE: Shorts or short skirts are not permitted in the CBE Laboratory Unit.

5.2.2. Contractors and Visitors

(i) All **contractors and visitors** entering the CBE Unit are required to wear designated laboratory coats. They will be required to don a disposable white laboratory coat in the 1st change area (H32) .

(ii) It is the responsibility of the person dealing with the contractor/visitor to inform the Laboratory Manager to ensure that appropriate lab coats are available. It is also their responsibility to ensure that the correct fastened lab coats are worn at all times and that disposable laboratory coat are properly disposed of.

5.3. Gloves and Hand-washing

Laboratory gloves are the last barrier or line of protection between you and the hazardous material or process you are working with. It's your responsibility to use the appropriate gloves for the task or hazardous material. Remember, gloves can get contaminated so care should be taken to ensure that you don't contaminate other areas.

(i) **All work carried out within the CBE laboratories MUST be undertaken wearing appropriate gloves for the work activity (refer to Section 5.1).**

(ii) Before putting gloves on, cover cuts or abrasions with a waterproof dressing.

(iii) Gloves should not be removed to open a door answer the telephone or use computer keyboards.

(iv) Always remove gloves aseptically. Change gloves regularly and always change gloves when contaminated. Never reuse disposable gloves.

NOTE; It is good practice to put on gloves before donning laboratory coat and removing gloves after removing lab coat, to help minimise skin contact with potential contaminants.

(v) For best protection, ensure that cuffs of gloves overlap the elasticated sleeves of the lab coat.

(vi) Ensure that disposable gloves are of a type suitable for the activity, further guidance on this is available from http://www.hse.gov.uk/latex/labs.htm

- Use heat resistant gloves for handling hot objects i.e. autoclaving. Asbestos-containing gloves will not be used.
- Use cold resistant gloves for handling cold objects i.e. cryopreserved objects.

CAUTION: Powdered latex (rubber) gloves must NOT be used because of the high risk of causing allergic reactions. If latex gloves are used they must be powder free and have a low level of extractable proteins (e.g. less than 50 mcg/g). Nitrile gloves are often a good alternative to latex

(vii) Consider double-gloving for some tasks that could potentially compromise the integrity of the gloves eg handling chemicals, using sharps etc. **NOTE:** Disposable gloves do not provide automatic protection; even new gloves may have their integrity compromised.

(viii) Used gloves MUST be disposed of as biohazardous waste (refer SOP003) and should be placed into a autoclave bag/orange lidded bin, and autoclaved.

(ix) Aloe sensitive gloves are available in a variety of sizes for those with sensitivities.

NOTE: If gloves have been contaminated with Virkon, they should be placed in yellow waste bags .

5.4 Glove Change Procedure in The CBE Laboratory Unit

Gloves MUST be donned in the first change area (H32) & gloves sprayed with 1:50 dilution of ChemGene) and changed at regular intervals while working**.** The recommended procedure for gloves changes in the CBE unit is described below:

5.4.1 Entry into the CBE Laboratory Unit

1. On entry into the first change room (H32) put on a pair of gloves and spray with 1:50 dilution of ChemGene.

5.4.2 Exit from the CBE Laboratory Unit

1. Before exiting the laboratories remove and discard your gloves in the designated waste bin (orange bin/clavie for autoclaving) in the change room or ancillary room. After removing your lab coat you MUST wash your hands thoroughly (refer to section 5.5) and apply alcohol gel to hands before leaving the Unit.
2. If you are changing lab coat to reduce cross contamination within a change area within the lab you **must** also change your gloves. Place gloves in bin/clavie provided within change area.
3. If gloves are heavily contaminated with chemicals place in yellow stream waste and do not autoclave.

Note on General Rules:

- **You MUST spray gloves with 1:50 dilution of ChemGene immediately after each change.**
- **<u>All</u> gloves MUST be disposed of as autoclavable waste , (in orange lidded bins or into clavies by all BSC's).**

5.5. Hand washing Procedure

(i) Glove wearing does not replace the need for hand washing – hands should be washed before & after wearing gloves i.e between changes. Follow the good hand washing guideline below:

- Use soap and running water (preferably warm water - hot water increases the risk of skin irritation.
- Wash all surfaces thoroughly including wrists, palms, back of hands and thumbs and under fingernails
- Rub hands together for at least 20 seconds
- Rinse and dry hands well (on paper, towels – not on clothes!)

NOTE; It is a mandatory requirement to wash hands after removing gloves in H32 before exiting to the unclassified corridors and CBE office areas.

(ii) Alcohol-based hand rubs (minimum alcohol content 60%) should be used in addition to hand washing or if hand washing facilities are not available.

5.6. Footwear

(i) DO NOT wear sandals, high heeled or open-toed shoes. Closed toe shoes must be worn to protect feet from spills and injuries.

(ii) Shoes should have non slip soles and should have a reasonable heel height.

(iii) Safety shoes must be worn if there is potential for injury from heavy objects .The Laboratory Manager is responsible for procuring safety shoes if they are determined necessary

(iv) Sturdy enclosed shoes must be worn when working with liquid nitrogen or moving cylinders.

5.7. Eye and Face Protection

Eye protection (Safety glasses or goggles) MUST be worn when it is necessary to protect the eyes or face from accidental splashes, sprays or impacting objects. The choice of equipment to protect eyes and face from splashes (or impacting objects) will depend on the activity performed and specific advice detailed in operating procedures and risk assessments. General rules are as follows:

(i) It is **mandatory** to wear safety glasses/visor under the following conditions:

1. When it indicates their use in the Risk Assessment
2. When working with chemicals
3. When working with Liquid Nitrogen
4. When using the autoclave
5. When exchanging a gas cylinder
6. When working with any hazardous material/equipment.
7. When cleaning in **ANY laboratory** (i.e. outside BSC)

(iii) All authorised laboratory users will be supplied with a personal pair of safety glasses that MUST be kept with them at all times while in the CBE unit. Spare safety glasses are available in all laboratories.

(iv) It is the laboratory user's responsibility to take good care of personal safety glasses. Safety glasses MUST NOT be removed from the CBE Laboratory unit.

(v) Normal prescription glasses are NOT a suitable substitute. Goggles for splash and impact protection should be worn over normal prescription glasses or contact lenses.

(vi) Face shields must be used if full face protection is required (as identified in the risk assessment for the work activity).

(vii) Before each use, eye and face protection is to be inspected for damage (e.g., cracks, scratches), cleanliness and proper operation. If deficiencies are noted, the equipment should be cleaned, repaired, or replaced before use.

(viii) Goggles, safety spectacles or face shields must not be worn outside the laboratory areas.

5.7.1 Eye and Face Protection for Visitors/Contractors

Safety glasses or safety goggles should be provided to visitors or contractors who enter designated laboratories within the CBE Laboratory Unit and where they may be exposed to biological, chemical or mechanical eye hazards. Safety glasses are available in the first change room. Contractors or visitors should be advised of the correct procedures detailed in this SOP.

5.8. Respirators

(i) Respiratory protection is not required for any routine work conducted in the CBE laboratory unit. However, respiratory protection may be used when carrying out high-hazard procedures (e.g. cleaning up a spill of infectious material). Single use disposable respirators are suitable for protection against exposure to Biological Agents. Respirators should not be worn outside of laboratory areas.
(ii) **NOTE**: Respirators must be Face fitted to the individual.

5.9. Additional PPE requirements

5.9.1. Autoclave Operation (refer to SOP024 & SOP025 for further details)

When using loading/unloading autoclaves, personnel are required to don the following in addition to the basic PPE requirement mentioned above.

(i) Full length apron (green)
(ii) Eye protection (safety goggles or full face visor)
(iii) Specialised Heat Resistant (Orange) Gloves

5.9.2. Liquid Nitrogen (refer to SOP013 for further details)

When using Liquid Nitrogen, personnel are required to don the following in addition to basic PPE requirement stated above.

(i) Full face visor
(ii) Oxygen Monitor
(ii) Specialised Cold Resistant Loose Fitting Gloves (Blue)

NOTE; Before putting on Liquid Nitrogen specialised gloves, disposable nitrile gloves **must be removed.** This is in the case of a spillage where liquid nitrogen may get underneath these tight fitting gloves and be held against the operators hand causing severe burns.

For more information please refer to the University Policies *PUWER policy, Personal Protective Equipment, Chemical Safety Policy and Biological Safety Policy*. which can be found at https://www.lboro.ac.uk/services/health-safety/policies/

6. DOCUMENTATION

None

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SOP Version History

Version Reviewed	Date Revised/ Reviewed	Revision Summary	New Version Number
001	15Sept2009 **Reviewed by** K.Brosnan	1. Section 1 Added cross contamination note 2. Section 2 To include a mention of chemicals not just biological agents. 3. Section 6 To update the location of white and coloured lab coats and include autoclave apron. 4. Section 7.2 Altered to mention use of white and colour coded lab coats and the provision of lab coats for visitors/contractor. 5.Section 7.2 (xii) Amended to include short skirts as well as shorts. 6. Section 7.3, amended to highlight that gloves must be put on in H32 and worn throughout the CBE unit, also added note for putting gloves on before donning lab coat and note for the mandatory requirement to wash hands before leaving unit 7. Section 7.3,Highlighted need for double gloving be identified in a risk assessment. Also expanded (xiii) note on disposal route for used gloves. 8. Added section 7.7 Additional PPE requirements	**002**
002	10th December 2009- Reviewed by Carolyn Kavanagh	**Following changes to the PPE procedure agreed at the 1st CBE Safety Committee meeting on the 24th November 2009 a procedural change note has been generated (CBE/CN02) that details the rationale behind the change which has been fed into the following:** 1) **3**. Added relevant policies available through the CBE website to reference list 2) **7.1 (4)** Added the note to the section regarding minimum PPE in the CBE that Safety Glasses are to be worn in specified areas or for certain activities & to refer to section 7.3 & 7.5 3) **7.1** Removed safety glasses from list of additional PPE 4) **7.2.2** Added a section describing the PPE requirement for contractors & visitors 5**) 7.3 (iii)** Altered to say gloves should not be removed to open a door (except where necessary, see section 7.4), answer the telephone or use computer keyboards instead of saying gloves should be kept on.	003

		6**) 7.3 (viii**) Added a note to say If gloves have been contaminated with Virkon, they should be rinsed with water before placing into the yellow bins or placed in non-autoclave waste bags/red lidded bins. 7**) 7.4** Added a section to describe the glove change procedure in the CBE laboratory unit. 8**) 7.5 (ii)** Altered to say Alcohol-based hand rubs (minimum alcohol content 60%) should be used in addition to hand washing or if hand washing facilities are not available instead of may be used as an alternative. 9) **7.7 (i)** Added a note to say the CBE Safety Committee strongly recommends that all laboratory users should wear Safety glasses at all times in the CBE, however; 10) **7.7 (ii)** Added a section to describe the procedure for the use of Safety glasses in the CBE unit. 11) **7.7 (iii)** Added a note to say that all authorised laboratory users will be supplied with a personal pair of safety glasses that MUST be kept with them at all times while in the CBE unit. Spare safety glasses are available in all laboratories. 12) **7.7 (iv)** Added a note to say it is the laboratory user's responsibility to take good care of personal safety glasses. Safety glasses MUST NOT be removed from the CBE Laboratory unit. 13) **7.7.1** Added a section to describe the eye & face protection required for visitors & contractors. 14) General editorial & format changes have also been made throughout the SOP.	
003	8th March 2010 Reviewed by Carolyn Kavanagh	After a further review of the policy for wearing of contact lenses in the CBE Laboratory Unit (BGMSA, DSO OHA) the following revisions have been made. **4.4** Statement changed to "Personnel are strongly advised NOT to wear contact lenses in the laboratory. However, if worn, contact lens wearers must ensure that the PPE measures to control the risks identified in the Risk Assessment(s) for their work activity are sufficient. . **7.3 (viii)** Note changed to "If gloves have been contaminated with Virkon, they should be placed in yellow waste bags (in the red lidded bins). Alternatively, they can be rinsed with water and placed into orange waste bags (in the yellow lidded bins). **7.7 (ii) .**Removal of statement regarding mandatory wearing of safety glasses for contact lense wearers.	004

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004	**Reviewed by C.Kavanagh September 2012**	i)Inserted Tissue Engineering Laboratory (T208) in the Wolfson school to the title & in main text where applicable. 6.(i) Removal of the statement regarding the use & location of coloured laboratory coats as these are no longer in use apart from Blue laboratory coats used in the Tissue Engineering laboratory. 7.(i) 5. Addition of shoe covers to the minimum PPE requirements. 7.2.1 Removal of section regarding the use of the coloured laboratory coats & introduction of blue laboratory coats to the Tissue Engineering laboratory. 7.7 (ii) Minor amendments made to the use of safety glasses in the CBE due to changes to use of some laboratories.	005
005	**1st November 2015 C. Kavanagh**	Annual Review. 1)Section 4. Added 'disposable gloves (latex free) 2)Section 5.4 Amended section on glove change procedure to recommend changing on exit from each laboratory. 3)Removed comment about use of clogs	006
006	**January 2016 C.Kavanagh**	i)Removal of references to 70% IMS as no longer used as a disinfectant in the CBE labs. ii)Addition of references to 1:20/1:50 ChemGene disinfectant. See SOP160 for details.	007
007	**27th April 2020 by C.Kavanagh**	i)Addition of reference to University policies for PPE. ii)Minor amendments to responsibilities iii)Addition of oxygen monitors, aloe gloves , beard nets, dissection gloves and face masks to equipment iv)Slight amendments to glove change procedure and to highlight need to change if changing lab coat v)Note to say that colour lab coats available to reduce cross contamination in shared areas if required. vi)Added that green lab coats are for microbiological work. vii)Addition of wearing safety glasses when exchanging gas cylinders.	008