



Biosciences

Safety Awareness 2016-7 (Sept 17)

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This short-form document outlines safety issues likely to be encountered in Biosciences and must be read in conjunction with the detailed College and Biosciences Safety Information that will be found at:

www.exeter.ac.uk/lifesciences/healthsafety

1. HEALTH & SAFETY POLICY STATEMENT

Biosciences is committed to the provision of a Healthy and Safe environment for all employees, students, contractors and the general public. The responsibility rests with the College Pro – Vice Chancellor and the Head of Biosciences. Biosciences in making this statement must so far as is reasonably practicable:

- Ensure the Health, Safety and Welfare of its employees whilst they are at work, and other persons who may be affected by the work activity.
- Comply with the Health & Safety at Work etc. Act 1974 together with other relevant legislation and legal requirements.
- Provide the necessary resources to ensure that proper provision is made for health, safety and welfare.
- To liaise with Buildings & Estates so that the University may provide and maintain the premises and all items of plant, equipment and machinery, ensuring that it is safe and without risk to health.
- Where applicable, provide and maintain adequate, suitable and sufficient personal protective equipment.
- Provide such training, information, instruction and supervision for new and existing employees, so as to ensure their Health & Safety whilst at work, together with the safety of others who may be affected by their actions.
- Carry out risk assessments and maintain records and review and revise as necessary in accordance with the legal requirements.
- Provide and maintain First Aid services adequate to Biosciences' operations.
- Maintain statutory measures for fire prevention and liaise with Campus Services so that they may supply suitable, sufficient and adequate fire fighting equipment with appropriate systems employed for emergency evacuation.
- Consult with employees on matters relating to Health & Safety Representatives. Health and Safety at Work Etc. Act 1974, Sec 2 (4).
- Ensure the established Health & Safety measures are in place to secure the Health & Safety of Biosciences' employees, students, general public and contractors. Health and Safety at Work Etc. Act 1974, Sec 2 (7).
- Maintain adequate records of and monitor all accidents and incidents.
- Ensure that adequate provision is made for the use, handling, storage and transportation of articles and substances so that they are safe and without risk to health.
- Provide health surveillance to employees where appropriate.
- Regularly monitor the workplace and work activities to ensure the effectiveness of the Health and Safety Policy.

TO ACHIEVE THE ABOVE STATEMENT BIOSCIENCES WILL:

- Provide a clear structure within the Biosciences that will identify responsibilities of roles. Some of these roles will have specific training and ongoing support to ensure they can provide suitable support and advice to other College staff and students.
- Ensure all levels of management are aware of their Health & Safety responsibilities, and their obligation to provide and maintain, so far as is reasonably practicable, safe systems of work.
- Ensure all employees understand their individual statutory duties under relevant legislation, so securing so far as is reasonably practicable the Health, Safety and Welfare of themselves and other persons.
- Establish and maintain lines of communication throughout Biosciences, consulting with employees as and when required to secure their co-operation and aid the effective monitoring of safety matters.
- Maintain a proactive attitude regarding safety criteria when consideration is given to refurbishing existing, or planning new premises.
- Review this Policy on a regular basis to ensure legal compliance with new or existing legislation is maintained.
- The central safety team will provide a safety advisor (business partner) to provide additional support and advice to staff and students.

CONTRACTORS, VISITORS AND STUDENTS

- It is the responsibility of Biosciences to ensure the Safety, Health and Welfare of the above persons whilst they are on Biosciences premises.
- Any restricted areas will be clearly defined and where necessary restraints, e.g. barriers, installed. All Biosciences employees have a responsibility to ensure such areas are respected.
- Authorised contractors coming on to the premises will be advised by Biosciences of its Health and Safety Policy but it is the contractors' responsibility to ensure that their employees are fully aware of the contents of the Policy Document.
- All contractors must provide Biosciences with a copy of their Health & Safety Policy, Scheme of Work and any other relevant statutory registers or documentation if requested.

BIOSCIENCES SUPPORTS THE UNIVERSAL ETHICAL CODE FOR SCIENTISTS

Rigour, Honesty and Respect: A Universal Ethical Code for Scientists

Rigour, honesty and integrity

- Act with skill and care in all scientific work. Maintain up to date skills and assist their development in others.
- Take steps to prevent corrupt practices and professional misconduct. Declare conflicts of interest.
- Be alert to ways in which research derives from and affects the work of other people and respect rights and the reputation of others.

Respect for life, the law and the public good

- Ensure that your work is lawful and justified

- Minimise and justify any adverse effect your work may have on people, animals and the natural environment.

Responsible communication: listening and informing

- Seek to discuss the issues that science raises for society. Listen to the aspirations and concerns of others.
- Do not knowingly mislead, or allow others to be misled about scientific matters. Present and review scientific evidence, theory or interpretation honestly and accurately.

Head of Biosciences:
Date:

Professor Sarah Gurr
Sept 2016

2. SAFETY ORGANISATION AND PERSONNEL

People with Health and Safety Responsibilities and Biosciences Safety committee

The College Pro – Vice Chancellor , College Manager and Head of Biosciences have the following duties under the H&SAWA:

- To ensure as far as is reasonably practicable the occupational health and safety of staff, students and visitors while on Biosciences premises.
- To maintain and administer the Biosciences safety policy and co-ordinate any arrangements within this policy brought about Health and Safety at Work and COSHH and other safety regulations. In the absence of the Head of Biosciences, his deputies are the Safety Officers.
- **All Staff and Students: All employees and students have a responsibility to co-operate with supervisors and any officer engaged in the promotion of health and safety. They must also take care for the health and safety of themselves and others that may be affected by their acts or omissions at work.**

The Biosciences Safety Committee consists of the following:

Biosciences Safety Committee	Membership 2016	Contact Details	Extn No.
Chair	Dr Steve Michell	GP 405	3791
Radiation Protection Officer (<i>Isotopes</i>)	Dr S Porter	GP 403	2172
Laser Safety Officer	Dr. Martin Schuster	GP 211	
GM Safety Officer	Dr S Bates	GP 325	5174
Synthetic Chemistry Safety Officer	Dr M Wood	GP 225	3450
Biosciences Administrator (secretary)			
Fieldwork Safety Officer	Dr Jamie Stevens	GP204	3775
Tremough Safety Officer	Dr M Hares	PL A068	01326 259404
Tremough GM and RA Coordinator	Dr M Hares	PL A068	01326 259404
Lead Academic, Ecology and Conservation (<i>ex officio</i>)	Prof D Hosken	PL A068	01326 371843
Technical Representatives	H Ford	GP 101	2386
Postdoctoral Representatives	TBA	GP 410	
Postgraduate Representatives	Jack plume	GP 410	
Undergraduate Representatives	Kathryn Dunn		
TU Representatives	Ms Amber Baker	GP 101	3482

The Chair of the Biosciences Ethical Committee is Professor Nick Smirnoff

The Genetic Modification Safety Sub Committee 2016-17

Member	Office / Representing	Location	Extension
Dr Steve Bates	Chair/GM Safety officer	GP 325	5174
Dr. Nic Harmer		Biocat 2.1	5179
Dr Mike Deeks	Academic Staff	GP M06	5852
Amber Baker	TU rep	GP101	
Mr M Wetherell	Health and Safety Manager (BSO)	Hope Hall	6345
Deb Galley	Staff BSU	Hatherly	5987
Daniela Farina	Staff member	Penryn ESI	01326 259469
tbc	Undergraduate Students		

3. SAFETY INFORMATION and CONTACTS

Streatham-

Safety, Health and Wellbeing Service

Kate Lindsell (Assistant Director, Health & Safety and Wellbeing)

University of Exeter

Hope Hall,

Prince of Wales Road,

Exeter, EX4 4PL

Email: safety@exeter.ac.uk

Email: K.Lindsell@exeter.ac.uk

Tel:- 01392 725341

Brian Robertson - Radiation Protection Officer & Health and Safety Adviser 01392 725339

John Howkins - Fire Safety Manager 01392 725338

Penryn-

For College-

FXPLUS Health and Safety Advisor

Pez Hargreaves

Penryn Campus Service

Treliever Road

Penryn

Cornwall

TR10 9EZ

Tel: 01326 253616

Fax: 01326 370450

The full Biosciences Code of Safety Practice and various safety information: www.exeter.ac.uk/lifesciences/healthsafety

Further details and copies of safety regulations or guidance notes may be found on the HSE Web site <http://www.hse.gov.uk/>

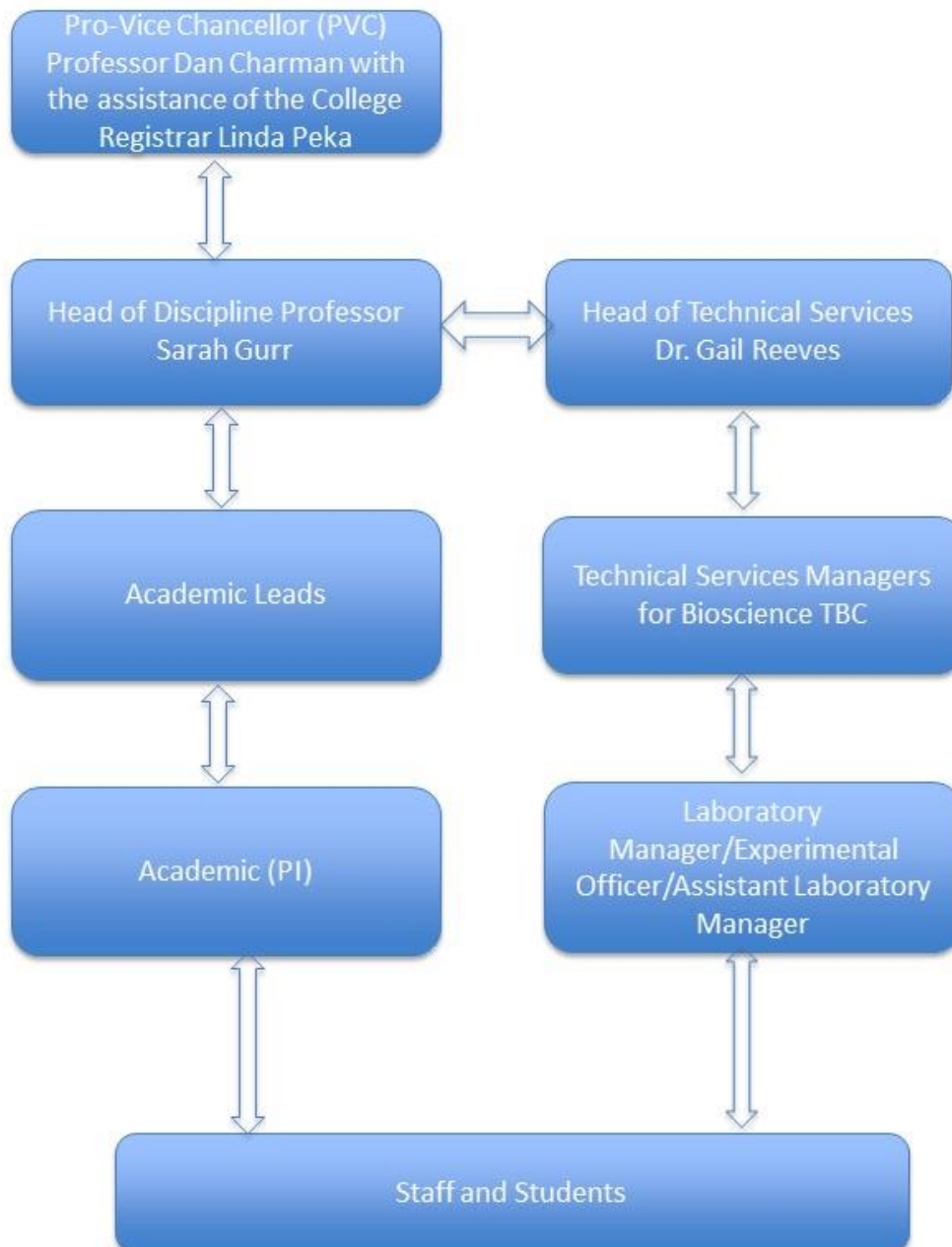
For further information contact the Safety Advisors

Some useful Web sites (there are many others):

<http://www.hse.gov.uk>

http://www.ucea.ac.uk/index.cfm/pcms/site.Publications.Health_and_Safety/

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



4. EMERGENCY PROCEDURES

MAJOR ACCIDENTS

Immediate Action

- Determine continuing danger and extent of injury. If necessary, evacuate area. Summon help and ensure the following are contacted:
 - The Emergency Services 999 or 112 ((9)999 on internal phones), give location, building and postcode. These are: Hatherly EX4 4PS; Geoffrey Pope and Biocat EX4 4QD. Living Systems Institute (LSI) EX4 4QD
UECC, Penryn TR10 9EZ
 - A First Aider
(<http://www.exeter.ac.uk/staff/wellbeing/safety/safetyguidance/firstaid/firstaiderslist/>
) at Penryn call 444 for first aid

- At Exeter, the Estate Patrol, 3999 on internal phones 01392 263999 on external phones. Penryn on Internal extension 3666 – this diverts to the security team’s mobile number Mobile 07768 557779.
- If safe to do so, ensure that the injured are accompanied until help arrives

As Soon As Possible

- University Staff must ensure that the following are informed:
- The Safety, Health and Wellbeing Service in Exeter on extension 5340 (01392 269140)
 - The Head of Biosciences and College Manager.
 -
- Details of all accidents **and “near misses”** must be recorded on a University Incident Report Form that is available online at http://www.exeter.ac.uk/media/universityofexeter/humanresources/documents/health_safety/accidentandincidentreporting/HSI01_Incident_reporting_form.pdf . When completed submit via the submit tab at the bottom of the form – this will be sent directly to the Safety, Health and Wellbeing Service.

MINOR ACCIDENTS

Immediate Action

- Determine continuing danger and extent of injury
- Summon help and ensure that:
- For First Aider in Exeter is contacted via the contact details next to the first aid kits or online at <http://www.exeter.ac.uk/staff/wellbeing/safety/safetyguidance/firstaid/firstaiderslist/>.
- For first aid at Penryn call 444
- The injured are accompanied until help arrives

As Soon As Possible

- Details of all accidents **and “near misses”** must be recorded on a University Incident Report Form that is available online at http://www.exeter.ac.uk/media/universityofexeter/humanresources/documents/health_safety/accidentandincidentreporting/HSI01_Incident_reporting_form.pdf . When completed submit via the submit tab at the bottom of the form – this will be sent directly to the Safety, Health and Wellbeing Service.

Useful telephone numbers

All injuries Royal Devon and Exeter Hospital, Barrack Road, Tel: 01392 411 611

Royal Cornwall Hospital, Truro, Tel: 01872 250 000

Call a taxi if necessary (cost will be repaid from College funds)

Emergency numbers in the case of an accident involving radioactive material to Brian Robertson - Radiation Protection Officer & Health and Safety Adviser 01392 725339 |

First Aid

First Aid should be applied without panic and a First Aider should be consulted as soon as possible. In the case of serious injuries Emergency Services should be called or a doctor or nurse should be consulted immediately.

- The Emergency Services 999 or 112 (9)999 on internal phones), give Location, Building and Postcode. These are as below:

**Hatherly EX4 4PS;
Geoffrey Pope and Biocat EX4 4QD.
LSI EX4 4QD
Penryn TR10 9EZ**

- A First Aider

At Exeter, the Estate Patrol, 3999 on internal phones 263999 on external phones. Out of Hours contact Estate patrol on 3999 for First Aid

Penryn on Internal extension 444 for first aid or 3666 – this diverts to the security team's mobile number Mobile 07768 557779.

In the Geoffrey Pope Building Emergency-only telephones are situated in the foyer of the Geoffrey Pope, Hatherly Laboratories and LSI. At Penryn call 444 for first aid

Biosciences has a number of qualified First Aiders, can be found at:

<http://www.exeter.ac.uk/staff/wellbeing/safety/safetyguidance/firstaid/firstaiderslist/>

Some portering staff and other staff also qualified; see First Aid notices

Most other technical staff have received basic First Aid Training.

There are First Aid boxes in all of the larger laboratories within the Hatherly and GP Buildings and in the corridors the Geoffrey Pope Building.

Treatment of severe injuries

Check for continued danger. If the patient is unconscious, check for breathing and pulse, open airway and place in recovery position. If possible summon aid and call an ambulance (9) 999 or 112 as soon as possible informing the emergency services giving details of location, postcode and if the patient is unconscious or not breathing. Hatherly EX4 4PS, Geoffrey Pope/Biocat EX4 4QD, Penryn TR10 9EZ

If casualty is not breathing apply 'rescue breaths' (artificial resuscitation). Further treatment should be confined to controlling bleeding by direct pressure or pressure point methods as appropriate and giving treatment for shock.

- D **Danger**-Are you or the casualty in danger? Make safe then assess the casualty.
- R **Response** - If the casualty appears unconscious, check this by shouting "can you hear me".
- A **Airway**- Open the airway by placing one hand on the casualty's forehead and gently tipping the head back, check the mouth for obstructions and then lift the chin using two fingers only.
- B **Breathing** - Spend 10 seconds checking to see if the casualty is breathing, see if chest is rising, and listen for breathing. Feel for breath on your cheek. Check for life threatening injuries. If casualty is breathing, place in the recovery position. If the casualty is not breathing, ask a helper to call an ambulance and a First Aider. Give 2 rescue breaths then:
- C **Circulation** - Spend 10 seconds checking for circulation, look, listen and feel for breathing or other signs of life. Give 10 rescue breaths and then commence chest compressions and rescue breaths according to training.

Injuries, Accidents, Incidents and RIDDOR

- All accidents and injuries and near misses must be reported on the *accident/incident form* (http://www.exeter.ac.uk/media/universityofexeter/humanresources/documents/healthsafety/accidentandincidentreporting/HSI01_Incident_reporting_form.pdf). When

completed submit via the submit tab at the bottom of the form – this will be sent directly to the Safety, Health and Wellbeing Service.

All serious diseases and injuries resulting from accidents at work which cause incapacity for more than seven days, or a specified injury or a death **must** be reported to the HSE Inspectorate under RIDDOR (Reporting of Injuries, Diseases and Dangerous Occurrences Regulations 1995). These must be reported only by The Safety, Health and Wellbeing Service are based in , Hope Hall, Prince of Wales Road, Exeter, EX4 4PL

FIRE (General)

If you discover a fire in the building firstly *Sound the alarm*** then:**

- **If the fire is small**
Summon help.
Without taking personal risk, if possible, attack the fire with the fire fighting equipment available. Turn off gas and electricity supplies.
- **If the fire is large and out of control**
Leave immediately, closing the door behind you.
Do not stop to collect personal belongings.
Dial (9)999 or 112 from the nearest safe telephone, give location, building and postcode. These are:
Hatherly EX4 4PS, Geoffrey Pope/Biocat/LSI EX4 4QD, UECC Penryn TR10 9EZ
Make your way quickly out of the building to the assembly point away from the building.
- **On hearing the Alarm**
Close your window and door.
Do not stay to collect possessions.
Leave the building quickly by the nearest exit.
Go to the assembly point away from the building.
Fire Marshals will check their allocated area before leaving the building

IF YOU HAVE RESPONSIBILITY FOR A COLLEAGUE WITH SPECIAL NEEDS, CONTACT THAT PERSON AND GIVE ASSISTANCE

- The assembly point for Hatherly is to the right of the building as you exit on the pavement and lawn towards the Old Library
 - The assembly point for Geoffrey Pope Building and Biocatalysis Centre is below the Peter Chalk Building on the grass.
 - **The assembly point for LSI**
 - For UEC Science at Penryn this is fire assembly point 4 in the north car park.
- Keep the access roads clear to avoid obstructing fire-fighting vehicles.
It is forbidden to enter the building while fire alarms are ringing.

Biosciences will arrange for fire drills to be performed at least annually. You must vacate the building immediately by the nearest fire exit and go to the assembly point keeping well clear of the building and access roads.

Fire alarms are tested weekly as follows: Geoffrey Pope Building on Wednesdays @ 18.30, Biocat on Thursdays @ 19.45 and Hatherly on Thursday @ 18.15. The DuMaurier Building

Penryn @ 8.00am on Tuesday. Ignore the alarm bell if it rings at this time, unless it rings continuously for more than 2 minutes, when the normal drill should be carried out.

Know the location of the alarm call points, the fire-fighting equipment, the fire escape, the phones and the assembly point BEFORE there is a fire!

5. GENERAL SAFETY and GOOD LABORATORY PRACTICE

All staff, research workers, visiting workers and students are required to contribute to health and safety in Biosciences by working in a manner that is clean, tidy and thoughtful at all times and by following G.L.P. Hazardous materials and procedures must be subject to an appropriate safety assessment. See also

<http://www.exeter.ac.uk/staff/wellbeing/safety/guidance/>

- There must be no eating, drinking or application of cosmetics or use of mobile phones in laboratories.
- Smoking is not permitted in or within 5 metres of any University building.
- Laboratory coats must be worn and be fastened in laboratories. These must not be taken into rest areas and coffee rooms. Laboratory coats should be hung up separately from other clothing.
- All staff should be aware that, for example, open shoes or shorts are inappropriate for certain types of laboratory activity.
- There may be occasions on which long hair should be tied up.
- Safety spectacles or visors must be worn when handling acids, alkalis, corrosive or other hazardous materials including microbiological material.
- Safety spectacles or visors must be worn in solution-chemistry laboratories
- In the Geoffrey Pope Building, safety glassed must be worn in the teaching laboratory at all times by staff and students alike. The only exceptions being when using microscopes or if an approved *Risk Assessment* has been completed showing that they are not necessary.
- Suitable gloves should be worn when handling hazardous materials. Disposable gloves should be changed frequently to avoid contamination.
- Remove disposable gloves before handling other equipment and books and before leaving the laboratory if possible. To avoid contamination, one glove must always be removed to handle door-knobs etc.
- Hands should be washed when leaving the laboratory and before meals etc.
- Corridors and room exits should be kept clear at all times. Clothes and belongings should be kept in cloakrooms, lockers or special facilities in the laboratory lobby/write-up areas where applicable.
- Do not run in corridors.
- Trolleys or appropriate carriers should be used to convey equipment, materials and chemicals.
- Do not work with flammable solvents near a naked flame, or place them in refrigerators or freezers unless these are marked spark-proofed.
- Mobile phones should not be used in the laboratory. Personal calls must be taken outside the laboratory. The only exceptions for phone use is for on-call and when required for specialist technical advice on equipment. Phones must be turned off particularly when working with flammable solvents
- The use of iPods and personal stereos is discouraged and must only be used with the express permission of the laboratory manager/PI and when there is no risk of contamination.
- The presence of children in laboratories is not permitted. If it is necessary for a child to enter the building, this is permitted only on the following conditions: -

- The child is at all times supervised by a responsible adult and is not left unattended and a full risk assessment has been completed.
- All responsibility for accidents caused will be that of the parent or person in charge of the child. Biosciences will not accept any responsibility.
- Pets must not be brought into Biosciences' premises
- Persons ignoring these rules will be referred to the Head of Biosciences.

Vaccination against tetanus is recommended (available from your GP).

General Safety

- All staff/students working in a research laboratory must complete induction with their lab manager before commencing work in the laboratory.
- Supervisors must ensure that new staff and postgraduates have appropriate safety training. This should be integrated within the induction process.
- All postgraduates and new research staff must attend the annual safety awareness sessions and adhere to the guidance therein.
- All new members of Biosciences are required to read the Biosciences' Code of Safety Practice before they are issued with keys and/or access cards and before they commence work.
- Each member of the academic staff who has research students (including undergraduates and Erasmus students) under his or her supervision is responsible for their safe working in the laboratory.
- Research students must consult their academic supervisors about all their practical work in order that the potential hazards may be assessed and suitable safety precautions taken. Further discussion with appropriate Safety Officers or the Head of Biosciences may be necessary for some experiments.
- All visiting research personnel must comply with the Biosciences' COP.

5.1 Out of Hours Working including Lone Working out of Hours

- Lone working in laboratories out of normal University hours is not permitted for undergraduates. It is also discouraged for all other members of Biosciences. **Another responsible person must always be within calling distance.**
- Anyone wishing to do practical work in laboratories after 5.30 p.m. or at weekends involving rapidly toxic materials and other hazardous materials or techniques must provide a risk assessment, this should be sent to Mike Wetherell (Exeter) or Michelle Hares (Penryn) for approval, You must arrange to be within call, and preferably within sight, of another person, i.e. there must be at least TWO persons on each floor. **YOU MUST NOT WORK ALONE IN THE BUILDING OR ON ANY ONE FLOOR.**
- Fire doors must be kept closed at all times and doors in corridors must be kept closed after 6.30 p.m. and at weekends

- No experimental work may be carried out when the University is officially closed (e.g., at Christmas) without the presence at all times in the same laboratory, of a second person qualified in the experimental techniques and safety procedures.
- Individuals wishing to work out of hours must identify associated hazards and assess specific risks via COSHH procedures or the MHSW risk assessments.
- Anyone working after 6.00 p.m. Monday to Friday or at weekends must sign in and out with his or her name, times and location as well as arrival and departure times. This information should be written in the Night Book located at:
 - The Porters' Desk Geoffrey Pope Building,
 - The lower entrance to the building in Hatherly
 - At the bottom of the stairs in the Biocatalysis Centre
 - Entrance to the laboratories at Penryn.

Note: This is ONLY for security reasons and to ensure that in case of fire a record of people in the building is readily available.

6. RISK ASSESSMENT

The proper assessment of risks and the implementation of suitable precautions to reduce those risks is the basis of most health and safety regulations.

Risk assessment is required by the EC based regulations including the Management of Health and Safety at Work Regulations (1992) and Manual Handling Operations Regs. 1992 etc. Assessments must also be made in certain regulations made under the Health and Safety of Work Act 1974 e.g. Control of Substances Hazardous to Health (COSHH) Regulations 1988, 1994, 1999 & 2002.

These require that employers make a **suitable and sufficient assessment** of:

- the **risks** to the health and safety of his **employees** to which they are exposed while at works; and
- the **risks** to the health and safety of **persons not in his employment** arising out of or in connection with the conduct by him or of his undertaking

Definition of Hazard and Risk:

- **Hazard** is something, which has the potential to cause harm to people, or damage to equipment, buildings or the environment;
- **Risk** is a function of the likelihood of that harm or damage actually occurring and the severity of its consequences
- If a hazard exists, it is always associated with a degree of risk. Risks can only be completely eliminated by eliminating the hazard.

A risk assessment must consider:

- What is the hazard
- What could go wrong?
- Where is there likely to be a problem?
- Who might be hurt?
- Why might it happen?

- When could it happen?
- How could all this be avoided?

Risk assessments should be completed by the worker and verified and signed by their line manager/ supervisor/ PI. Copies of all completed recorded and kept within the laboratory. Risk assessments must be reviewed annually and always following any changes to procedures etc.

Copies of the various risk assessment forms are available from:

<http://www.exeter.ac.uk/staff/wellbeing/safety/formssignsandtemplates/>

The Safety Committee will review selected risk assessments to assure that hazards have been properly identified and the appropriate control measures are in place to minimise risk.

7. HAZARDOUS MATERIALS AND COSHH

Before carrying out a procedure with hazardous materials (including microorganisms) is commenced, any risk must be identified and assessed. It is the responsibility of the Supervisor and the laboratory worker to jointly assess the hazards associated with their work. Except in the very low risk situations it will be necessary for the assessment to be in the written form using a COSHH assessment *pro forma*. The *process assessor* and the *process supervisor* must sign the assessment form.

The *process supervisor* may delegate the task of assessment BUT s/he cannot delegate the supervisory responsibility. The *process supervisor* has executive control of and health and safety responsibility for the process and s/he must ensure that the assessment is complete and appropriate then sign it. The main findings of this assessment must be recorded electronically and then reviewed **annually** or sooner if there has been a significant change in the work

The Safety Committee will review COSHH

The forms are available from:

<http://www.exeter.ac.uk/staff/wellbeing/safety/formssignsandtemplates/>

COSHH requires the following steps are taken in the assessment:

Step 1: Identify the hazardous substances used or created by your procedure. What is the hazardous substance? Is it?

- Substances or mixtures of substances classified as dangerous by the *Chemicals (Hazard Information and Packaging for Supply) Regulations 1994 (as amended) (CHIP)*. These substances can usually be identified by their hazard-warning label and should have a material safety data sheet.
- Substances with occupational exposure limits (OEL). These are published in the HSE *Occupational exposure limits* publication EH40 available in the Safety Office.
- Biological agents and other microorganisms directly connected with work
- Any kind of dust in a concentration specified by COSHH
- Any other substance, which has comparable hazards to people's health, but which for technical reasons, may not have a hazard label e.g. some pesticides, medicines etc.
- Material that is a known allergen, e.g. livestock, insect frass and scales etc.

Step 2: Consider the risk these substances present to people's health. Assessing the risk involves making a judgement of how likely it is that a hazardous substance will affect someone's health. How much of the substance is used? How could people be exposed to it? Who could be exposed to the substance and how often?

Step 3: If you identify significant risks then decide what precautions are needed to remove or reduce those risks to an acceptable level. What control measures are required? What are the first aid measures in case of an accident? What are the disposal methods?

Step 4: Ensure that control measures are used and maintained so that exposure to hazardous material is prevented or adequately controlled. This may involve changing the process so that the hazardous material is not needed or replacing it with a safer form. If prevention is not practical then the control measures must be improved so that exposure is adequately controlled and *OELs* are not exceeded.

Workers should be properly informed, trained and supervised.

For certain very hazardous materials, exposure must be monitored and there should be health surveillance; the use of these materials is not permitted without prior consultation with the safety officers.

Microorganisms

Micro-organism, cell culture, or human endoparasite, including any which have been genetically modified, which may cause any infection, allergy, toxicity or otherwise create a hazard to human health **must be assessed under COSHH.**

Dangerous Substances and Explosive Atmospheres

Certain materials such as flammable solvents and gases are covered by the Dangerous Substances and Explosive Atmosphere Regulations 2002 (DSEAR), the primary purpose of DSEAR, is to protect workers and others who may be at risk from dangerous substances that can cause a fire, explosion or similar energy-releasing event, such as a runaway exothermic reaction.

In addition to COSHH it may be necessary to complete a DSEAR risk assessment for certain materials:

http://www.exeter.ac.uk/staff/wellbeing/safety/guidance/dangerous_substances/

Solvents

- Laboratory workers must be aware of the hazard associated with solvents; many are highly flammable and toxic and therefore should also be assessed under COSHH.
- Most solvents are very volatile and so may easily be inhaled and will often cause drowsiness even if they are not toxic. Some can cause irritation or dermatitis if spilt on the skin.
- Solvents should be stored in flameproof cabinets; large quantities must not be stored in the open laboratory.
- Flammable solvents should not be store in refrigerators or freezers unless these have been spark-proofed.
- **Never** put solvents for disposal down the sink.
- Waste solvent should be separated into **clearly** labelled bottles of:
 - Acetone.
 - Halogenated waste solvent(Chloroform, dichloromethane etc.) and
 - Non-halogenated waste solvent (ethanol, ether etc).
- As there is a real possibility of explosion of waste acetone and chloroform in the presence of alkali, waste ACETONE should only be added to the blue labelled ACETONE waste bottles.

- Winchesters must not be left on the floor, on top of shelves or on reagent bottle shelves and they should not be kept on bench working surfaces for longer than necessary.
- Winchesters of solvents should be transported around the building using the carriers available for them and not carried in the hand.
- In general, waste solvent which contains a high concentration of acid or base should not be indiscriminately added to general waste solvent containers but disposed of separately.
- Decompose reactive materials before placing in waste solvent bottles.

Cryogenics

- Liquid nitrogen and other cryogenics must only be stored or conveyed in approved Dewar containers. Sealed containers must **never** be used for cryogenics (including solid CO₂) due to build-up of dangerous pressure.
- There must be adequate ventilation when using liquid nitrogen and other cryogenics including solid CO₂. **Never remain in a small enclosed space or travel in a lift with a Dewar of liquid nitrogen or other cryogenic material.** Such area should be fitted with an oxygen depletion monitor.
- Persons transferring liquid nitrogen and other cryogenics from storage containers to liquid nitrogen refrigerators or Dewar flasks (including small vacuum flasks) must use facemasks and suitable gloves.

Compressed gases

- Gas cylinder should be handled by **trained personnel only**.
- Gas regulators should be fitted by **trained personnel only**.
- Be aware that toxic or asphyxiant gases such as CO₂ could build up in confined spaces.
- Gas cylinders must be strapped to a secure support.
- Please contact Safety, Health and Wellbeing Service for any advise
- Cylinders must be stored or used away from heat and in upright position.
- Gas regulators should be fitted by trained personnel only, training must be provided for new research workers before they change cylinder regulators.
- Regulators should only be used for the gas identified on the regulator.
- Never over-tighten regulators when fitting and do not lubricate threads.
- Cylinders should only be moved using the appropriate equipment. Safety shoes and cylinder trolleys are available
- Gases which assist fire e.g. oxygen should be stored separately to flammable gases
- Compressed gas cylinders are colour coded according to the gas contained. Cylinders containing flammable gases are red or part red and have a left-hand thread; non-flammable gas cylinders have a right hand thread for fitting of regulators.
- Cylinder colours, valve threads or markings, should never be interfered with.
- The door to the laboratory must be labelled with the gases in use to inform fire fighters in the event of a fire
- Cylinders not in regular use should be returned to the stores (there is a rental charge)

Personal Protective equipment (PPE)

Research workers must make full use of the safety equipment available and have the requisite items at hand before commencing a potentially dangerous experiment. Such equipment must be regularly checked. The Biosciences Store keeps a comprehensive range of safety equipment however if you need additional items then contact the safety coordinator.

If it is necessary to use full respirators for a hazardous procedure then these respirators must be **face-fitted**. Please see <http://www.exeter.ac.uk/staff/wellbeing/safety/guidance/controlofsubstanceshazardoustohealthcoshh/> for more information

8 DISPOSAL

ENVIRONMENTALLY HAZARDOUS, FLAMMABLE and WATER IMMISCIBLE SUBSTANCES MUST NOT BE DISCHARGED DOWN THE SINKS.

Chemicals

All postgraduate workers and staff are responsible for arranging the safe disposal of samples and chemicals that they have ordered but no longer require. This must be in consultation with Supervisors. At the termination of work, when keys are returned, affirmation will be required that all outstanding disposals have been dealt with. Charges may be made to Supervisors who persistently leave unwanted materials.

The following guidelines must be adhered to regarding disposal of chemicals:

- Purchase only enough chemical to complete your experiment.
- When designing and COSHH assessing experiments, remember to give due consideration to the safe disposal of waste.
- Toxic waste for disposal should be clearly and securely labelled with details and concentration of contents, date and laboratory and user's name, this should be taken to the waste chemical store and details sent to M Grapes and Anna Ames.
- Waste mercury is best collected, stored under water and saved for recycling. Traces of mercury remaining should be treated with zinc or sulphur dust, brushed up and put into a screw-capped jar before sending for disposal.
- Material that requires specialized licensed disposal should be carefully labelled and Karen Gallagher (Environment and Sustainability Advisor) should be contacted regarding appropriate disposal arrangements.
- Small quantities of materials and disposable contaminated with chemicals that require incineration; for example tips contaminated with ethidium bromide or acrylamide, should be placed in a YELLOW Biohazard bag and marked with the warning of CYTOTOXIN and placed in the yellow waste wheelie bin to be sent for incineration (see below). **Keep this waste to a minimum.**
- Large volumes of acid or strong alkali should be neutralised before washing to waste with copious quantities of water.
- Silica Gel Waste and other chromatographic media must be placed in labelled plastic containers. When full, the waste containers must be taken to the stores (DO NOT PLACE IN THE LABORATORY WASTE BINS). Stores will continue to hold a stock of suitable plastic containers available on request.
- Under no circumstances should **any** chemical waste or other hazardous material be placed in the normal laboratory waste bins, please consult with Lab Managers if in doubt.

Solvents

- Waste solvents must be poured into properly labelled waste solvent containers. Remove original labels if reusing bottles. **DO NOT** throw solvents down the drains. When the containers are full to the shoulder of the bottle, transfer them to the Waste Chemical Store for disposal, send details to Heather Ford.

- Halogenated hydrocarbon waste should be segregated from non-halogenated hydrocarbon waste into separate bottles and properly labelled accordingly.
 - Acetone,
 - Halogenated waste solvent (Chloroform, dichloromethane etc.) and
 - Non-halogenated waste solvent (ethanol, ether etc.).

- As there is a real possibility of explosion of waste acetone and chloroform in the presence of alkali, waste ACETONE should only be added to the blue labelled acetone waste bottles; if for some reason it is contaminated, then it should be sent for disposal in a separate container clearly labelled 'Do not mix with other waste solvent'.
- In general, waste solvent that contains a high concentration of acid or base should not be indiscriminately added to general waste solvent containers but disposed of separately.
- Decompose reactive materials before placing in waste solvent bottles.

Biological Material:

It is important that biological waste is disposed of safely. Appropriate sterilisation procedures must be used prior to disposal of any material contaminated with microorganisms.

Some guidelines:

- **Unlicensed Waste for autoclaving.** Material should be placed in clear plastic autoclave bags for standard autoclaving at the conditions detailed under the risk assessment for the specific material before disposal. These bags should be filled no more than $\frac{3}{4}$ full and securely sealed. The bag must be labelled with the lab., building and date of filling. This bag should then be placed in the yellow wheelie bin in the stores yard. The key is with the storekeeper. The material is then sent for incineration.
- **Licensed Waste e.g. plant pathogens.** Material should be placed in RED plastic bags for autoclaving under the conditions specified on the licence.
- **Unlicensed waste for incineration.** Material that is **unsuitable** for autoclaving (including small quantities of some volatile chemical waste that requires incineration) should be placed in special YELLOW Biohazard labelled bags. These bags should be filled no more than $\frac{3}{4}$ full and securely sealed. The bag must be labelled with the lab., building and date of filling. This bag should then be placed in the yellow wheelie bin in the stores yard. The key is with the storekeeper. The material is then sent for incineration.

Glass: There is a dedicated broken glass disposal bin in each laboratory. All chemicals must be rinsed off and any glassware used for microbiological work must be autoclaved before disposal as this glass is ground and recycled for road surfacing. Never put broken glass in ordinary waste bin in case the staff collecting the waste are accidentally injured. Bottles and containers supplied by Fisher are recycled; these may be returned to the Stores for collection (wash out first please).

Sharps: Blades, hypodermic needles, capillary spotters and other 'sharps' should be placed in a yellow 'sharps' disposal container available from the Stores. Containers of biologically contaminated sharps should be autoclaved before disposal. Containers should then be placed in the yellow wheelie bin for incineration.

General Waste: Low risk waste should be placed in the bins provided.

Paper: White paper is collected for recycling.

Waste bins: A universal colour code for waste bins is currently being implemented throughout Biosciences.

Hand towel waste	Green or Grey
General 'safe' waste	Green
Bacterial and other waste for autoclaving	Red (clear bag)
Licensed GM waste for autoclaving	Red (clear bag)
Biological and chemical waste for incineration (biohazardous material must be autoclaved prior to incineration)	Yellow (yellow bag)
Broken Glass	Blue/Grey bin or black dustbins

9 WORKING WITH SOURCES OF IONISING RADIATION REGULATIONS & UNIVERSITY FRAMEWORK

All persons wishing to work with ionising radiations for the first time **must** contact the Biosciences Radiation Protection Officer who will arrange for registration and training with the University Radiation Protection Officer.

For isotopes and open sources, Dr Stephen Porter GP403.
Lasers, Dr Martin Schuster GP 211

The University is subject to the **Ionising Radiation Regulations (1999)** made under the Health and Safety at Work Act (1974), which protect individuals from injury at their place of work. The **Health and Safety Executive (HSE)** administers and checks compliance with the regulations. A copy of the Regulations and guidance to operation of the regulations is available from either the **Biosciences Radiation Protection Officers** or the **University Radiation Protection Officer the University RPO Brian Robertson: Tel. 5340**

The University is also subject to the "Radioactive Substances Act" 1961 and 1994, which controls holdings of radioactive materials and their disposal. The **Environment Agency** is responsible for checking our compliance.

Within each laboratory working with open sources of ionising radiation there is an appointed **Radiation Protection Supervisor (RPS)** responsible for ensuring adequate radiation protection procedures and training of workers in their area. Bioscience has also appointed an **Radiation Protection Officers (RPO)** who oversees all aspects of radiation within Biosciences. Dr. Steve Porter (Exeter).

The RPSs are responsible to the SRPO and both SRPO and RPSs are responsible to the Head of Biosciences who is ultimately responsible for all matters concerning radiation protection in his/her Biosciences.

Radiation protection is based on three general principles:

- (a) Practices exposing individuals to ionising radiation must be justified by the advantages produced;
- (b) Exposures must be kept as low as reasonably achievable;
- (c) The sum of doses received shall not exceed certain limits.

The Biosciences Laser Safety Policy

The University requires that a register be kept by the University Radiation service of all laser (including laser pointers above *Class 1*) All lasers systems purchased from manufacturers must carry a label stating the class of that system. Very strict rules apply to the use of lasers and in particular to *Class 3b* and *Class 4* lasers. Biosciences must have Local Rules and there must be a written Scheme of Work for each sphere of work involving *Class 3b* and *Class 4* lasers. These rules and schemes of work must be ratified by the URPO. Any research worker intending to use Laser(s) in Biosciences must read the Laser Safety Policy and sign a Statement of Compliance **before** starting the work. Any queries should be addressed to your supervisor and/or the Laser Safety Officer, Dr M Schuster

Full details on CLES network at: www.exeter.ac.uk/lifesciences/healthsafety

10 MICROBIOLOGICAL SAFETY

The full Biosciences' Code of Microbiological Safety Practice can be found on: CLES network at www.exeter.ac.uk/lifesciences/healthsafety and should be read alongside other relevant documents.

A COSHH assessment must be completed.

Any research worker intending to undertake microbiological work must read the Biosciences COP and safety regulations for the handling of microorganisms **before** starting the work.

Microorganisms have been classified according to their considered degree of hazard and the appropriate **containment level** required.

Biosciences has facilities to handle *Advisory Committee on Dangerous Pathogens (ACDP)* **Hazard Group 1** (HG1), **Hazard Group 2** (HG2) and **Hazard Group 3** (HG3) microorganisms. No work shall be undertaken using organisms above HG 3.

This code of practice should be read alongside other relevant documents;

- Health and Safety at Work Act (HASWA) 1974
<http://www.hse.gov.uk/legislation/hswa.htm> and the European Communities Act 1972 and regulations within <http://www.legislation.gov.uk/ukpga/1972/68/contents>, including Control of Substances Hazardous to Health (COSHH) 2002 Regulations (as amended)
- The Management, Design and Operation of Microbiological Containment Laboratories. Advisory Committee on Dangerous Pathogens. HSE Books 2001
- Biological agents: managing the risks in laboratories and healthcare premises. Advisory Committee on Dangerous Pathogens. HSE Books 2005.
<http://www.hse.gov.uk/biosafety/biologagents.pdf>
- Categorisation of biological agents according to hazard and categories of containment. Advisory Committee on Dangerous Pathogens. 1995. Fourth Edition
- The Approved List of Biological Agents. Advisory Committee on Dangerous Pathogens. HSE 2004. <http://www.hse.gov.uk/pubns/misc208.pdf>
- Work with agents listed by DEFRA as specified animal pathogens may require a DEFRA licence(s). Advice should be sought from the Biological Safety Advisor. The list of specified animal pathogens can be found at:
<http://www.defra.gov.uk/animalh/diseases/pathogens/index.htm>
- Home Office Anti-Terrorism, Crime and Security Act (ATCSA) 2001 (<http://www.homeoffice.gov.uk/security/terrorism-and-the-law/anti-terrorism-crime-security-ac/>) and pathogens listed under schedule 5 (<http://www.opsi.gov.uk/acts/acts2001/10024-ac.htm#sch5>)
- Individual risk assessments for work in the School of Biosciences
- Operating Procedure and Workplace Risk Assessment for Containment Level 3 Laboratory, Geoffrey Pope Building, University of Exeter
- **Air Transport**
ICAO Technical Instructions for the Safe Transport of Dangerous Goods by Air The Air Navigation Order 2005 SI 1970 provides the legal basis for the Air Navigation (Dangerous Goods) Regulations 2002 (SI 2786) (As amended)
- **Road and Rail Transport**
ADR European Agreement concerning the International Carriage of Dangerous Goods by Road.
RID Regulations concerning the International Carriage of Dangerous Goods by Rail. The Carriage of Dangerous Goods and Use of Transportable Pressure Equipment Regulations 2004 (SI 568) as amended
- **Maritime Transport**
IMDG International Maritime Dangerous Goods (Code)

A. TRAINING AND SUPERVISION OF STAFF

1. Laboratory personnel must receive suitable and sufficient information, instruction and training in the procedures to be conducted in the laboratory.
2. Training received must be recorded and maintained locally. This should also include details of relevant documents read including SOPs and Risk assessments
3. Every researcher must have a nominated academic supervisor responsible for ensuring compliance with these rules and for liaison with the MSO.
4. Supervisors must register all work being undertaken with their lab manager stating the organisms used and the safety procedures that will apply before the work commences.
5. Individuals working with microorganisms must ensure that other persons e.g. cleaners; maintenance personnel, visitors, etc. are not exposed to biological hazards.
6. At CL1 and CL2 portering/cleaning staff may enter laboratories. However, arrangements must be made for appropriate training, advice and guidance of these staff. Portering staff must only deal with general, hand towel waste and glass waste; they must not handle autoclaved, biohazardous or other similar waste. This must be dealt with (including transportation to the wheelie bins) by lab workers.
7. Portering / cleaning staff must not enter CL3 laboratories.
8. Project students and other undergraduates working with microorganisms in HG1 or HG2 require close supervision, the safety and security of these individuals is paramount. 1st and 2nd year undergraduates may handle HG1 organisms only.

B. HEALTH SURVEILLANCE

Individuals with medical conditions which predispose them to infection (e.g. eczema, compromised immune systems, diabetes etc.) are at a special risk. Everyone must notify their supervisor of any illness or other medical condition that may compromise the immune system and may make them more susceptible to hazards, which may arise through working with microorganisms. The MSO must be advised by the supervisor of any such notification.

All individuals working with microorganisms, including undergraduates must read the health warning and complete a health declaration. Those working with HG2 and HG3 microorganisms are required to complete a **confidential** health questionnaire and if necessary to undergo health surveillance. In some cases clinical examination may be necessary, depending upon the nature of the work. In rare cases it may be necessary to take baseline serum samples

Health surveillance is required under COSHH where;

- There is an identifiable disease which may be related to workplace exposure;
- there is a reasonable likelihood that exposure may happen;
- There are valid techniques for detecting indications of the disease or its effects.

Pre-employment screening may be required to identify those who may be more susceptible to infection because of pre-existing medical conditions such as eczema or impaired immune function.

In rare cases **immunization** may be required **and health monitoring** may be required

Note:

Record keeping; a health questionnaire/record is different from a clinical record

C. GENERAL RULES FOR WORK WITH MICROORGANISMS

1. There should be adequate space in the laboratory for each worker, 11m³ for HG 1 or 2 and 24m³ for HG3.
2. Consult with the MSO to assign the correct **hazard group** and **containment level** for the microorganisms you are using. For genetically modified microorganisms you must also consult with the Genetic Modification Safety Officer and obtain a risk assessment to determine the **containment level**: you must do this well in advance of the proposed commencement of the laboratory work.
3. No organisms shall be brought into Biosciences without an accompanying written statement by the sender specifying the nature of the organism and any safety procedures that should be followed by the user. All organisms in Biosciences must be registered prior to their use.
4. Viable material to be moved between areas must be sealed and transported in double containers; such movement must be kept to a minimum.
5. All CL1, CL2 and CL3 laboratories will be subject to random safety audits. Supervisors are responsible for taking any corrective action specified by the auditors within the time specified in the report.
6. The lab manager will instruct any individual(s) to immediately cease work on any organism(s) where in his/her opinion there is a safety risk. The lab manager may also instruct that the organisms are properly disposed of and any affected areas or equipment be made safe.
7. SOPs and COSHH assessments must be completed for procedures involving microorganisms and should be signed by all personnel using the technique. Supervisors are responsible for the proper completion of COSHH assessment with respect to microbiological organisms (use, storage, methods, procedures, disposal etc.) in their area.
8. All accidents and incidents **must** be immediately reported to and recorded by the person responsible for the work or other delegated person using the University's incident form available from http://www.exeter.ac.uk/media/universityofexeter/humanresources/documents/health_safety/accidentandincidentreporting/HSI01_Incident_reporting_form.pdf.
9. Disposal of material must be carried out in a safe manner as outlined in section E

D. GOOD MICROBIOLOGICAL PRACTICE

At all levels of containment the following rules apply:

1. All procedures should be performed so as to minimise the production of aerosols.
2. The laboratory door should be closed when work is in progress.
3. Safety glasses should be worn when indicated in a risk assessment
4. Laboratory coats must be worn in the laboratory and removed when leaving the laboratory.
5. Personal protective equipment, including protective clothing, must be:
 - a. stored in a well-defined place;
 - b. checked and cleaned at suitable intervals;
 - c. when discovered to be defective, repaired or replaced before further use.
6. Personal protective equipment which may be contaminated by biological agents must be:
 - a. removed on leaving the working area;
 - b. kept apart from uncontaminated clothing;
 - c. decontaminated and cleaned or, if necessary, destroyed.
7. Eating, chewing, drinking, taking medication, smoking, storing food and applying cosmetics is forbidden.
8. Hands must be decontaminated immediately when contamination is suspected, after handling infective materials and before leaving the laboratory. When gloves are

worn, these should be washed or preferably changed before handling items likely to be touched by others not wearing gloves, for example telephones, paperwork. Computer keyboards and, where practicable, equipment controls should be protected by a removable flexible cover that can be disinfected.

9. Mouth pipetting is forbidden.
 10. Bench tops and work surfaces should be cleaned and decontaminated after use.
 11. Used glassware and other materials awaiting disinfection should be stored in a safe manner. Pipettes, for example, if placed in disinfectant, should be totally immersed.
 12. Material for autoclaving should be transported to the autoclave in robust containers without spillage.
 13. There must be safe storage of microorganisms.
 14. All waste material, if not to be incinerated, should be disposed of safely by other appropriate means.
 15. Accidents and incidents must be immediately reported to and recorded by the person responsible for the work or other delegated person.
 16. Effective disinfectants should be available for immediate use in the event of spillage.
 17. The laboratory should be easy to clean. Bench surfaces should be impervious to water and resistant to acids, alkalis, solvents and disinfectants.
 18. If the laboratory is mechanically ventilated, it must be maintained at an air pressure negative to atmosphere while work is in progress.
 19. The laboratory should contain a basin or sink located near the laboratory exit, which can be used for hand washing. Taps should be of a type that can be operated without being touched by hand.
20. Use of paper in laboratories
- Minimum paper is permitted in laboratories; this includes vital paperwork and laboratory books only.
 - Protocols and SOPs should be available electronically in the laboratory and if hard copies are necessary these should normally be laminated.
 - Risk assessments should be stored online with laminated copies available when required
21. Laboratory coats
- Howie side fastening lab coats must be used in BSL2 and BSL3 laboratories
 - Howie coats used in laboratories must not be worn in public areas of building or outside the specific suite
 - Howie laboratory coats must be stored separately from other lab coats and outdoor wear.
 - Howie laboratory coats should be autoclaved prior to sending for laundry.
 - Laboratories should have a small supply of standard type lab coats for such tasks as collection of material from stores, transporting of autoclaved waste to exterior bins etc.

E. DISPOSAL

Guidance on standard operation procedures for waste disposal is given in Appendix 5 of *The Management, Design and Operations of Microbiological Containment Laboratories*.

GENERAL

- At CL1 and CL2 Portering/cleaning staff must only deal with general, hand towel waste and glass waste; they must not handle autoclaved, biohazardous or other similar waste. This must be dealt with (including transportation to the wheelie bins) by lab workers. Portering / cleaning staff must **not** enter CL3 laboratories.

- Inactivation of biohazards in contaminated material and waste must be conducted by a validated method.
- At HG 2 and above there must be access to an incinerator for the disposal of infected material which must be autoclaved prior to incineration.
- All biological waste material, if not to be incinerated, should be autoclaved prior to disposal. Access to an incinerator' may be taken to mean an incinerator at another site but whether local or distant, material and carcasses for incineration must be transported in secure containers.
- **Waste bins:** There is a universal colour code for waste bins throughout the School.

Hand towel waste	Green or Grey
General 'safe' waste	Green
Bacterial and other waste for autoclaving	Red (clear bag)
Licensed GM waste for autoclaving	Red (clear bag)
Biohazardous (must be autoclaved prior to incineration) and chemical waste for incineration	Yellow (yellow bag)
Broken Glass	Blue/Grey bin or black dustbins

AUTOCLAVES:

Most biological agents (including bacterial and fungal spores) can be rendered non-viable by exposure to steam under pressure. The hazard from adequately treated material should be very low. Sterilisation depends on steam penetrating to all parts of the load. Lids must be removed and plastic bags undone. The efficiency of sterilisation should be verified by one of the following methods:

- **A thermocouple** placed in the load will indicate how long the load takes to heat up to the chosen sterilisation temperature and how long the autoclave should be maintained at this temperature. A safety margin should be included to ensure sterilisation.
- **Spore strips** may be placed in the load but, as they have to be incubated, do not give an instant indication;
- **some indicator devices** (e.g. "Thermolog" strips) may give a reasonably reliable indication of sterilisation and (subject to risk assessment) be suitable for day to day use where thermocouple tests are impracticable;
- Ordinary **autoclave tape**, however, does not give a reliable indication of sterilisation.

AUTOCLAVE PROCEDURES:

- Waste destruction conditions need to be verified and specified to fall in line with appropriate licences for the area. For example 1 hour at 121°C (15psi).
- Procedures for final disposal need to be specified in the procedure, Portering /cleaning staff must not be required to handle such material
- Autoclaves must be operated by trained, competent staff and manufacturer's instructions must be followed;
- Heat resistant gloves and a face visor should be worn;
- Loads containing bottled fluids must be cooled to below 80°C before removal from the autoclave (otherwise they may explode);
- Items which may explode, release toxic fumes etc. or corrode surfaces must not be autoclaved;
- Autoclaves must be periodically inspected (as pressure vessels), tested, maintained and records must be kept (*Pressure Systems Safety Regulations 2000*).
<http://www.legislation.gov.uk/ukxi/2000/128/contents/made>

See also *Safe Working and the Prevention of Infection in Clinical Laboratories* (HSAC), *Laboratory-Acquired Infections* (Collins) and *Biological Safety: Principles and Practices* (ASM).

11 GENETIC MODIFICATION LOCAL RULES

All work involving genetic modification is subject to the Genetically Modified Organisms (Contained Use) Regulations 2013 which are made under the Health and Safety at Work Act 1974.

The Regulations require that a risk assessment is carried out for all work involving genetic modification; and that the Health and Safety Executive (HSE) is informed of any such work that is assigned to level 2 or above. To assist and co-ordinate these procedures within Biosciences, a Genetic Modification Safety Committee (GMSC) has been set up and a Genetic Modification Safety Officer (GMSO) has been appointed.

No-one may commence work involving genetic modification in Biosciences without first registering online <http://lifesciences.exeter.ac.uk/healthsafety/gmoprojects/> ; and carrying out and submit a risk assessment to the Genetic Modification Safety Committee, this must be completed and submitted online <http://lifesciences.exeter.ac.uk/healthsafety/gmoprojects/> confirmation that the assessment has been approved will be returned once the GMSC has sat and approved the assessment. . Where notification to the HSE is required, work must not commence until the HSE have acknowledged receipt of the notification, and any statutory delay period has expired. More information on the GM standard and process can be found at <http://www.exeter.ac.uk/staff/wellbeing/safety/guidance/gom/>

The Regulations apply to any operation in which organisms are genetically modified or in which such genetically modified organisms are **cultured, stored used, transported, destroyed, disposed of or deliberately released into the environment**. "Genetic modification" in relation to an organisms means the altering of the genetic material in that organisms by a way that does not occur naturally by mating or natural recombination. The GMSO can advise whether or not proposed research falls within the scope of the Regulations.

Academic supervisors are responsible for obtaining from the GMSO and completing the relevant **risk assessment form and any relevant HSE notification forms for each new or changed project involving genetic modification**. Certain experiments require prior notification to HSE before work can begin, so it is vital that the GMSC is provided with the risk assessments well before work is planned to begin.

All workers (including students) must ensure they have correctly completed a GM registration form and submitted it to the GMSO prior to starting any genetic modification work.

Further details of GM law and regulations, advice, dates of committee meetings, and relevant forms may be obtained from the GMSO, Dr Steve Bates GP 325 - email: [S. Bates@exeter.ac.uk](mailto:S.Bates@exeter.ac.uk)

12 FIELDWORK

12.1 Preparing for Fieldwork

A safe system of work must be established for all staff and students involved in fieldwork. The full field safety COP, risk assessment forms and guidance notes are available on: the University website at <http://www.exeter.ac.uk/staff/wellbeing/safety/guidance/fieldwork/>

Biosciences requires as a minimum that field workers:

Follow the recommendations of:

Guidance on Safety in Fieldwork, UCEA 2005

<http://www.ucea.ac.uk/en/publications/index.cfm/guidance-on-health-and-safety-in-fieldwork>

Health and Safety Guidance when Working Overseas, UCEA

Go through the check list in the guidance notes and then complete a **Risk Assessment** for **all hazardous situations** together with an appropriate **insurance form** (the latter should be returned to the Insurance office This is particularly important for overseas trips.

Do not work alone in hazardous locations or when using hazardous procedures.

Inform a responsible person in Biosciences of the proposed location of the field work and the expected return time. Contact that person upon your return.

Take appropriate clothing and equipment.

It is strongly recommended that the emergency contact details form is completed and sent to Biosciences office to be kept in confidential storage.

A qualified First Aider must be present on all Biosciences undergraduate field courses.

12.2 Risk Assessment

Formal risk assessments must be completed for fieldwork in:

Hazardous areas such as sea shore, rivers, moor land, quarries, mines, cliffs, or near railways or motorways

For overseas trips.

Hazardous procedures such as electric fishing, diving or the use of small boats, fieldwork at night etc.

12.3 BIOSCIENCES DOCUMENTS to be completed

- FIELDWORK RISK ASSESSMENT either:
 - Short Format for non residential field work
 - Long format for residential fieldwork
- DECLARATION OF COMPLIANCE
- IN CASE OF EMERGENCY

Streatham	Authorised by	Records held
Undergraduate	Mark Ramsdale/Steve Aves and module coordinator	On the end drive
Masters	Mark van der Giezen and Coordinator	On the end drive
PhD	Supervisor/PI	On the end drive
Post doctoral	Supervisor/PI	On the end drive
Academics	Academic (and HOD)	On the end drive

Go though the check list in the guidance notes, then the form should be completed electronically by the field worker jointly with their supervisor and be signed by both parties. A copy is kept by the fieldwork and the supervisor.

13 TRANSPORTATION

Use of Biosciences' Vehicles

Biosciences number of vehicles, which may be driven by authorised persons on Biosciences' business.

If you need to use the vehicle, contact the Brett Crane in the Stores.

- Drivers are advised that the University Motor Insurers, involve excesses in cases where claims involve drivers under the age of 24, and over 25 years of age where a full driving licence has not been held for 12 months. Drivers qualified to avoid the excesses should drive whenever possible.
- Private vehicles should not be used for Biosciences business when a Biosciences' vehicle is available (see below)
- In the event of an accident involving damage to persons or property other than Biosciences' vehicle or its occupants; details must be reported to the persons involved (or the owner of the property) or to the police and also to the Head of Biosciences and the Academic Registrar and Secretary of the University. If only Biosciences' vehicle is damaged, a report need only be made to the College Safety Office.
- The University Finance Office holds the certificates of insurance of the vehicles.
- Only authorised persons may travel in Biosciences' vehicles.
- Any unauthorised use or the misuse of vehicles may lead to withdrawal of the privilege of using them.
- Users must ensure that the vehicle is in a safe condition (check the oil and water and condition of tyres etc.) before journey.
- First aid kits are kept in each vehicle.

Use of Private Vehicles on Biosciences' Business

It is recommended that personnel use hired vehicles or Biosciences' vehicle whenever possible. If the use of a private vehicle is unavoidable then the following points must be considered:

The vehicle must be taxed, road-worthy and suitable for the intended purpose
 The insurance cover must be adequate i.e. it **must specify for business use.**
 The Supervisor/Head of Biosciences considers such a use is necessary
 The driver holds a full UK drivers licence

See:

<http://www.exeter.ac.uk/staff/wellbeing/safety/guidance/drivingvehiclesonuniversitybusiness/>

Minibus Passenger Transport Vehicles

Biosciences requires that minibus drivers attend recognised minibus driver training. Driver competency is a combination of experience, physical ability and training. Retraining every 4 years is recommended. Drivers are trained in order to reduce the dangers associated with driving minibuses and undertake practicable means to:

- a) Reduce the likelihood of an accident occurring; and
- b) Mitigate the extent of personal injury.

Minibus drivers should be registered as a Competent Trained Minibus Driver before driving a minibus.

See:

<http://www.exeter.ac.uk/staff/wellbeing/safety/guidance/drivingvehiclesonuniversitybusiness/>

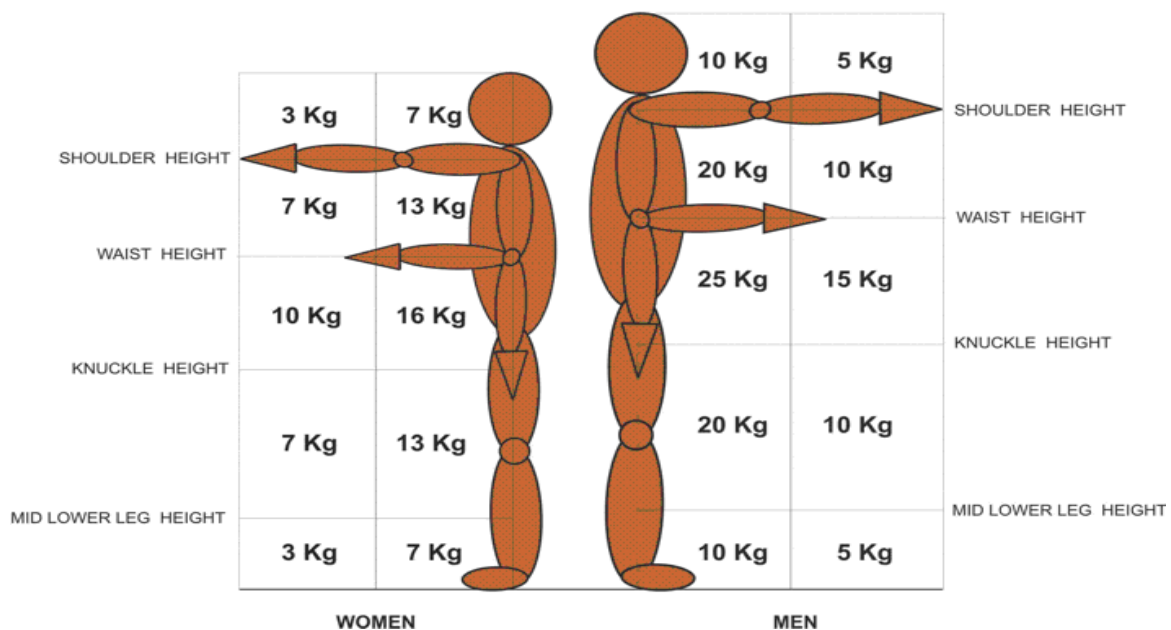
14. MANUAL HANDLING OPERATIONS

The Manual Handling Operations Regulations 1992 require the University to assess manual handling operations undertaken by its employees. Heavy, difficult and repetitive loads require a written assessment to be completed. Appropriate steps must be taken to reduce the risk of injury to the lowest level practicable. Contact M.Wetherell if you consider an assessment is required.

Some basic tips to prevent accidents:

- 1) Assess the object to be moved. Determine its weight and look for sharp edges. Is the weight evenly distributed?
- 2) Plan the job. Check the route is free of obstacles and slipping or tripping hazards. Check that you have suitable tools to help or lifting aids if necessary.
- 3) Get help. If you have any doubt about carrying the object then get help.
- 4) Get a good grip. Decide in advance how best to hold the object.
- 5) Protect your hands and feet.
- 6) Lift with your legs.
- 7) Avoid twisting, move your feet instead.
- 8) Hold the load close to the centre of your body.
- 9) Minimise lifts above your shoulders or below your knees.
- 10) Avoid becoming over-tired. Frequent lifting or lowering is demanding work and can result in cumulative stress.
- 11) When lifting in a team, work with someone of similar build and height if possible.

GUIDELINE MAXIMUM HANDLING LOADS



15. PCs and DISPLAY SCREEN EQUIPMENT

A number of health problems are attributed to use of DSE. Where problems occur, they are generally caused by the way in which DSEs are used rather than the DSE itself. Some users may get aches and pains in their hands, wrists, arms, neck, shoulders or back, especially after long periods of uninterrupted DSE work.

See guidance at - <http://www.exeter.ac.uk/staff/wellbeing/safety/guidance/dse/>

Problems can usually be avoided by good workplace design and by good working practices. Prevention is easiest if action is taken early, before the problem has become serious. If you wish to have your workstation assessed then please contact your supervisor and/or Safety, Health and Wellbeing Service safety@exeter.ac.uk

16 SAFE USE OF EQUIPMENT

Repairs

All staff and students should be vigilant about the safe condition and operation of equipment.

Any suspected fault should be reported to bio-repairs@ex.ac.uk – for the attention of the

Equipment and Facilities team or the Lab Manager for the laboratory and Anna Leonard for Penryn who will arrange repair

Any equipment sparking in operation should be reported to bio-repairs@ex.ac.uk and sent for repair if necessary

General

- The use of extension leads and multi-sockets is discouraged.
- The use of privately owned equipment/appliances and extension leads is discouraged. Such equipment must undergo testing before use. The University insurance will only cover such equipment that is directly required for work, non-authorised equipment is the responsibility of the owner and he/she is personally liable for any damage, accident, injury or death resulting from its use.
- Plug tops with suitably rated fuse should normally be fitted by technicians only.
- Faults to permanent wiring and 13A sockets, etc. must be notified to the Equipment and Facilities Manager. The fault must be made safe by switching off the supply to the immediate area if possible.
- Special care must be taken when using electrical equipment in the vicinity of flammable vapours. Precautions must be taken to ensure the equipment is spark-proofed. This especially applies to 'fridges and freezers.
- Earth leakage circuit breakers or RCCBs should be used when equipment is operated under adverse conditions e.g. in damp or cold areas.

Electrical Safety Testing of Equipment (PAT)

All electrical equipment and appliances used within Biosciences must be tested at recommended intervals. The technician responsible for the laboratory manages this. A green label will be attached to the equipment stating date of test and when the next test is due. Check all equipment that you use has a valid electrical test label before use. Do not use equipment that does not have a valid test label. Any item that has failed the PA test or is faulty should be labelled accordingly and **taken out of service immediately** and bio-repairs@ex.ac.uk informed.

Autoclaves and High Pressure Equipment

All users must receive instruction on the use of autoclaves and be authorised by the technician in charge before using any autoclave. Lab Managers I/C are:

Richard Webb GP 301/2, Gemma Pritchard in the GP 4th floor, Heather Ford in GP 103, Sam Mitchell GP 211, Dr. John Dowdle GP 201, **Dominic** GP Mezzanine,

- Undergraduates are not permitted to use autoclaves
- Autoclave use must be recorded in the logbook
- Read the risk assessment and Code of Practice before starting work.
- Follow the procedures as laid out in the abridged operating instructions that may be found in the autoclave rooms.
- Autoclaves should normally be allowed to cool before removing sterilised material with heat resistant gloves. A fastened laboratory coat should be worn. Eye protection is recommended.
- Use only bottles designed for autoclave use, do not overfill bottles and ensure tops are loosened. If a spill occurs, notify the technician in charge.
- All items must be clearly labelled with: name, lab and autoclave conditions and then tagged with autoclave tape.
- Radioactive, flammable or volatile liquids must not be autoclaved. Do not autoclave material that has been treated with hypochlorite or similar as chlorine gas may be evolved

- The destruction of waste licensed material should be according to particular licenses as specified. Use RED bags loosely sealed (to allow penetration of steam), labelled and tagged using autoclave indicating tape.
- Unlicensed general waste should be autoclaved according to the conditions specified in the SOP/risk assessment for the area taking into account the bulk and nature of the material. Use CLEAR bags loosely sealed.
- Waste bags should be disposed of via the yellow wheelie bin for incineration unless COSHH assessments determines otherwise. Contents of *discard* trays should be allowed to cool, any solid agar must be put in waste sacks and the trays cleaned after use, do not pour molten agar down the sink.
- Waste destruction conditions must to be verified.
- Procedures for final disposal need to be specified in the procedure
- Portering /cleaning staff must not be required to handle such material

Centrifuges

Centrifuges must not be used until the researcher has received proper training. This especially applies to all high-speed and the ultracentrifuges. Talk to you Lab Manager.

MISUSE OF CENTRIFUGES CAN CAUSE SEVERE HAZARDS & DAMAGE

- Always follow the instructions.
- Always use the correct rotor and centrifuge tubes and ensure tubes are weight balanced and symmetrically loaded within the rotor. Never spin just one tube.
- Always ensure all the buckets securely fitted on swing out rotors.
- Centrifuge caps and buckets are in matched sets; never mix caps or buckets from different sets.
- Alcohols and many other solvents attack polycarbonate tubes. Other plastic centrifuge tubes are susceptible to strong solvents and chemicals e.g. phenol.
- Most plastic tubes should be completely filled or they may collapse at high speeds.
- Always remove tubes and rotors from centrifuges after use. Rinse out rotor with clean water and leave to drain on a plastic mat.
- If a spillage has occurred, wash rotor and wipe inside of centrifuge bowl with water and a mild detergent e.g. Teepol, and then rinse the rotor and wipe the centrifuge bowl using clean water and dry. Special precautions must be taken if infective, radioactive or poisonous materials are spilt.
- Never stop a centrifuge rotor by hand.
- Material in centrifuge tubes that are not capped or incorrectly sealed will produce aerosols within the centrifuge bowl and surrounding atmosphere. This is extremely dangerous when infective, poisonous or radioactive materials are being centrifuged. Even relatively harmless bacteria can cause unpleasant chest complaints when inhaled in this form.
- To minimise the consequences resulting from the production of aerosols, spun tubes containing potentially harmful microorganisms belonging to Hazard Group 2 and above must only be opened in a microbiological safety cabinet

Electrophoresis Equipment

- Special care should be taken when operating electrophoresis equipment and similar equipment involving high D.C. voltages.
- All cables and plugs should be inspected each time they are used and great care must be taken to ensure that safety interlocks are working correctly.
- The interlocks must never be tampered with and no modification may be made.

- The power supply must always be switched off before making or modifying the connections to the electrophoresis tank.
- Take care that buffers are not spilt over leads and connections.

Out of Hours Running Procedure for Equipment

Equipment Left Running Permanently

Each laboratory must list all equipment left running permanently. This list should be renewed annually.

- Electrical equipment must have a current electrical safety test and have a plug marked orange.
- Only equipment such as incubators, refrigerators etc. or items that are professionally plumbed in should be left running permanently.
- Contact telephone numbers must be supplied for each item of equipment This particularly recommended for freezers in case of a failure.
- A copy of the list should be lodged in the red folder at the porters' desk in the appropriate building.

Estate Patrol check the building during the night and may turn off any items without appropriate information

Estate Patrol check the building during the night and may turn off any items without appropriate permits.

17 Permits to Work

For safety and insurance purposes, service engineers and members of the Campus Services Division must obtain a permit to work before commencing work in any laboratory. They must also be warned of any hazards associated with the area. Equipment for repair should be clean and free from hazards before they commence work. Due attention should be given to areas containing asbestos. These permits also ensure that the workers are covered by the University insurance. These permits are available from www.exeter.ac.uk/lifesciences/healthsafety and should be added to the data base. Forms should be returned from the contractor and given to Thomas Adams in GP313.