

**BMS\_RA1 Risk Assessment**

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| **Describe the activity, experiment or area under assessment.**  CRISPR gene editing workshop: transformation protocol |

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| List the significant hazard(s).1 | Describe what could go wrong – that is, say who might be hurt and how.2 | Is the risk high, medium or low?3 | Please list the existing and/or intended control measures which will reduce the likelihood of all this happening.4 | Who will carry these measures out? Is the residual risk high, medium or low?. |
| Biological Containment | Non-pathogenic yeast containing a gene for kanamycin resistance or that have been gene edited may be touched and removed from the laboratory by participants. | Low | All participants will be given a full safety induction.  All participants will be made aware of the presence of a GM organism that requires containment measures.  All participants will be supervised in pairs or threes by an instructor.  All participants will wear full PPE as appropriate (lab coat, goggles, gloves).  The yeast will be handled using standard pipetting and aseptic techniques.  All liquid waste will be disposed of into 5%+ ChemGene; all non-liquid waste will be handled using the standard Biomakespace BioBin and autoclave waste routes.  Handling of any spills will be handled by the instructor. | Biomakespace instructors and participants will carry out these measures. Residual risk is thought to be low. |
| Chemical | Ingestion or skin contact with chemicals used in transformation | Low | All participants will be given a full safety induction. All participants will be supervised in pairs or threes by an instructor. All participants will wear full PPE as appropriate (lab coat, goggles, gloves).  All chemicals will be handled using standard pipetting techniques, which will be practiced by participants beforehand using water, dyes and parafilm.  Any minor injury will be treated using the standard first aid procedure using the first aid kits in the main lab. Any major injury can be referred to the nearby A&E. All spillages will be handled according to the BMS08 Accident at Work Emergency Plan. The chemicals handled during the transformation do not have COSHH warnings for hazards, with the exception of 70% ethanol (covered separately in this risk assessment). | Biomakespace instructors and participants will carry out these measures. Residual risk is thought to be low. |
| Heat | Hot block heated  to 37’C, 65’C and 100’C;  Water bath heated to 42’C. | Medium | Hot block is well contained, the instructor will explain risks associated with use and will ensure it is turned off after use.  A sign placed in front of the device will be used to indicate when the hot block is too warm. | Biomakespace instructors and participants will carry out these measures. Residual risk is thought to be low. |
| Heat | Use of autoclave | Medium | All stock solutions for use in the transformation protocol will be prepared in advance by instructors; no participant will handle the autoclave or any materials that have been recently autoclaved and have an elevated temperature. | Biomakespace instructors and participants will carry out these measures. Residual risk is thought to be low. |
| Sharps | Needle used to pierce lid of tube heated to 100’C, in order to prevent pressure build-up and lid popping; risk of stabbing hand whilst piercing plastic. | Low | Instructor will handle the piercing of the tube lid(s) with a sterile needle, and will ensure it is kept in safe casing (e.g. a needle wallet) when not in use.  First aid precautions will be followed if any unintentional piercing occurs. | Biomakespace instructors and participants will carry out these measures. Residual risk is thought to be low. |

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| Important! It is essential to check regularly that control measures specified in this risk assessment document are actually being used in practice. Any specialist emergency or first aid procedures should be specified here.  None required | |
| If any Standard Operating Procedure (SOP) is required, please specify it here or attach it to this form. Any specialist training required should also be specified here  None required | |
| Are any lone working or out of hours restrictions required for this project?  No lone working or out of hours restrictions beyond standard Biomakespace policies. | |
| Is special monitoring (e.g. hearing test, eye test, health surveillance) required? If so, please enter details and also contact the Safety Officer for advice.  None required | What personal protective equipment (PPE) is required (e.g. overalls, gloves, respiratory protection, eye protection)? You must ensure that any PPE specified is suitable for the purpose.  Lab coat and nitrile gloves at all times, safety goggles where appropriate, thick insulating gloves for handling -80C freezer or heated liquids. |

Please complete this section to confirm that this constitutes a suitable and sufficient assessment of risk.

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| Name of assessor:  Abigail Wood | Signature:  ABIGAIL WOOD | Date:  3 Mar 2020 | Name of Biomakespace Safety Team member: | Signature: | Date: |

This assessment should be reviewed regularly (usually every 12 months), or earlier if there is a material change to the process, the equipment, location or relevant safety technologies. It should also be reviewed when new people are involved, or after an accident or incident has taken place.

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| Reviewed by (name) | Signature | Date | Indicate changes here5 |
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1 A list of hazards is provided below to help you, but this may not be exhaustive. If any of these hazards can be eliminated altogether, or can be reduced at source by making an inherent change then we must consider doing so. Hazards in **bold** will also need an additional, more technical assessment on a specialist form - please ask the Safety Officer for further advice.

High or low temperatures High pressures **Chemical hazards** **Biological hazards Genetically Modified Organisms**

**Ionising radiations** **Lasers**  Sharp objects **Dusts** Work at heights **Animal houses**

Magnetic fields Machinery hazards Electricity **Manual Handling** Noise Vibration

Falling objects Collapsing structures Flooding Slips, trips and falls Asphyxiant gases **Flammable gases**

2 Please explain how an accident, incident or health condition could arise. We must consider all events which are *reasonably foreseeable*.

3 Please see the health and safety risk assessment handbook for further guidance on levels of risk.

4 When deciding on suitable control measures, you should ensure that you are complying with all relevant University policy and guidance documents, and that you have considered the hierarchy of control measures. In order to comply with legislation, we must also take all steps which are ‘reasonably practicable’ to reduce risk. This means that we should take all steps which are (in terms of time, cost and trouble) reasonable in relation to the reduction of risk achieved.

5 If changes are extensive, you will need to complete a whole new form, or attach a written amendment. If there are no changes say so.