**Manchester Institute of Biotechnology - Risk Assessment Form**



| **Date:** 13/01/15 | **Assessed by**: Fiona Marriage | **Validated by**: Tanya Aspinall | **Location**: MIB  |  | **Review date:** 12/01/16 |
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| **Task** Visualisation and excision of Ethidium Bromide stained nucleic acid bands from electrophoresis gel using an ultraviolet light. **EtBr and ultraviolet light should only be used when product evaluation has shown that there is no appropriate alternative for your experimental procedure** |

| **Activity**  | **Hazard**  | **Person(s) in dange**r | **Existing measures to control risk**  | **Risk rating**  | **Result**  |
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| Addition of Ethidium Bromide concentrate (10mg/ml in water) to gel | Chemical hazard Concentrated Ethidium Bromide – **Suspected of causing genetic defects.**Toxic if inhaled and easily absorbed through skin.-Environmental contamination  | The user and anyone in the environment (in particular from contaminated surfaces and from splashes into eyes when pipetting)-Expectant and nursing mothers should refer to their maternity risk assessment -General public  | Appropriate training and supervision **(ref 1)**Appropriate PPE to be worn **(ref2)** – double gloving is recommended, ensure gloves are over lab coat cuffs Users to have read and signed the COSHH Single Substance Risk Assessment for Ethidium BromideGel must be sufficiently cool before addition of any stain – if added to hot agarose Ethidium will vaporise and thus expose user Ethidium Bromide use should be within a contained area which is clearly labelled. All equipment and surfaces to be decontaminated after use **Disposal**Never let EtBr enter the drainage system or black bin waste.All waste resulting from EtBr use including gel, tips and blue roll must be disposed of as hazardous waste via the yellow bin incineration waste route. EtBr must be extracted from liquid waste via a charcoal filter system / destain tea bag (A buffer might look colourless however it will still contain EtBr)Use commercially available filtrating vacuums or EtBr extractors to remove EtBr from buffers and other dilute aqueous solutions e.g. a destain tea bag, a charcoal filter system. A “tea bag” method is the safest option.  | Medium | A |
| Gels in EtBr baths / destaining from EtBr | Ethidium Bromide -**Suspected of causing genetic defects.**Toxic if inhaled and Easily absorbed through skin.-Environmental Contamination  | The user and anyone in the environment (in particular from door handles, contaminated surfaces, equipment and from splashes into eyes -Expectant and nursing mothers should refer to their maternity risk assessment -General public - | Appropriate training and supervision **(ref 1)**Appropriate PPE to be worn **(ref2)**The second method requires the use of a large volume of EtBr solution in which the gel is immersed to be stained. This procedure MUST be conducted in a contained area (a fume cupboard is recommended).Gels must be contained within a rigid box designated specifically for this purpose with a close fitting lid **Disposal**All waste resulting from EtBr use including gel, tips and blue roll must be disposed of as hazardous waste via the by the yellow bin incineration waste routeEtBr must be extracted from liquid waste via a charcoal filter system / destain tea bag or equivalent as above A buffer might look colourless however it will still contain EtBrUse commercially available filtrating vacuums or EtBr extractors to remove EtBr from buffers and other dilute aqueous solutions e.g. a destain tea bag, a charcoal filter system. A “tea bag” method is the safest option.  | Medium  | A |
| Transport of EtBr gels  | Ethidium Bromide –**Suspected of causing genetic defects.**Toxic if inhaled and Easily absorbed through skin.-Environmental hazard | Anyone in the environment (in particular from contaminated surfaces, door handles, equipment and from splashes into eyes  | When transporting EtBr-stained gels e.g. to the dark room, the gels must be contained within a rigid box with a close fitting lid designated specifically for this purpose. If necessary use a gloved hand to carry to box and open doors with an ungloved hand.   | Low | A |
| Using a UV source. | UV source.Ethidium Bromide – **Suspected of causing genetic defects.**Toxic if inhaled and Easily absorbed through skin.Electric Shock  | User / those in the vicinity may expose themselves to UV resulting in **severe burns to eyes and skin.** User - scratched / damaged visor obscuring vision / letting through UV light User, anyone in the environment (in particular from contaminated equipment  | UV must only be used in area with restricted access to other lab staff. There should be a clear sign indicating the use of non-ionising radiation. Appropriate training and supervision **(ref 1, 1a)**Appropriate PPE to be worn **(ref2)**All transilluminators should be registered by the non-ionising radiation safety advisor and be annually inspected **(ref 5)**All gel-doc systems must have a functioning fail safe interlock i.e. when the UV source is on the user should not be able to open the access panel / door. Any faults should be reported immediately to the supervisor / TRM If an open UV source without an interlock mechanism e.g. a transilluminator or handheld UV lamp must be used full PPE must be worn consisting of: **A full face shield labelled as “suitable for use with UV”. The visor must be BS EN 170 2C-1, 2 compliant and these codes must be clearly marked on the visor. (Ref 4)**Visually inspect visor before use to ensure it is not showing signs of any damage. Adjust the head band so that the visor is a close and comfortable fit. Visor must cover face and throat.Lab coat must be fully buttoned. Gloves should be worn with no gap between lab coat cuffs, overlapping to prevent skin exposure. (Double glove). They should be impervious to Ethidium **Do not switch on transilluminator until wearing full PPE and the protective shield is in place.** **Samples should be positioned on the transilluminator when it is off.****Only use with protective shields in place as per the manufacturer’s instructions. Shields should be checked regularly for cracks or other damage. Never remove the shield.** **Turn off transilluminator before removal of gel and cleaning.** Clean the work area after use (Use EtBr destroyer or equivalent e.g. 70% IMS), all waste including gel, tips and blue roll must be disposed of as hazardous waste via the yellow bin incineration waste route. Transilluminator to be annually PAT tested, any defect to be reported to a technical resources manager. Equipment needs to be logged and checked by MIB UV Safety Advisor |  Medium  | A |
| Excising bands  | Sharp blades | User, cuts and lacerations  | Appropriate training and supervision **(ref 1)**Consider replacing use of traditional scalpel blades with commercially available safety scalpels or disposable onesUse safe blade removal techniques **(ref 6)**Sharps must be discarded into a sharps container at point of use. | Low | A |

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| **Action plan** |
| **Ref No** | **Further action required** | **Action by whom** | **Action by when** | **Done** |
| 1 | Training – all staff and students should be trained in the safe operating of equipment and the safe usage of hazardous substances and supervised until competent. All users must be trained in the safe usage and disposal of sharps.  | Supervisor  | Before work starts  |  |
| 1a | All staff and students using UV should be aware of the signs and symptoms of UV exposure and appropriate action:**Skin:** this will look like sunburn – the skin will be red and in extreme cases blistered. Treat by cooling the area (don’t place blistered skin under a running tap, run cold water into the sink or use cold compress)and covering with a light sterile dressing. If burns blister the victim must go to Casualty or a NHS walk in centre as soon as possible. **Eyes:** Victim will not notice the signs of exposure for up to 6 hours after it has happened; they will notice a gritty feeling like sand in their eyes, which will progress to sever pain and an aversion to light. The symptoms often worsen over the first 24 hours. I**f you think your eyes have been exposed attend casualty immediately**, if you are in the area the eye casualty attached to MRI is better set up for treating burnt eyes.  | Supervisor to make staff / student aware of first aid procedures. Should anything happen the accident should be reported IMMEDIATELY to a TRM or the SAFETY and RISK team  | Before work starts |  |
| 2 | The following items of PPE must be worn: Howie-style laboratory coat, BS EN374 compliant gloves (nitrile) and BS EN166 compliant eye protection (chemical splash proof safety glasses). A selection of safety glasses and goggles are available from MIB Stores; users are advised to visit Stores and select eye protection which fits well and is comfortable to use. Regular lab inspections monitor the wearing of PPE; users found not to be wearing PPE when the risk assessment states that it must be worn will be subject to the MIB compliance policy. | User  | Before work starts |  |
| 4 | When using the UV light source **A full face shield labelled as “suitable for use with UV”. The visor must be BS EN 170 2C-1, 2 compliant and these codes must be clearly marked on the visor.**Visors should never be place face down, they should be returned to their designated hook. They should be replaced immediately if scratched / damaged in any way  | Visor to be sourced via the non-ionising radiation advisor user to wear  | Before work starts |  |
| 5 | A central record is kept of all UV devices by the MIB UV Safety Advisor. In conjunction with the University Non-Ionising Radiation Technical Advisor these are annually inspected. If you have a UV device you must ensure the advisor is aware of it  | User to MIB UV Safety Advisorof deviceThe above and the University non-ionising radiation technical advisor to annually check device  | When UV equipment is purchasedAnnually  |  |
| 6 | Safe blade technique: always work with blades pointing away from you.To mount the blade open the dull end of the scalpel blade wrapper, align the edge of the scalpel bade with the edge of the scalpel handle. Make sure the blade clicks into place. To remove the blade use long nosed forceps to get hold of the very back of the blade (non sharp end), lift a couple of millimetres then push it off the handle into the sharps bin Place all disposable sharps into an approved (BS 7320:1990, UN3292) puncture proof sharps container immediately at the point of use. Activate temporary closure, which should be activated between uses. Alternatively consider the use of safety scalpels  | Supervisor to provide training , user to use safe techniques  | Before work starts |  |

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| **Authorisation by PI** **I confirm that I have considered and understand the experiment and the associated hazards. I am satisfied that all of the hazards have been identified and that the control measures to be followed will reduce the risks to acceptable levels.** **Print name: Signed:****Date:** |

**Declaration by researcher**

**I confirm that I have read this Risk Assessment and that I understand the hazards and risks involved and will follow all of the safety procedures stated. Where PPE has been identified as a control measure, I will ensure that it is worn.**

**Declaration by PI**

**I confirm that the researcher who has signed below is competent to undertake the work. My counter-signature indicates that I am happy for the work to proceed.**

| **Name (please print)** | **signed** | **PI countersignature** | **date** |
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