

SCHOOL OF MEDICAL SCIENCES

General Risk Assessment – Within labs or offices

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| Department: Physiology and Pharmacology | Room number: LG04 | Date assessed: 14 May 2004 |
| Procedure title: Making standard electrolyte solutions | Assessed by: Peter Barry & Trevor Lewis | Supervisors signature: |

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| <p>Description of Procedure: Standard electrolyte solutions are made either by weighing chemicals and adding to appropriate final solution in volumetric flasks or cylinders, or by adding appropriate amounts of more concentrated stock solutions by pipette or other measuring flask into the solution in appropriate volumetric flasks or cylinders. For details of adjusting the pH of buffered experimental solutions, see separate risk assessment “Adjusting the pH of Solutions”. Preparation of 1 M solutions of KOH, NaOH or HCl is covered by other procedures. For non-standard electrolyte solutions, see separate risk assessments and procedures.</p> |
| <p>Apparatus/Equipment used: Laboratory balance, standard glassware (conical flasks, measuring cylinders, volumetric flasks and beakers etc.), pipettes, displacement pipetters (Gilson).</p> |

Chemical Hazards – Properties of chemicals to be used

| Hazardous substance | Hazards (see label and MSDS) Tick if relevant | | | | | | | | |
|---------------------------------------|---|-----------|-------|---------|----------|-----------|-------------|------|-------------|
| Reactants or Products | Flammable | Corrosive | Toxic | Harmful | Irritant | Oxidizing | Radioactive | Safe | MSDS viewed |
| NaCl, KCl | | | | | low | | | | Yes |
| CaCl ₂ , MgCl ₂ | | | | | mod. | | | | Yes |
| HEPES | | | | | low | | | | Yes |
| glycine, cAMP | | | | | low | | | | Yes |
| sucrose | | | | | | | | Yes | Yes |

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| <p>First Aid Notes:</p> <p>Eye - Flush gently with running water, holding eyelids open for 20 minute period. Inhalation - non-hazardous. Skin - wash with water. Ingestion If poisoning occurs, contact a Doctor or Poisons Information Centre on 13 11 26 (Australia Wide). Do not induce vomiting. Give water to drink and seek immediate medical attention.</p> |
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Review of Hazard/Risk

| Step in process List major steps or tasks in process | Hazard | Risk (Harm) | EXISTING CONTROLS List all current controls that are already in place or that will be used to undertake the task e.g. -personal protective equipment - identify facility type, location - existing safety measures | Risk rating with existing controls? | | | ADDITIONAL CONTROLS REQUIRED Additional controls may be required to reduce the risk rating e.g. - greater containment - specific induction / training - additional personal protective equipment | Risk rating with additional controls? | | |
|---|--|--|---|-------------------------------------|------------|--------|--|---------------------------------------|------------|--------|
| | | | | Consequences | Likelihood | Rating | | Consequences | Likelihood | Rating |
| 1. Use of electrical weighing balance | Electrical | Electric shock | <ul style="list-style-type: none"> Yearly inspection and testing of power cord and equipment (inspection tags attached). Training of all lab personnel in good laboratory practice. Appropriate PPE (lab coat must be worn, gloves and eye protection must be worn). Enclosure around weigh balance to reduce risk of exposure. All spills to be cleaned up as soon as practicable. Training of all lab personnel in good laboratory practice. Pipetting must be done with mechanical pumps and MUST NOT be done by mouth. Appropriate PPE (lab coat must be worn, gloves and eye protection must be worn). All spills to be cleaned up as soon as practicable. Covered in a separate risk assessment. PPE must be worn Working stocks of 1M HCl, 1M NaOH and 1M KOH are maintained in small volumes of 100 ml or less. | 2 | E | L | | | | |
| 2. Weighing of dry chemicals | Spills of dry chemicals; potential to raise chemical dust; spread of chemicals due to electrostatic repulsion. | Potential irritation of skin or irritation to the eyes | | 2 | D | L | | | | |
| 3. Adding volumes of stock solutions | Splashes or spills from solutions | Potential irritation of skin or irritation to the eyes. Potential slip hazard from solution spills. | | 2 | D | L | | | | |
| 4. Adjusting pH | Corrosive acids or alkalis | Potential for burns of skin, or burns / damage to the eyes | | 2 | D | L | | | | |

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| 5. Making up to final volume | Splashes or spills from solutions | Potential irritation of skin or irritation to the eyes. Potential slip hazard from solution spills. | <ul style="list-style-type: none"> • Appropriate PPE (lab coat must be worn, gloves and eye protection must be worn). • All spills to be cleaned up as soon as practicable. | 2 | D | L | | | |
| | Handling of large volumetric flasks (2 l or greater) | Potential for strain injury from lifting / handling heavy objects. | <ul style="list-style-type: none"> • Training of all lab personnel in good laboratory practice and handling heavy objects. • Restricting handling to the lab area designated for making up solutions. • Decanting of solutions to smaller volumes for transport around the lab and for use in the experiments | 2 | D | L | | | |

| <u>Containment Facility used</u> | <u>Sterilization/Decontamination requirements</u> | <u>Disinfectant</u> | <u>Location of Spill Kit</u> | <u>Emergency information</u> |
|----------------------------------|---|---------------------------|---|--|
| Location: LG04 PC level: PC1 | N/A | Type: N/A Suitability: | Room: LG04 near the storage cabinet for corrosives. | Contacts: Prof. Peter Barry Dr. Trevor Lewis Dr. Andrew Moorhouse |

Physical Hazards

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|---|---|--|---|---------------------------------------|
| <input type="checkbox"/> Explosion | <input type="checkbox"/> Hot liquids | <input checked="" type="checkbox"/> Spillage/Splash | <input type="checkbox"/> Chemical fumes | <input type="checkbox"/> Fire |
| <input checked="" type="checkbox"/> Heavy objects | <input type="checkbox"/> Cold liquids | <input checked="" type="checkbox"/> Sharps | <input type="checkbox"/> Hot equipment | <input type="checkbox"/> Other people |
| <input type="checkbox"/> Radiation | <input type="checkbox"/> Cold environment | <input type="checkbox"/> Ignition source | <input type="checkbox"/> Biological | <input type="checkbox"/> Other |
| <input type="checkbox"/> Pressure/vacuum | <input type="checkbox"/> Noise | <input checked="" type="checkbox"/> Electrical current | <input type="checkbox"/> UV/X-Ray/laser | |

Comments:

Any splashes or spills of solutions are generally expected to be of small volumes for stocks of more concentrated solutions (approx. 100 ml). The final volumes of electrolyte solutions vary between 100 ml and 2000 ml volumes. Handling of volumetric flasks with electrolyte solutions greater than 1000 ml need to be handled with care as they are moderately heavy. Electrolyte solutions are generally decanted to smaller volumes for transport within the lab and for use during experiments. Dry chemicals that show an electrostatic charge effect, causing spread of the chemical, should be weighed out on aluminum foil or glassine paper rather than polystyrene weigh boats. Spills of dry chemicals are expected to be small as amounts being weighed out are generally less than 30 g. Salts pose a low irritant risk with exposure to the skin and may result in dermatitis with repeated prolonged exposure to the salts. The raising of dust from the dry salts pose an irritant risk to the upper respiratory tract and an irritant risk to the eyes that might result in lacrimation, redness and conjunctivitis. Any broken glass will be swept up and placed in a sharps/broken-glass container for disposal. The balance should be checked to see that it has a valid electrical inspection tag.

Control Measures Needed

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| <input checked="" type="checkbox"/> Protective clothing | <input type="checkbox"/> Fume cupboard | <input type="checkbox"/> Hearing protection | <input type="checkbox"/> PC1 lab |
| <input checked="" type="checkbox"/> Appropriate eye protection | <input checked="" type="checkbox"/> Appropriate footwear | <input type="checkbox"/> Handling aids | <input type="checkbox"/> PC2 lab |
| <input type="checkbox"/> Gloves | <input type="checkbox"/> Appropriate face mask | <input checked="" type="checkbox"/> training received | <input type="checkbox"/> Hot room |
| <input checked="" type="checkbox"/> Nitrile gloves | <input type="checkbox"/> Remove ignition source | <input type="checkbox"/> Assistance needed | <input type="checkbox"/> S.O.P viewed |

Comments:

Standard personal protective equipment (PPE) should be worn at all times. This includes covered shoes, lab coat or gown, eye protection, latex gloves for protection against irritation from salts and nitrile gloves for added protection against corrosives. Hair should be tied back. Contact lenses should not be worn. All lab personnel will be trained in the correct procedures for making up standard solutions. For pH buffering refer to separate Risk Assessment "Adjusting the pH of solutions".

Other Control Measures

Location of nearest Spill Kit: LG04 near corrosives cabinet

Location of nearest Eye Wash: LG04 first aid kit

Location of nearest First Aid Kit: LG04 near corrosives cabinet

Nearest Safety Shower: Not available

Clean up and disposal of contaminated waste

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|---|---|---|
| <input type="checkbox"/> Non halogenated hydrocarbons | <input type="checkbox"/> Gloves | <input type="checkbox"/> Other (please specify) |
| <input type="checkbox"/> Halogenated hydrocarbons | <input type="checkbox"/> Biological | <input type="checkbox"/> Radioactive |
| <input checked="" type="checkbox"/> Aqueous (not heavy metal) | <input type="checkbox"/> Sharps | |
| <input type="checkbox"/> Aqueous heavy metals | <input checked="" type="checkbox"/> Glass bin | |

Clean up procedure:

Any spills of standard electrophysiological solutions are non-hazardous and pose a low irritant risk and can be adsorbed for disposal in normal waste. Any spills of dry chemicals pose a low irritant risk and can be wiped up with damp paper towel to avoid raising any dust and disposed of in normal waste. Any broken glassware should be cleaned up and placed in the sharps/broken-glass container for that purpose.

Overall Risk Assessment:

- Low risk (simple assessment). File and keep this assessment.
- Risks are significant but can be effectively controlled. File and keep this assessment.
- Risks are significant and not easily controlled. Carry out a more detailed risk assessment and report. File and keep. Consider other control measures and provide training.

Signed:

Date: 14 May 04

Date for review: 14 May 05