What is Ethidium Bromide?

Ethidium bromide (EtBr) is commonly used as a non-radioactive DNA stain to identify and visualize nucleic acid bands in electrophoresis and perform other methods of nucleic acid separation. Solutions of EtBr fluoresce readily with a reddish-brown color when exposed to ultraviolet (UV) light. Although it is an effective tool for genomic research, its hazardous properties require special safe handling and disposal.

What are the potential health hazards of Ethidium Bromide?

- EtBr is a mutagen (may cause genetic damage) and is moderately toxic after an acute exposure
- EtBr can be absorbed through skin, and will stain it purple
- EtBr is an irritant to the skin, eyes, mouth, and upper respiratory tract
- Some alternative stains are less mutagenic and less toxic than EtBr. If the toxicological data is lacking or unclear, handle the stain in the same way as EtBr
- Some alternative stains are suspended in dimethyl sulfoxide (DMSO), which can increase skin absorption of organic compounds

What special laboratory precautions are recommended?

Good laboratory work practices help reduce hazardous exposures.

- Use dry materials in a fume hood, or choose premixed solutions to avoid inhalation exposure
- Wear nitrile gloves, a laboratory coat, safety glasses, long pants, and closed-toed shoes. Change gloves frequently
- Provide users with safety training on the hazards, use, and proper cleanup procedures
- Following glove removal, always wash hands
- Review Material Safety Data Sheet (MSDS) and this EH&S fact sheet before handling DNA stains
- Ensure unobstructed access to an emergency eyewash/shower unit in the work area
- Wear UV-blocking eyewear or work behind a UV shielding glass when using ultra-violet light
- Store EtBr away from strong oxidizing agents in a cool, dry place, and the keep container undamaged and tightly closed

What should I do in the event of an exposure?

After any exposure to EtBr (via skin, inhalation, ingestion, or eye contact), seek medical treatment:

**Occupational Health Facility**, Monday - Friday, 7:00 a.m. to 4:00 p.m., located at CHS 67-120, x56771

**Ronald Reagan UCLA Medical Center** - enter from Gayley Avenue, x52111 (for medical emergency or after hours and on weekends)

<table>
<thead>
<tr>
<th>Inhalation or Ingestion</th>
<th>In the case of EtBr ingestion, obtain medical attention immediately. If EtBr dust is inhaled, move the victim to a source of fresh air</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eyes</td>
<td>Immediately flush eyes with copious amounts of water for at least 15 minutes, preferably in an emergency eyewash</td>
</tr>
<tr>
<td>Skin</td>
<td>In the event of skin exposure, remove contaminated clothing and immediately wash the affected area with soap and copious amounts of water for 15 minutes</td>
</tr>
</tbody>
</table>

11/2010
How do I dispose of Ethidium Bromide and its alternatives?

The table below outlines proper disposal of different staining products used in the preparation of electrophoresis gels. Using the California definition of a hazardous waste, the legal disposal options are summarized for each product.

<table>
<thead>
<tr>
<th>Product Name</th>
<th>Percent Solution</th>
<th>Hazardous Waste?</th>
<th>Mutagen?</th>
<th>Safety compared to EtBr</th>
<th>Liquid Waste Disposal</th>
<th>Solid Waste Disposal (gels w/stain)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethidium Bromide</td>
<td>100%</td>
<td>Yes</td>
<td>Yes</td>
<td>N/A</td>
<td>Hazardous Waste via EH&amp;S</td>
<td>Hazardous Waste via EH&amp;S¹</td>
</tr>
<tr>
<td>Ethidium Bromide</td>
<td>&lt;0.15% (working solution)</td>
<td>No</td>
<td>Yes</td>
<td>N/A</td>
<td>Dispose as hazardous via EH&amp;S</td>
<td>Hazardous Waste via EH&amp;S¹</td>
</tr>
<tr>
<td>SybrSafe</td>
<td>Working Solution</td>
<td>No</td>
<td>Weakly Mutagenic</td>
<td>Safer</td>
<td>Drain</td>
<td>Trash</td>
</tr>
<tr>
<td>GelRed</td>
<td>Working Solution</td>
<td>No</td>
<td>No</td>
<td>Safer</td>
<td>Drain</td>
<td>Trash</td>
</tr>
<tr>
<td>GelGreen</td>
<td>Working Solution</td>
<td>No</td>
<td>No</td>
<td>Safer</td>
<td>Drain</td>
<td>Trash</td>
</tr>
<tr>
<td>EZVision</td>
<td>Working Solution</td>
<td>No</td>
<td>No</td>
<td>Safer</td>
<td>Drain</td>
<td>Trash</td>
</tr>
</tbody>
</table>

¹Working solutions of Ethidium Bromide, although not hazardous by the State definition, are restricted from drain disposal by campus policy. Because Ethidium Bromide is a mutagen, UCLA does not allow sink disposal of any waste containing Ethidium Bromide. Solutions of Ethidium bromide should be disposed as hazardous waste via EH&S.

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