Chemical Safety Practices Recommendations
Doxorubicin (Adriamycin)

Exposure Hazards (1, 2)

<table>
<thead>
<tr>
<th>Category 1B</th>
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<tbody>
<tr>
<td>Danger</td>
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<tr>
<td>Carcinogenicity</td>
<td>Mutagenicity</td>
<td>Toxicty</td>
</tr>
<tr>
<td>May Cause Cancer</td>
<td>May Cause Genetic Defects</td>
<td>Reproduction</td>
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<td></td>
<td></td>
<td>May Damage Fertility or the Unborn Child</td>
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<table>
<thead>
<tr>
<th>Category 4 Warning</th>
<th>Category 2 Warning</th>
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<tbody>
<tr>
<td>Toxic</td>
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<tr>
<td>Harmful If Swallowed</td>
<td>May Cause Damage to Heart Through Prolonged or Repeated Exposure</td>
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<td></td>
<td>Causes Serious Eye Irritation. Causes Skin Irritation.</td>
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Response to Exposure

<table>
<thead>
<tr>
<th>Oral</th>
<th>Dermal</th>
<th>Inhalation</th>
<th>Injection</th>
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<tbody>
<tr>
<td>Rinse mouth; do not induce vomiting. Report to OHS.</td>
<td>Wash skin with soap and water for 15 minutes. Rinse eyes for 15 minutes. Report to OHS.</td>
<td>Leave area; go to clean air. Report to OHS.</td>
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</tbody>
</table>

Special Precautions
- Pregnant women should be cautious when working with or around Doxorubicin. (3)
- Discard garments as hazardous if contaminated with Doxorubicin.

Personal Protective Equipment
- Gloves (Double glove) (Latex or Nitrile)
- Skin Protection (Suit or Scrubs or Lab Coat)
- Eye Protection (Safety-glasses or Goggles)
- Closed-toe shoes
- Use N100 respirator if engineering controls are not available.

Engineering Controls
- Doxorubicin powder- Chemical Fume Hood (CFH) (4)
- Doxorubicin solution- CFH or Biosafety Cabinet (Class II, B2 BSC if aerosolized) Animal waste and bedding until 7 day after last treatment- CFH or Class II, B2 BSC (5)

Animal Handling
- Avoid exposure to animal urine until 7 day after last treatment.

Bedding Disposal
- Dispose of bedding as hazardous material until 7 day after last treatment.

Work Practices
- Empty Doxorubicin containers and unused Doxorubicin must be disposed of as hazardous. Follow LASP SOP 4.003F

References:

Questions or concerns: Please contact EHS, Ted Witte, theodore.witte@nih.gov or 301-846-5860
Reviewed 03/03/2015 These recommendations are not final and may be updated.
Doxorubicin is an antineoplastic drug produced by hydroxylation of Daunorubicin, a compound naturally synthesized by the soil bacteria Streptomyces peucetius. Daunorubicin and its derivatives intercalate with DNA and block the action of the enzyme Topoisomerase II, inducing DNA strand breaks and interrupting DNA replication.

Doxorubicin is mutagenic and genotoxic. The most serious toxicity associated with Doxorubicin is cardiomyopathy, caused by the tendency of Doxorubicin to accumulate in the membranes of the mitochondria. Doxorubicin is also potentially a hazard to the developing fetus though it does not efficiently pass the placenta.

Doxorubicin is excreted primarily in the feces but also in the urine. Due to enterohepatic recirculation the drug excretion continues for several days. At this time there is insufficient information to determine the point at which excretion becomes negligible in rodents. Therefore the 7 day guideline is based on human clinical practice. As a general rule, substances are cleared from the bodies of rats and mice more rapidly than from human patients. This recommendation will be updated as information becomes available.

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