

**Arizona State University**  
**Institutional Animal Care and Use Committee**  
**STANDARD INSTITUTIONAL GUIDELINE**

**EUTHANASIA**

The IACUC's policy on methods of euthanasia considers the recommendations of the American Veterinary Medical Association (AVMA) Guidelines for the Euthanasia of Animals: 2020 Edition (<https://www.avma.org/sites/default/files/2020-01/2020-Euthanasia-Final-1-17-20.pdf>), as well as methods provided in the primary literature and guidelines developed by other professional societies (see <https://researchintegrity.asu.edu/animals/procedures-library-and-guidelines> for key guidelines). Alternative means of euthanasia may also be permitted if sufficiently justified and approved in an IACUC protocol. However, the Public Health Service (PHS) requires contract proposals to be consistent with the AVMA Guidelines, and therefore all National Institutes of Health (NIH) and National Science Foundation (NSF) grant proposals must conform with these guidelines independent of whether alternative methods have been approved by the ASU IACUC.

The recommended method of euthanasia is by chemical means, which then **MUST** be followed by a secondary physical method to ensure death. The use of a physical method (e.g., decapitation, pithing, cervical dislocation, thoracotomy) as the primary means of euthanasia is permissible **only** by skilled individuals, when scientifically or clinically justified, and after other acceptable methods have been excluded. When permissible, physical methods should be used in anesthetized or unconscious animals. The following euthanasia methods are routinely accepted for the species indicated. Other methods of euthanasia should be discussed with an ASU veterinarian prior to being included in a protocol.

**1. Rodents**

- Commercial euthanasia solution (sodium pentobarbital 390 mg/ml + sodium phenytoin 50 mg/ml) (e.g. Beuthanasia<sup>®</sup>, Euthasol<sup>®</sup>) (100-150 mg/kg based on the pentobarbital component, IP)
- Inhalant anesthesia overdose (5%, inhalation)
- Carbon dioxide (100%, chamber flow at 30-70% air change/minute)
  - o Note that mouse, rat, and hamster neonates up to 10 days of age are resistant to CO<sub>2</sub> hypoxia and prolonged exposure (up to 50 minutes) may be necessary. Therefore, it is critical to ensure that CO<sub>2</sub>-exposed pups are nonresponsive to painful stimuli, and then a secondary method of euthanasia (e.g., cervical dislocation, decapitation) must be performed.
- Exsanguination or harvesting of vital organs while under anesthesia
- Perfusion under deep anesthesia

**2. Rabbits**

- Commercial euthanasia solution (sodium pentobarbital 390 mg/ml + sodium phenytoin 50 mg/ml) (e.g. Beuthanasia<sup>®</sup>, Euthasol<sup>®</sup>) (100-150 mg/kg based on the pentobarbital component, IP or IV); Prior sedation or anesthesia is preferred (see Anesthesia SIG for recommendations)
- Exsanguination (or harvesting of vital organs) while under anesthesia
- Perfusion under deep anesthesia

### **3. Dogs**

- Commercial euthanasia solution (sodium pentobarbital 390 mg/ml + sodium phenytoin 50 mg/ml) (e.g. Beuthanasia<sup>®</sup>, Euthasol<sup>®</sup>) (86-120 mg/kg based on the pentobarbital component, IV). Prior sedation or anesthesia is preferred (consult DACT veterinarians for recommendations)
- Perfusion under deep anesthesia

### **4. Cats**

- Commercial euthanasia solution (sodium pentobarbital 390 mg/ml + sodium phenytoin 50 mg/ml) (e.g. Beuthanasia<sup>®</sup>, Euthasol<sup>®</sup>) (86-120 mg/kg based on the pentobarbital component, IV). Prior sedation or anesthesia is preferred (consult DACT veterinarians for recommendations)
- Perfusion under deep anesthesia

### **5. Swine**

- Commercial euthanasia solution (sodium pentobarbital 390 mg/ml + sodium phenytoin 50 mg/ml) (e.g. Beuthanasia<sup>®</sup>, Euthasol<sup>®</sup>) (86-120 mg/kg based on the pentobarbital component, IV). Prior sedation or anesthesia is preferred (consult DACT veterinarians for recommendations)
- Exsanguination or harvesting of vital organs while under anesthesia
- Perfusion under deep anesthesia

### **6. Non-human primates**

- Sedation or anesthesia (See Anesthesia SIG or consult DACT veterinarians for recommendations) followed by commercial euthanasia solution (sodium pentobarbital 390 mg/ml + sodium phenytoin 50 mg/ml) (e.g. Beuthanasia<sup>®</sup>, Euthasol<sup>®</sup>) (86-120 mg/kg based on the pentobarbital component, IV; intracardiac or IP routes acceptable if unconscious/anesthetized)
- Perfusion under deep anesthesia

### **7. Birds**

- Commercial euthanasia solution (sodium pentobarbital 390 mg/ml + sodium phenytoin 50 mg/ml) (e.g. Beuthanasia<sup>®</sup>, Euthasol<sup>®</sup>) (100-150 mg/kg based on the pentobarbital component, IV; intracoelomic administration acceptable if unconscious/anesthetized; see Anesthesia SIG or consult DACT veterinarians for recommendations)
- Inhalant anesthesia overdose (5%, inhalation)
- Exsanguination or harvesting of vital organs while under anesthesia

### **8. Reptiles**

- Commercial euthanasia solution (sodium pentobarbital 390 mg/ml + sodium phenytoin 50 mg/ml) (e.g. Beuthanasia<sup>®</sup>, Euthasol<sup>®</sup>) (100-150 mg/kg based on the pentobarbital component, intracoelomically; intracardiac if anesthetized/unconscious or other routes not possible)
- Buffered tricaine methanesulfonate (MS-222, 1% solution) overdose (250-500 mg/kg, intracoelomically)
- Harvesting of vital organs while under anesthesia
- Perfusion under deep anesthesia

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## 9. Amphibians

- Commercial euthanasia solution (sodium pentobarbital 390 mg/ml + sodium phenytoin 50 mg/ml) (e.g. Beuthanasia®, Euthasol®) (100-150 mg/kg based on the pentobarbital component, intracoelomically; intracardiac if anesthetized/unconscious or other routes not possible)
- Buffered tricaine methanesulfonate (MS-222) overdose (5-10 g/L water, immersion for up to 1 hr may be required)
- Buffered benzocaine overdose (250-500 mg/L water, immersion)
- Harvesting of vital organs while under anesthesia
- Perfusion under deep anesthesia

## 10. Fish

- Buffered tricaine methanesulfonate (MS-222) overdose (250-500 mg/L water, immersion)
- Buffered benzocaine overdose (250-500 mg/L water, immersion)
- Commercial euthanasia solution (sodium pentobarbital 390 mg + sodium phenytoin 50 mg/ml) (e.g. Beuthanasia®, Euthasol®) (100-150 mg/kg based on the pentobarbital component, intracoelomically)
- Harvesting of vital organs while under anesthesia