

Summary of the AVMA Guidelines for the Euthanasia of Animals: 2020 Edition

AVMA 2020 Euthanasia Guidelines: Common Laboratory Animals

Species	Acceptable	Acceptable with conditions
Rodents (e.g. Mice, Rats, Guinea Pigs)	Injectable barbiturates, IP barbiturates with local anaesthetic, dissociative agent combinations	Inhaled anaesthetics, CO ₂ (30 to 70% flow rate of chamber or cage volume/min), CO, tribromoethanol (followed by a secondary method), ethanol (adult mice), cervical dislocation, decapitation, focused beam microwave irradiation
Rabbits	IV barbiturates, IP barbiturates with local anaesthetic	Inhaled anaesthetics, CO ₂ (50 to 60% flow rate of chamber or cage volume/min), cervical dislocation, PCB, NPCB
Sheep	IV barbiturates	Gunshot, PCB (followed by exsanguination)
Pigs	IV barbiturates	CO ₂ , CO, NO, N ₂ , Ar, gunshot, electrocution, PCB, NPCB (piglets), manually applied blunt force trauma
Zebrafish	Adults - Rapid chilling (10 minutes), 30 minute immersion in buffered MS 222 4 to 14 day old fry – Rapid chilling (30 minutes) < 3 day old embryos – immersion in diluted sodium or calcium hypochlorite solution	Immersion in CO ₂ saturated water, maceration, decapitation, blunt force trauma followed by pithing or exsanguination
Mammalian Neonates	IP barbiturates	Hypoxia (if in utero and early term pregnancy), IO barbiturates (under anaesthesia)

AVMA 2020 Euthanasia Guidelines: Wildlife

Species	Acceptable	Acceptable with conditions
Rodents (e.g. Mice, Rats, Guinea Pigs)	Injectable barbiturates, IP barbiturates with local anaesthetic, dissociative agent combinations	Inhaled anaesthetics, CO ₂ (30 to 70% flow rate of chamber or cage volume/min), CO, tribromoethanol, ethanol (adult mice), cervical dislocation, decapitation, focused beam microwave irradiation
Rabbits	IV barbiturates, IP barbiturates with local anaesthetic	Inhaled anaesthetics, CO ₂ (50 to 60% flow rate of chamber or cage volume/min), cervical dislocation, PCB, NPCB
Sheep and Goats	IV barbiturates	Gunshot, PCB (followed by exsanguination), NPCB (goat kids only – followed by exsanguination), CO ₂ (goat kids only)
Horses and Cattle	IV barbiturates	PCB, gunshot
Pigs	IV barbiturates	CO ₂ , CO, NO, N ₂ , Ar, gunshot, electrocution, PCB, NPCB (piglets), manually applied blunt force trauma
Cats and Dogs	IV barbiturates, injectable anaesthetic overdose	Barbiturates (alternate routes of administration), inhaled anaesthetics, CO*, CO ₂ *, gunshot*, PCB (dogs)*
Avian	IV barbiturates	Inhaled anaesthetics, CO ₂ , CO, N ₂ , Ar, cervical dislocation (small birds and poultry), decapitation (small birds), gunshot (free-ranging birds)
Reptiles	Injectable barbiturates/MS 222, injectable anaesthetic agents with an adjunctive method	Inhaled anaesthetics (some species), CO ₂ (some species), PCB or firearm, manually applied blunt force trauma, rapid freezing for animals < 4 g, spinal cord severance/destruction of brain (crocodilians)

Fish	Immersion in buffered benzocaine or benzocaine hydrochloride, isoflurane, sevoflurane, quinaldine sulfate, buffered MS 222, 2-phenoxyethanol or ethanol, injectable pentobarbital, rapid chilling (small tropical or sub-tropical fish)	Eugenol, isoeugenol, clove oil, CO ₂ -saturated water, decapitation/cervical transection/manually applied blunt force trauma followed by pithing or exsanguination, maceration (research setting), PCB (large fish), NPCB (large fish)
Other Free Ranging Wildlife	Injectable barbiturates, injectable anaesthetic overdose	Inhaled anaesthetics, CO [*] , CO ₂ [*] , gunshot [*]
Mammalian Neonates	IP barbiturates	Hypoxia (if in utero and early term pregnancy), IO barbiturates (under anaesthesia)

****Not recommended for routine use***

IV – intravenous, IP- intraperitoneal, IO – interosseus, PCB – penetrating captive bolt, NPCB - non-penetrating captive bolt

References:

- American Veterinary Medical Association 2020, *AVMA Guidelines for the Euthanasia of Animals: 2020 Edition*, AVMA, Illinois