

HELLBENDER ANESTHESIA

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Anesthetic protocol for hellbender procedures which are 20-30 minutes long with water temperatures that are >65°F (16.5°C)

Supplies:

Ms222
Huck towel
Plastic bin
NaHCO₂ (Baking soda)
pH pen with thermometer
60 ml syringe
Gram scale

To avoid *Batrachochytrium dendrobatidis* (chytrid) contaminations have different containers clearly marked for positive and negative chytrid. Clean container after procedure in a 1% bleach solution.

Anesthesia:

- The anesthetic solution should be made with water from the animals' enclosure to minimize stress associated with changes in water quality.
- Measure out 0.3g MS222 and mix into 1 liter of the animals water (this equates to 300ppm)
- Mix 1 gram of baking powder into treated water to buffer the acidic solution.
- Test the pH of the water. The goal is to have a physiological range between pH 7.0-7.4.
- Place animal into the basin and judge anesthetic depth by loss of righting reflex. Induction should take around 10 minutes. *(Tell your doctor to be patient and do not add more MS222 for your animals recovery time will be extended!!)*
- Once the hellbender does not resist being positioned on its back, remove the animal from the anesthetic water and place in dorsal recumbency on a wet towel. This allows monitoring of heart, normal heart rate under anesthesia is 30-40 beats per minute.
- A light stage of anesthesia is judged by loss of righting. At this stage of anesthesia the animal retains the withdrawal reflex, spontaneous movement, gular respiration and the cardiac pulse. Deep plane of anesthesia is the stage when only the cardiac pulse is present.
- To maintain a surgical level of anesthesia, a solution of MS222 at 100ppm, buffered with 1 gram of sodium bicarbonate is applied to the body surface. Midway through the procedure the anesthetic solution is changed to the water from the animal's enclosure to reverse the MS222 affects.
- Once the procedure is complete place animal into a container with fresh water. Place a hand under abdomen and slowly rock back and forth; be careful not to disrupt the animals slime coat.
- Hellbenders have highly vascular integument and the lateral folds are richly supplied with capillaries; rocking back and forth stimulates water flow past the folds keeps the animal well oxygenated and provides a smooth recovery.
- Animal should recover from anesthesia in 30 minutes.

Variables in our anesthetic protocol consist of water temperature, weight and overall health of animal. In water temperature <65°F (16.5°C) use a 250ppm concentration and bathe with a 100ppm solution. Anesthetic levels are reached in 20-30 minutes and recovery time is 30 minutes to an hour. BE PATIENT!! Colder water conditions equals slower metabolism! Invasive surgical procedures use a 250ppm induction and bath with 500ppm solution.

	100ppm	200ppm	250ppm	300ppm
MS222grams/Liter	0.1g	0.2g	0.25	0.3g

$$^{\circ}\text{C to }^{\circ}\text{F } (^{\circ}\text{C} \times 1.8) + 32$$

$$^{\circ}\text{F to }^{\circ}\text{C } (^{\circ}\text{F}-32) \times 0.5$$

