

## **Comparing the use of three different anesthetics on the freshwater snail *Radix balthica***

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An effective method for anesthesia is important to reduce discomfort for research organisms and is often unavoidable for experiments such as in vivo imaging, as they require the subject to be still during image acquisition. Additionally, some experiments have a timeline that requires the snails to stay alive during and after the procedure. Criteria such as affordability, easy to acquire and low health impact should also be considered, narrowing down the already small list of known gastropods anesthetics. We examined for the first time the effects of Listerine (commercial mouthwash with 5% ethanol and 10% ethanol/menthol), clove oil and menthol crystals as anesthetics on the freshwater snail *Radix balthica*. Three replicates of three individuals each were put into three different concentrations of each agent. Anesthesia was assessed by gently scraping the foot of the animal with a paintbrush to test its reaction. Time to recovery was recorded until the moment they would react again to the strokes. We recorded the time to full recovery from the reaction to the brush until they were out of their shell and in motion. Our results demonstrate that the Listerine had the shortest time to anesthesia and the longest time to recovery between the different anesthetics. Its also a very cheap, easy, and nonhazardous solution to use. Although the results were slightly worse for the menthol crystals and the clove oil, they successfully anesthetize the snails and could still be interesting solutions to investigate.