

Water Maze
IACUC Standard Procedure
Effective Date: October 2021

Description of procedure:

The mouse is placed in tepid water temperature (20-25°C) which has been made opaque by the addition of non-toxic paint. The mice are trained to locate a hidden escape platform just below the surface of the water, and allowed to search for up to 60-90 seconds or until they have located the platform. If they do not find the platform within the trial time limit, they are guided to the hidden platform, allowed to rest, then removed from the tank. The latency, distance and/or swim speed in which they locate the platform are recorded. The animal must learn the spatial location of the platform relative to visual cues located within or outside of the maze and the testing room; this learning is referred to as spatial place learning. The mice can be gently dried with towels to remove excess water after removal from the pool. In addition, they can also be placed on a heating pad or under a heat lamp to prevent adverse hypothermic responses from extending swim times. The mice are tested on anywhere from 1-8 trials per day and from up to 3-14 days depending on the protocol design and learning performance. The advantages of this task include the lack of a need for the traditional motivational constraints of shock or food deprivation, and the rapid acquisition of the task (typically 20-35 trials). This task is particularly sensitive to manipulations of the hippocampus, which is critically important for spatial learning and memory in animals. The mice are closely monitored while in the water such that they do not suffer significant adverse effects from this swimming test. During the course of testing, animals are monitored daily and their weights are recorded weekly. Mice that display difficulty swimming or excessive weight loss will be removed from the experiment.

Supplies:

- Water maze
- Non-toxic white tempera paint
- Timer
- Towels
- Heating device (pad or lamp)
- Thermometer

Procedure Steps:

1. The mouse is placed in water of a tepid temperature (20-25°C), which has been made opaque with the addition of non-toxic, white tempera paint.
2. The mice are trained to locate a platform just below the surface of the water (1-2 cm), and are allowed 60-90 seconds to locate the platform. If they do not find the platform within the 60-90 second trial limit, they are guided to it, allowed to rest for 10-20 seconds and then removed from the tank and monitored for effects of hypothermia that can be counteracted with a heat source. Extreme caution must be taken to prevent hyperthermia by placing only half of the housing cage on or under the heat source so the animal can

choose to avoid excessive heat. Do not put the animals directly on top of a heating pad or too close to a heat lamp source.

3. Because mice are proficient but not superior swimmers and they must be constantly monitored while in the water such that they do not suffer significant adverse effects from this test. Due to the possibility of hypothermic reactions, the spacing between repeated trials within the same day should include a 10-15 min interval in order to allow them enough time to regain normal body temperature.
4. The latency, distance and/or swim speed utilized to locate the platform are recorded. The animal must learn the location of the platform relative to visual spatial cues located within the maze and/or the testing room; this learning is referred to as spatial place learning.