Location: Queen's University

Responsibility: Principal Investigators (PI), Research Staff, Veterinary Staff

Purpose: The purpose of this Standard Operating Procedure (SOP) is to describe the proper set up and use of the Morris Water Maze for rats.

1. **Introduction and Definitions:** The Morris Water Maze (MWM) test measures spatial learning and memory. The MWM task involves placing the rodent in a pool of water where it must use visual cues to remember the location of a hidden platform just below the water's surface. When released, the subject swims around the pool in search of an exit while various parameters are recorded. Escape from the water reinforces a desire to quickly find the platform, and on subsequent trials (with the platform in the same position) subjects are able to locate the platform increasingly rapidly.

2. **Materials:**
   - Water Tank
   - Platform*
   - Thermometer
   - Water at experimental temperature
   - White Tempera paint
   - Towels
   - Paper towels
   - Empty cage with lid
   - Heat lamp
   - Stop watch
   - Visual cues on walls of room
   - Small mesh net/sieve
   - Disinfectant

   Size of platform can vary depending on task – diameter and shape. Surface of platform should be textured so the animal can maintain a secure grip, and close enough to the water surface so the majority of the animal's body is out of the water when on top of the platform.

3. **Procedures:**
   Pool Preparation:
   - Fill tank with tap water (22C +/- 1˚C; monitor with thermometer and adjust temperature as necessary) to a depth of about 40 cm (measured from the base of the tank).
   - Add 500 ml of non-toxic, white paint (Tempera) to the water during filling.
   - Stir paint/water as necessary to ensure that the water is opaque.

- Place platform in the pool away from the pool wall (this will ensure there is no escape from the tank).
- The water level should be approximately 2 cm above the escape platform.

Testing of Rodents:
- Bring rats into the water maze room in their home cage and leave for 5-10 minutes to acclimatize to the test environment.
- Take rat from its cage and gently place in the water facing the pool wall and allow to swim for a maximum of 60 seconds or until it can find and climb onto the platform.
- Once the rat climbs onto the platform, allow it to remain there for 15 seconds.
- If the rat fails to find the platform in 60 seconds, manually guided it to the platform and allow it to stay there for 15 seconds.
- The next trial begins after this 15 second period by placing the rat back into the water.
- Each rat is given four consecutive trials. Each trial has one of four start positions, one from each of the four cardinal compass points, pseudo randomly assigned and used.
- After completion of the last trial, remove rat from the escape platform and towel dry. Place in an empty cage on dry paper towels.
- Allow the rats to dry off under a heat lamp (mounted ~30 cm above cage) for 15 minutes before placing back in their home cage. The heat lamp should be positioned over half of the cage only, to allow the rat to move in and out of the heat has needed. Return the rat to the colony room.
- Between rats, use a sieve or small mesh net to scoop out any fecal pellets that may be floating.

Regular Pool Maintenance:
- Once a week drain all water from the pool, using the valve at bottom of pool. Full water changes may be required more often when in regular use.
- Spray pool walls and floor with a disinfectant. Brush down with a scrub brush and then rinse with water.
- Fill pool as per Pool Preparation above.

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