

Forced Swim Test in Mice
IACUC Standard Procedure
Effective Date: January 2025

Description of Procedure:

The Forced Swim Test is a mouse behavioral test used to evaluate “depressive-like” states and behavioral despair. This test was first developed in 1977 by Porsolt to test anti-depressant efficacy of new compounds. Animals undergoing this test must be placed in **Category E**. This standard procedure is limited to mice because rats can swim longer than mice, making rats a less desirable choice for this assay.

Procedure Steps:

In this test, animals are placed in a cylinder tank or other IACUC approved container that is partially filled with water from which escape is impossible. The time spent immobile or floating is recorded, which does not include any amount of time spent swimming or attempting to climb the walls. The immobility time is considered a measure of behavioral despair or learned helplessness. It is important to consider sex differences when planning experiments and analyzing data, as it has been reported that sex can affect swimming and immobility times. (Bogdanova et. al. Physiol Behav. 2013 Jun 13; 118: 227–239; Can et al. J Vis Exp. 2012; (59): 3638)

Testing is performed under normal light conditions and animals are given a minimum of 60 minutes to acclimate to the test room before initiating the test. If sudden loud noises could startle the animals (depending on the specific laboratory environment), the use of a white noise generator is recommended. The Plexiglas container is filled 2/3 of the way with water, which is warmed and maintained at 24°C +/- 1°C/ 75°F +/- 2°. Check the water temperature with a thermometer. Water can be colored with non-toxic agents. Temperature is tested before each test with an infra-red or glass thermometer.

Hold the animal by its tail while supporting the rest of the body with the other hand, and gently and slowly place in the water. Once the mouse is in the water, slowly release the tail to begin an 8-minute maximum testing session. Generally, the first 2 minutes are not included in the analysis as nearly all mice will swim continuously while trying to escape in the first 2 minutes. The mice are closely observed throughout the test and immediately removed if in danger of drowning or if they are unable to keep their head above water (this is a very rare occurrence when using only an 8-minute duration test).

After completion, mice are removed from the tank. The animal will be gently dried off and will be placed in a dry and clean cage with heat support (for example, with half of the cage bottom placed on a heating pad) and monitored until normal behavior is exhibited (e.g., grooming, active, moving around in cage, etc.) Extreme caution must be taken during heating 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. Mice are expected to be active and begin grooming themselves to remove excess water.

Water should be replaced between every 10 animals or more frequently if water is visibly soiled.

Protocol requirements:

Section J. Adverse effects: Describe how you will monitor and manage potential exhaustion, drowning, hypothermia.

RIO Documents Section:

Email a completed "[LARC Behavioral Equipment Sanitation SOP](#)" form to LARC (ORRodentNurses@ucsf.edu) for review and to request ATP testing. Once sanitation procedure is approved, upload the completed form to Documents section of RIO protocol and post the form in the procedure room.

References:

Can A, Dao DT, Arad M, Terrillion CE, Piantadosi SC, Gould TD. The mouse forced swim test. J Vis Exp. 2012;(59):e3638. Published 2012 Jan 29. doi:10.3791/3638

Yankelevitch-Yahav R, Franko M, Huly A, Doron R. The forced swim test as a model of depressive-like behavior. J Vis Exp. 2015;(97):52587. Published 2015 Mar 2. doi:10.3791/52587