Hot/Cold Plate 冷熱痛覺測試

1. Purpose

1.1 This test is used to measure the thermal nociception of mice. The tested mouse is put on the surface of a metal plate which provides heat or cold stimulation. The degree of nociceptive threshold can be measured via the withdrawal latency when the tested mouse shows sign of lifting or licking hind paws or jumping. This service is applicable to the research of analgesia, anesthesia, thermal nociception and hyperalgesia.

2. Scope

2.1 Individuals who have been trained, and are competent in performing the procedures described herein must follow this procedure.

2.2 Any queries, comments or suggestions, either relating to this SOP in general or to a specific problem encountered during a procedure, should be addressed to the Neuroscience Project Leader.

2.3 Any deviances from this protocol must be reported to the Behavioural Neuroscience Project Leader.

3. Safety Requirements

3.1 General laboratory procedures should be followed, which include: no eating, no chewing gum, no drinking, and no applying of cosmetics in the work area. Laboratory coats and gloves must be worn at all times in the work area, unless the protocol specifically describes the appropriate attire for the procedure.

4. Notes

4.1 The validity of results obtained from behavioural phenotyping is largely dependent on methods of animal husbandry. It is important that individuals following this procedure are experienced and aware of the animal's welfare, and be familiar with the animal being tested, in order to reduce the anxiety levels of the animal prior to testing.

4.2 The majority of mouse behavioural studies are age/sex/strain dependent. It is important to keep these parameters comparable throughout a single experiment.

4.3 Environmental factors may contribute to the levels of mouse anxiety. The temperature, humidity, ventilation, noise intensity and light intensity must be maintained at levels appropriate for mice. It is essential that the mice be kept in a uniform environment before and after testing to avoid anomalous results being obtained.

4.4 It is recommended that all phenotyping experimentation is conducted at approximately the same time of day because physiological and biochemical parameters change throughout the day.

4.5 Heat intensity should be adjustable to produce stable baseline latencies from which hypo- or hyperalgesia responses can be determined. A cut-off time is set to prevent tissue damage.

5. Equipment

5.1 Commercially available hot/cold plate apparatus (35100 Hot/Cold Plate, Ugo Basile, Italy).

6. Supplies

6.1 Pens
6.2 Marker pen
6.3 Datasheet
6.4 Gloves
6.5 Paper mask
6.6 Ethanol 70%
6.7 Hand towels
6.8 Absorbent bench top
6.9 Acrylic protection casing
6.10 Detergent (Windex)
6.11 Hot/Cold Perspex Restrainer
6.12 Pedal Switch

7. Procedures

7.1 Transport mice to the testing room in their home cages. Allow 15 minutes for the mice to acclimatise.
7.2 Switch on the hot plate apparatus to heat up the surface of the hot plate to a constant temperature of 55±0.2℃.
7.3 Mice are placed on the hot plate (dia. 20cm), which is surrounded by a clear acrylic protection casing (25 cm tall, open top)
7.4 Immediately press the Start/Stop button on timer and machine to start timing.
7.5
(1) Press the Start/Stop button on timer again to measure the latency for the first sign of pain.
(2) When the tested mouse shows a hind paw licking, flicking, or jumping, press the Start/Stop button on machine again. The mouse is immediately removed from the hot plate and returned to its home cage. The latency time is displayed on the control unit screen.
7.6 If a mouse does not respond within 30 seconds, the test is terminated and the mouse is removed from the hot plate.
7.7 Ensure that the mouse has not any tissue damage before returning to its home cage.
7.8 Wipe clean the apparatus with detergent (Windex) before testing another mouse. Re-heat the hot plate and wait temperature to the setting unit. Then start next test.
7.9 After testing the last mouse, wipe clean the apparatus with detergent then with 70% ethanol.