

Mouse Behavior and Appearance

- Supplies:
- 20 kHz IHR Clickbox to assess hearing (manufactured by The MRC Institute of Hearing Research, Nottingham, UK)
 - viewing box (an empty clear-sided, small mouse cage with grid-style top)
 - 50 ml Falcon tube
 - halogen penlite
 - ruler
 - timer stopwatch
 - The Acculab Pocket-Pro® Series balance
 - plastic container
 - pole

General Information:

The general well-being of a mouse is examined by a skilled, experienced technician. The mouse's eyes, ears, integument, and musculoskeletal, circulatory, respiratory, digestive, urogenital and nervous systems are observed for abnormalities or conditions different from the normal population. The mouse's general condition, gait and posture, mental attitude, righting reflex, vision and hearing are also assessed. Weight and body length are measured and recorded.

Procedures:

For the following observations, the mouse is restrained by grasping the excess skin at the base of the neck with the thumb and forefinger and holding it taut. The technician is then able to rotate the mouse as required to make whole-animal observations. The mouse's tail can be held under the pinky finger in order to immobilize the hind end of the mouse.

The **eyes** are checked first for any signs of abnormalities. These abnormalities include size difference, discharge or the appearance of cataracts. Next lights in the hood are turned off for a few seconds causing pupil dilations. Pupillary light reflex and shape of the pupils are then examined by halogen illumination of the eyes.

The mouse's **ears** are then checked for size, appearance and the presence of discharge. The colour and consistency of any discharge is noted.

The mouse's **integument** is assessed next. Specifically, the mouse's hair coat (dry, oily, dirty, alopecia, piloerection, discoloration) skin (lesions, redness, dryness), whiskers (length, appearance), and nails/pads (discoloration, overgrowth, lesions, dryness) are inspected.

The **musculoskeletal system** is examined by checking for lumps or bumps, any swelling of the limbs as well as the general muscle tone. The size and shape of the head and the shape and length of the tail are assessed. The mouse's toes are also examined for any abnormalities.

An external assessment of the **circulatory system** is made by observing the colour of the mucous membranes and the capillary refill time. A mouse's mucous membranes are normally pink and well hydrated. Any deviations in colour are noted. The mouse's capillary refill time is determined by gently pinching a toe and observing how long it takes for blood to flow back into the capillaries. A normal capillary refill time is less than two seconds.

The mouse's **respiratory system** is assessed by examining the nostrils for any discharge or malformations and by observing the mouse's respiratory pattern (rate, depth and rhythm).

The **digestive system** is checked by examining the mouth (abnormal growths, drooling, jaw malformation), teeth (number, size, colour, malocclusion) and perianal region (prolapsed rectum).

The **urogenital system** is examined by looking for any signs of urine dribbling, discharge or abnormal growths.

The **nervous system** is assessed by observing the mouse's response to a painful stimulus (tail pinch), by its ability to support its hind end and by the occurrence of seizures.

Finally, body length is measured from the tip of the nose to the base of the tail.

At the conclusion of the above screens, the mouse is released from the technician's grasp, and weight is measured and recorded by placing a mouse into the plastic container and onto the balance.

The next step in the behavior and appearance screen is to examine the mouse's **righting reflex**. Motor coordination and balance is then measured by placing the mouse in the center of a metal pole, which is held in a horizontal position. The pole is then gradually lifted to a vertical position. Normal mice will not fall off the pole and will walk up or down the length of the pole. The mouse is placed in an uncapped 50 ml Falcon tube that has had air holes drilled into the closed end. The tube is then turned sideways. A normal mouse responds to the turning by moving in the opposite direction. Next, the mouse is grasped by the tail and carefully flipped over. Its ability to land on its feet is noted.

The final step in the behavior and appearance screen involves a 3 minute observation by the technician of the mouse in a viewing box. The mouse is given several minutes to adjust to the new environment before any observations are made. The mouse's **mental attitude, general condition, and gait and posture** are observed. A click test is then performed to assess the mouse's **hearing**. A 20 kHz Clickbox is placed 20 cm above the mouse and a clicking sound is produced. The normal response to the click test is for the mouse to flick its ears backwards. The mouse's **vision** is then assessed by performing the menace response test. The fast movement of a finger towards a mouse normally elicits an immediate reaction from the mouse. In addition, the mouse is held a few centimeters above a grid (a wire mouse cage top) and should extend its front limbs in an attempt to grasp the grid. This response is known as visual placing. Finally, any **feces** produced by the mouse during the behavior and appearance screen are examined for color and consistency, and urine is examined for its colour.

Reported Result:

For each mouse analyzed, a summarized Behavior and Appearance Results Report is generated.

Acknowledgements:

The CMHD requests that the users of our screening service acknowledge the technical assistance of our facility in any presentations or publications that report results generated by our services. A suitable acknowledgement for publications is as follows: "The authors would like to acknowledge the Samuel Lunenfeld Research Institute's CMHD Mouse Physiology Facility for their technical screening services (www.cmhd.ca)."

Additionally, please send reprints or information on such publications or presentations when they are submitted or available. Such acknowledgements will help promote the use of our service and assist us in obtaining continued financial support to help defray service fees.