

Neurological Exam
IACUC Standard Procedure
Effective Date: June 2024



Description of procedure:

The neurological exam assesses basic sensory and motor functions in a mouse or rat.

Procedure Steps:

1. Assessment of General Health: Each animal is weighed to ensure its body weight is appropriate for its age and strain. The animal is also inspected visually for any physical abnormalities including wounds, skin lesions, bite marks, and poor grooming.
2. Activity Level: The animal is observed in a novel cage for 5 minutes. Every 10 seconds, an observer notes the behavior the animal is currently engaged in (i.e. locomotion, sniffing, freezing, rearing, grooming, etc.). This test should reveal major abnormalities in activity level as well as the occurrence of unusual behaviors or stereotypies (i.e. circling, biting, head-weaving, repetitive movements, etc.).
3. Righting Reflex: When the animal is placed on its back, it should immediately right themselves to an upright position on all four paws (principally labyrinthine and body righting mechanisms).
4. Crossed Extensor Reflex: Pinching the paw of one hind limb causes the flexion of the stimulated limb, while the opposite hind limb is extended (reflex mediated at the spinal level).
5. Forelimb and Hindlimb Placing Responses: Contact of the dorsum of the paw against the edge of an object causes the paw to be raised and placed on the surface of that object when the animal is suspended and no other paw is in contact with a solid surface. Mice should be suspended by the base of the tail. Rats should be held vertically with a firm but gentle grasp around the torso.
6. Grasp Reflex: When the forepaw or hindpaw is stroked with a blunt instrument, it is flexed to grasp the instrument.
7. Postural Reflex: The animal is placed on the floor of a clean cage. Experimenter gently lifts the cage, then, suddenly lowers it 3-6 inches. Normal response for the animal is to splay all four limbs outward to maintain balance and upright posture.
8. Rooting Reflex: Bilateral stimulation of the face region causes the animal to crawl forward, pushing its head in a rooting fashion (mediated by the 5th sensory cranial nerve).
9. Placing Response: When the animal is suspended by the base of the tail and lowered so that the vibrissae make contact with a solid object (e.g., a bar or tabletop), the head raises and the forelimbs are extended to grasp the object.
10. Vibrissae Orientation: When the vibrissae are lightly touched with a swab, the head turns to orient toward the stimulus.
11. Visual Placing Response: When the animal is suspended by the base of the tail and lowered toward a solid object, it raises its head and extends its forelimbs toward the object.
12. Eyeblink Response: When a soft cotton swab is moved toward the open eye, the animal should blink before the swab touches the mouse.
13. Negative Geotaxis: When the animal is placed on a 45-degree slope with its head pointing down the incline, it turns around and crawls up the slope.
14. Acoustic Startle Response: A loud sharp noise (bell or Galants whistle) causes an immediate startle response, seen either as a sudden extension of the head, forelimbs and hindlimbs followed by withdrawal into a crouching position, or a flight response.

References:

1. Nguyen AT, Armstrong EA, Yager JY. Neurodevelopmental Reflex Testing in Neonatal Rat Pups. J Vis Exp. 2017 Apr 24;(122):55261. doi: 10.3791/55261. PMID: 28518104; PMCID: PMC5565095.