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🌐 Behavioral tests in rodents coupled with dopamine signaling manipulations

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Protocol status: Working
We use this protocol and it's working

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Abstract

These two protocols describe behavioral tests associated with Parkinson's disease phenotypes in mice. The striatal motor learning protocol (rotarod test) is a two-phase paradigm assessing striatal motor learning under reversible dopamine antagonism.
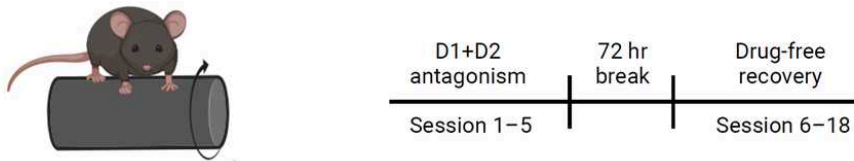
Materials

Figure 1: Schematic of the rotarod training paradigm including reversal dopamine receptors antagonism.

Troubleshooting

Rotarod test

1   General Rota-rod test is performed as follows:

1.1   The rotarod apparatus (Panlab LE8205, Harvard Apparatus) equipped with a mouse rod (3 cm diameter)

1.2   Set the rotarod with a start speed of 4 rpm, and set to 4–40 rpm acceleration over 300s

1.3   Hold the mouse by tail. Place the mouse on the rod and face away from the direction of rotation.

1.4   Start acceleration and record the time for each mouse to fall.

1.5   Perform five trials with intertrial-interval = 15 s, max trial duration = 300 s (one daily session)

1.6   Calculate the average time to fall over five trials.

Details of dopamine signaling manipulations for Rota-rod

2   The specific task consists of eighteen daily sessions divided into two phases (Figure 1).

3   Administer intraperitoneally dopamine receptor antagonists for sessions 1-5 30 min prior to testing prepared in 0.9% saline): cocktail of 1 mg/kg SCH23390 + 1 mg/kg eticlopride, 1 mg/kg SCH23390, or 1 mg/kg eticlopride.

4   Following a 72-hr break, test the mice for another thirteen sessions (drug-free recovery phase)

Open field test

5   The open field arena (56 × 56 cm) is used to assess locomotor activity.

6   Turn on the lights in the recordingg chamber. Clean the arena with 70% ethanol and adjust the camera border to match the arena edge.

7   Wait for 5min to allow the ethanol to evaporate completely prior test.

8   A mouse is placed in the center of the arena and its ambulation activity is collected by the LimeLight software for 20 minutes.

9   Clean the arena with 70% ethanol between tests.

10   The LimeLight software provides the total distance traveled and the percentage of time/distance within different parts of the arena.