

TECHNIQUE FOR MACHINE CHANGE



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MDA
Micropipette-guided
Drug Administration

MDA

Micropipette-guided Drug Administration for rodents

Why should you use MDA?

MDA is a voluntary administration method for oral treatments in mice and rats, utilizing sweetened condensed milk. Compared to traditional methods such as oral gavage, MDA minimizes the risk of injury and reduces stress for the animals.

This approach is suitable for administering various substances (e.g. drugs and chemicals), with the solution's preparation depending on the specific properties of the substance. The following sections outline the training and administration procedure, along with an example preparation method for mice. Adjustments may be necessary when applying MDA to rats. Below, an example preparation procedure is provided.

Equipment and Preparation

Equipment, materials

1. Sweetened condensed milk
2. Water
3. 15 or 50ml Falcon tubes
4. Ultrasonic water bath* and Magnetic stirrer*
5. Channel p200 Micropipette
6. p200 pipette tips

*depending on characteristics of substance to be administered

Example Procedure Preparation of Solution**

1. Dilute condensed milk with water in a desired ratio (condensed milk to water, e.g. 1:1). This solution is used as a vehicle.
2. Dissolve the substance of interest in an appropriate solvent (e.g. water, DMSO or ethanol) and sonicate if necessary.
3. Mix suspended drug with vehicle solution to reach the desired concentration.
4. Drug and vehicle solution are administered at the desired volume (e.g. 2 ml/kg).

** this section depends on the characteristics of the drug to be administered and might need to be adapted.

MDA Training & Procedure

1. Prepare the desired amount (e.g. 2ml/kg; suggesting max. vol. <80 ul) of solution in the tip of the p200 micropipette. For training you may use vehicle solution only.
2. **Training Day 1:** Gently restrain the mouse, adjusting as needed based on the individual temperament. If restraint is unnecessary, it may be omitted. Introduce the mouse to the milk solution for the first time by offering the pipette tip to its mouth until it begins to drink (see Figure 1A).
3. **Training Day 2:** Restrain mouse (if necessary) solely by the tail on the metal grid of the food hopper and position the pipette continually next to the mouse's mouth until it drinks (see Figure 1B). The animal should ingest the complete volume.
4. **(Optional) Training Day 3–7:** If necessary, repeat the procedure from training day 2 to familiarize the mouse with the milk solution even further. The animal should ingest the complete volume.
5. **MDA procedure:** Place the mouse on the metal grid of the food hopper with no or minimal restraint and offer the pipette tip until the mouse voluntarily begins to drink the solution (see Figure 1C).

The three steps of MDA training in mice

A



1. Training Day 1: Mice are restrained and exposed to the sweetened condensed milk solution for the first time via a micropipette.

B



2. Training Day 2 (and 3–7): Mice are restrained by the tail and exposed to the sweetened condensed milk solution via a micropipette.

C



3. MDA procedure: Mice are no longer restrained and drink the sweetened condensed milk solution voluntarily from the micropipette.

Contacts

Paulin Jirkof
Office for Animal Welfare and 3R
University of Zurich
rodentmda@uzh.ch

References

Find all references together with a constantly updated list of publications on Micropipette-guided Drug Administration on our website:

