

Handling Techniques to Reduce Stress in Mice

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BACKGROUND

Mice and rats represent essential assets to preclinical studies.

However, preclinical studies do not necessarily control for potential stress and anxiety of mice caused by interactions with humans.

While automation is not always feasible, handling techniques were widely developed and used for rats but less for mice.

Proper habituation of mice to human interaction provides benefit in animals' reactivity, baseline anxiety and welfare, and also contributes to facilitating interactions with experimenters and animal care providers

AIMS

Demonstrate the usefulness of a short handling technique in mice at reducing stress and reactivity, and improving interactions with human individuals.

METHODS

Day1.

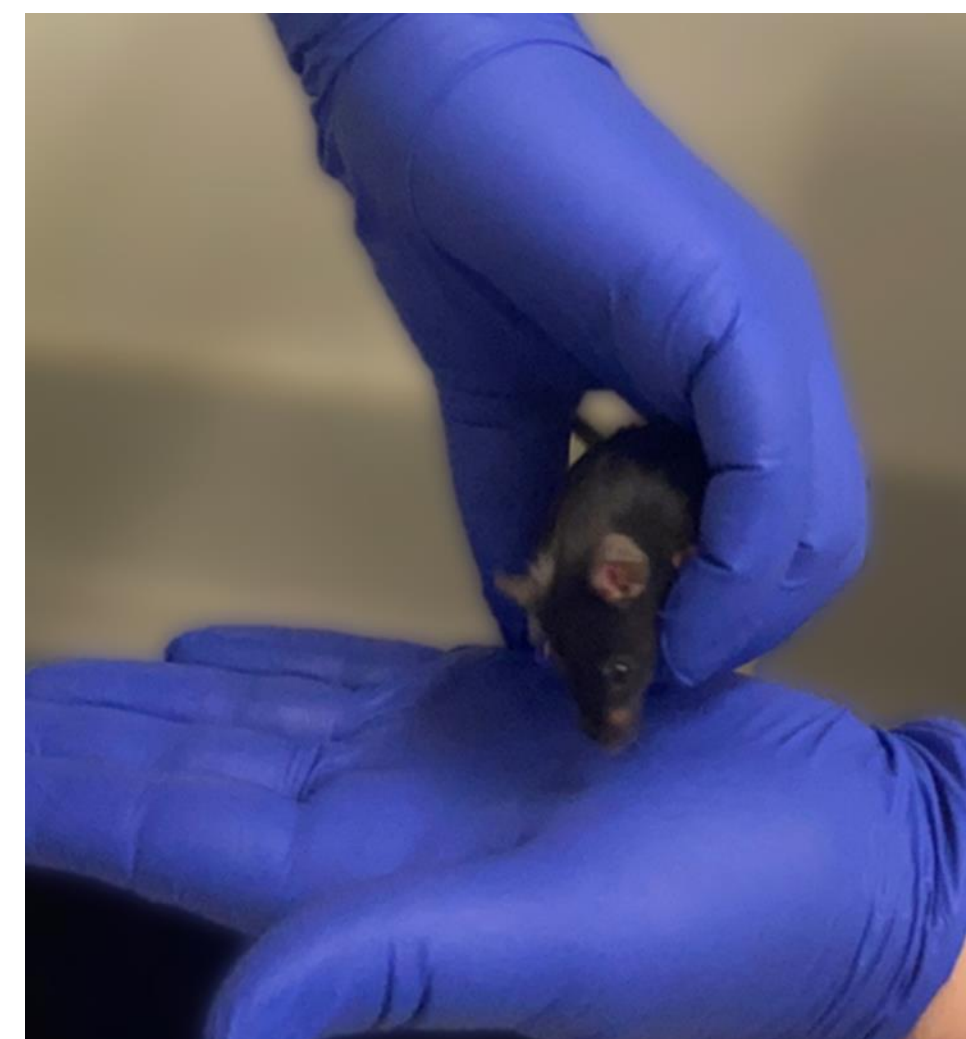
Hand in cage



Flat hand



Roll



Shelter



5min

Place your hand in the cage to habituate the mouse to your hand. Take the mouse and place it in your flat hand. It will start exploring. Start gently transferring the mouse from one hand to the other, with flat hands, and then start a gentle roll so the mouse habituates to being confined between hands. Finally, try to close your hands to form a shelter for the mouse to stay inside but keep an opening to allow for escape if desired.

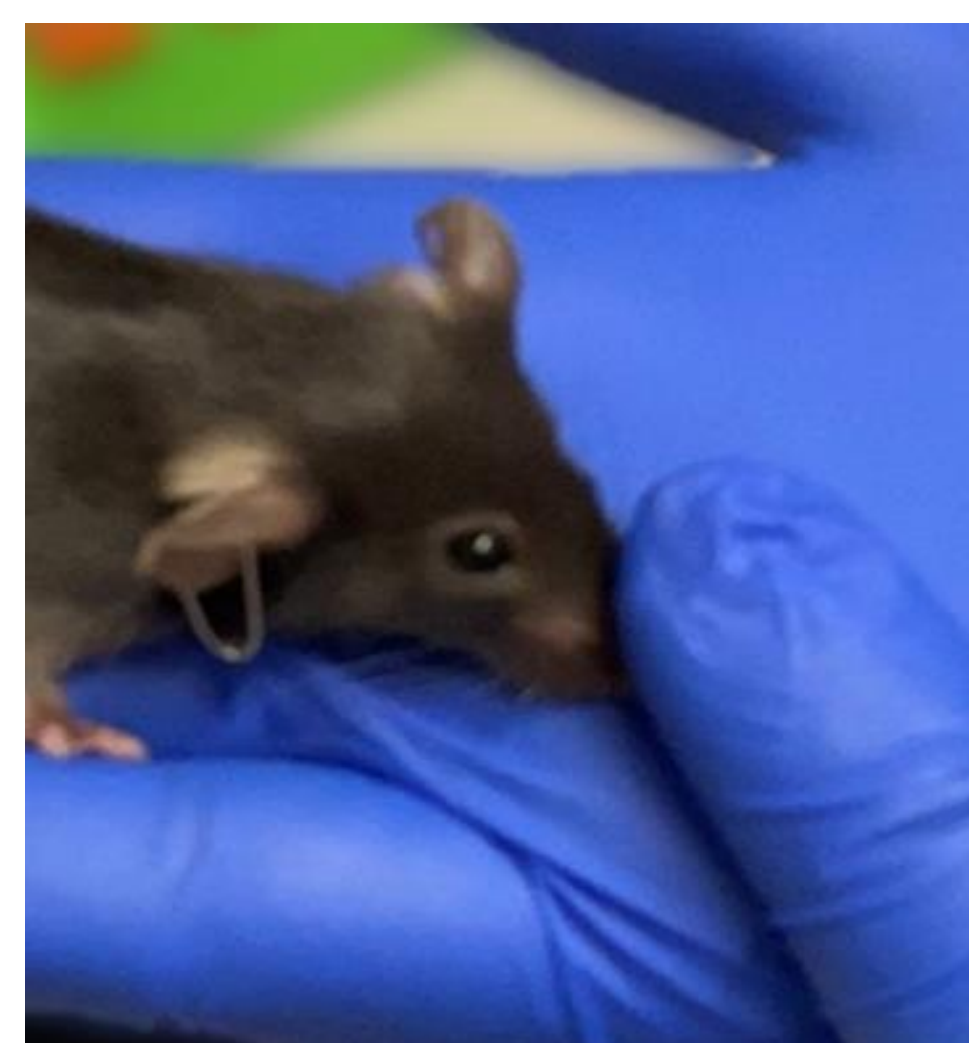
Day2.

Proceed as in Day1, but within 2 min. Try to pet the mouse on its back and head, and try to touch the snout of the mouse. If the mouse lets you touch its head and snout, it is already a great sign of habituation.

Head/back petting



Nose Poke



3-5min

Day3.

Proceed as in Day1 and 2. Day 3 can be performed within 3 min. If the animals will need to be restrained for injection or other intervention, try the neck pinch, lifting the mouse for 3 sec. Habituated mice should remain immobile.

Neck pinch

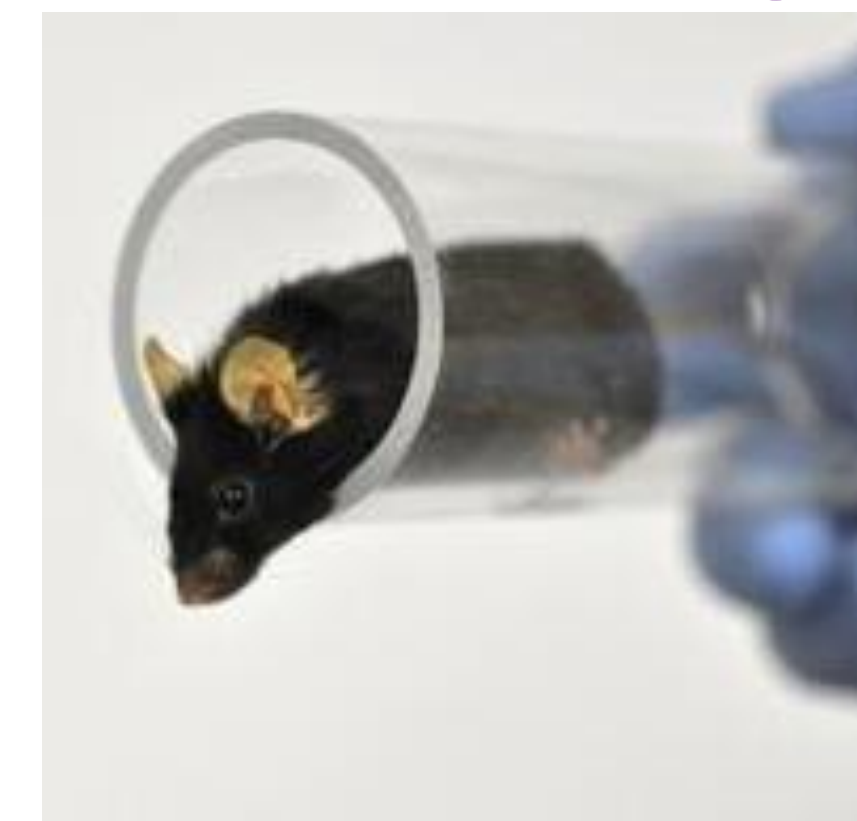


For comparison, we used tail handling, and tunnel handling:

Tail Handling

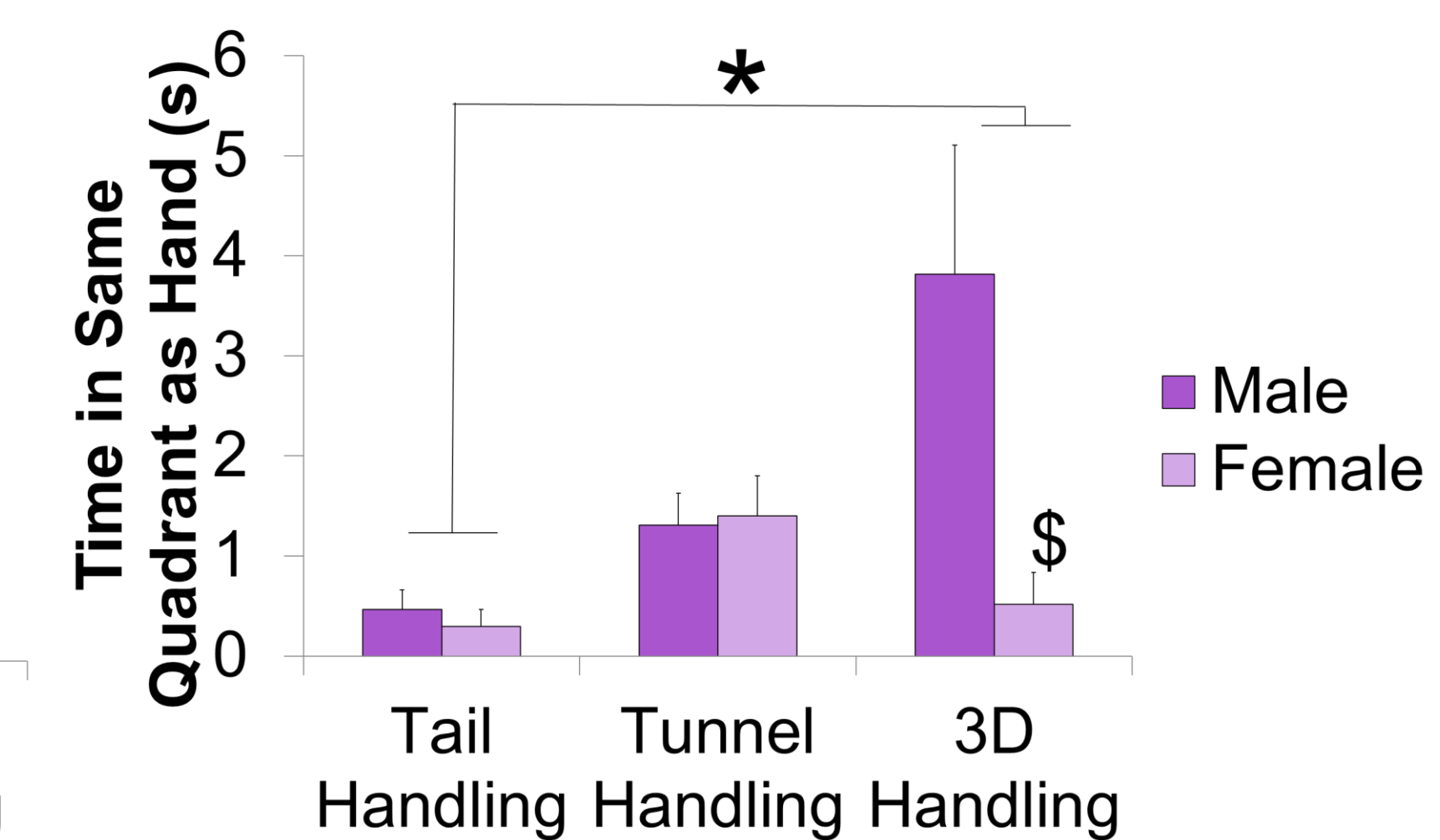
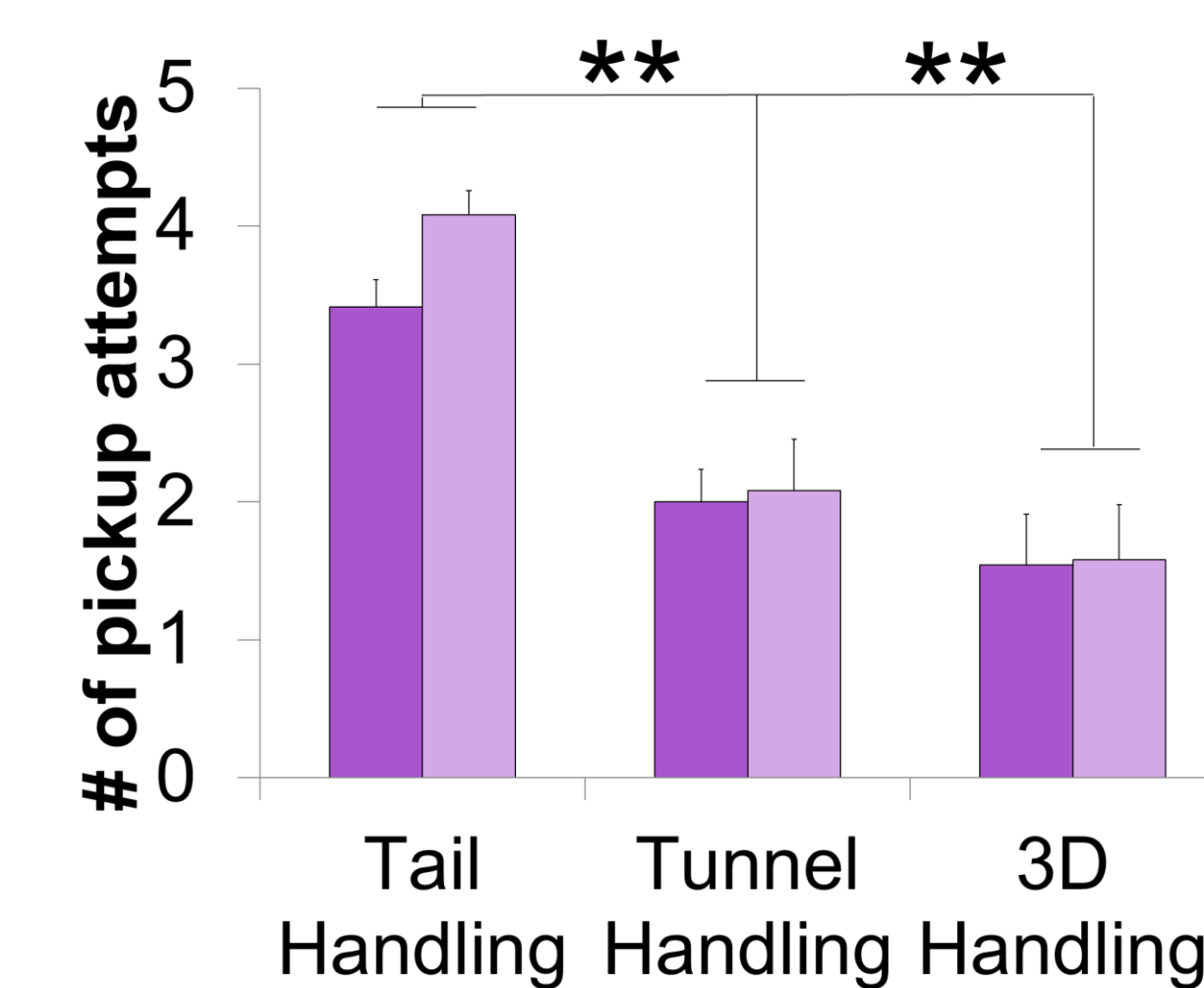


Tunnel Handling



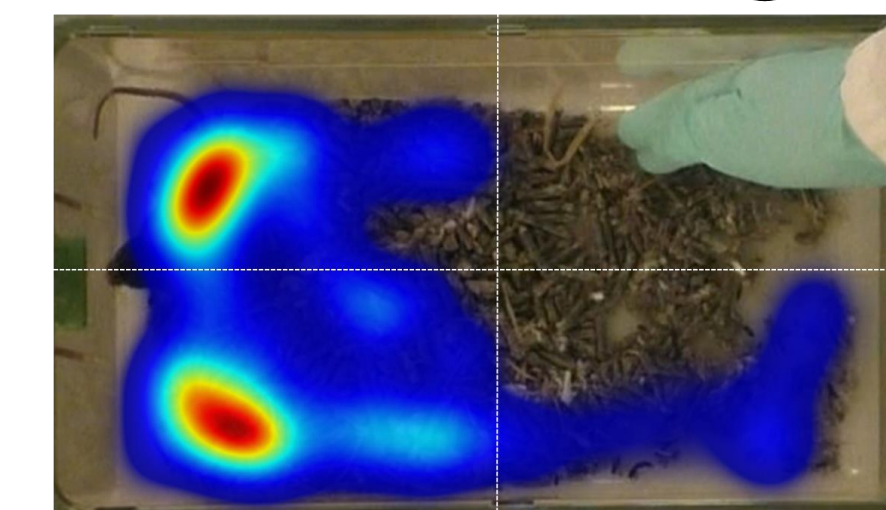
RESULTS

Facilitating interactions with handler

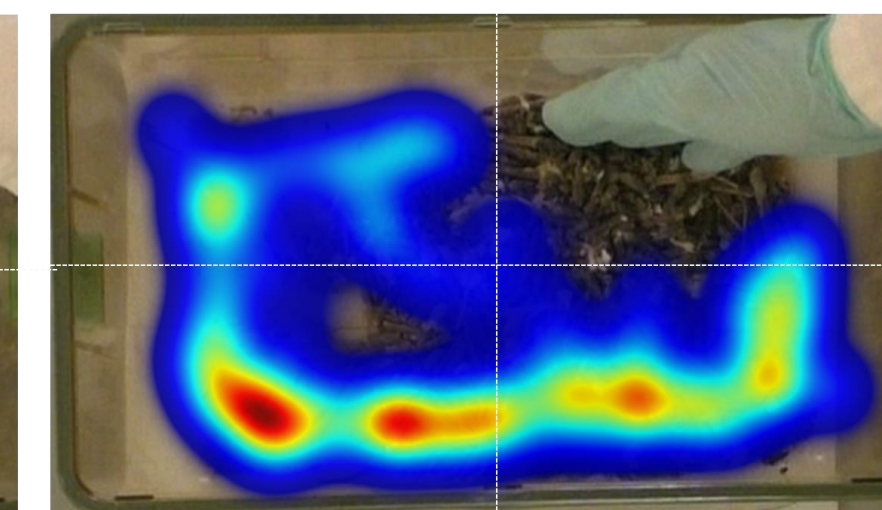


Representative Heat-maps (♂)

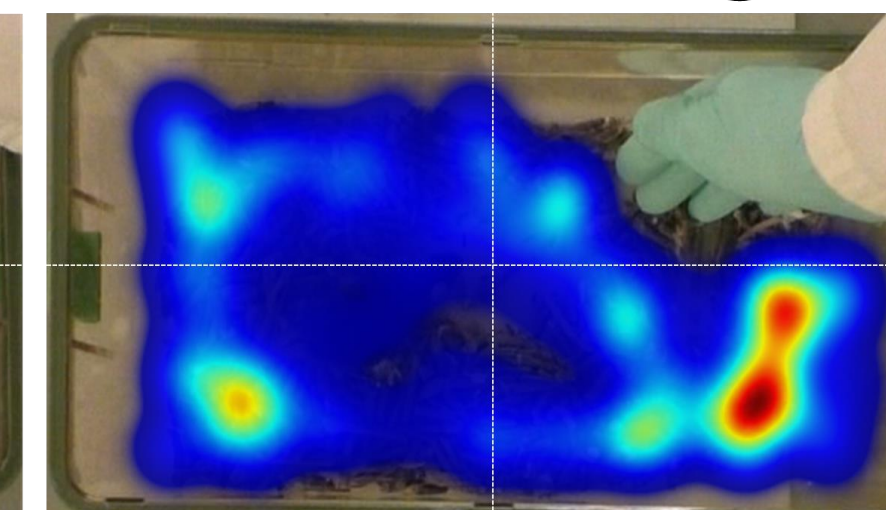
Tail Handling



Tunnel Handling



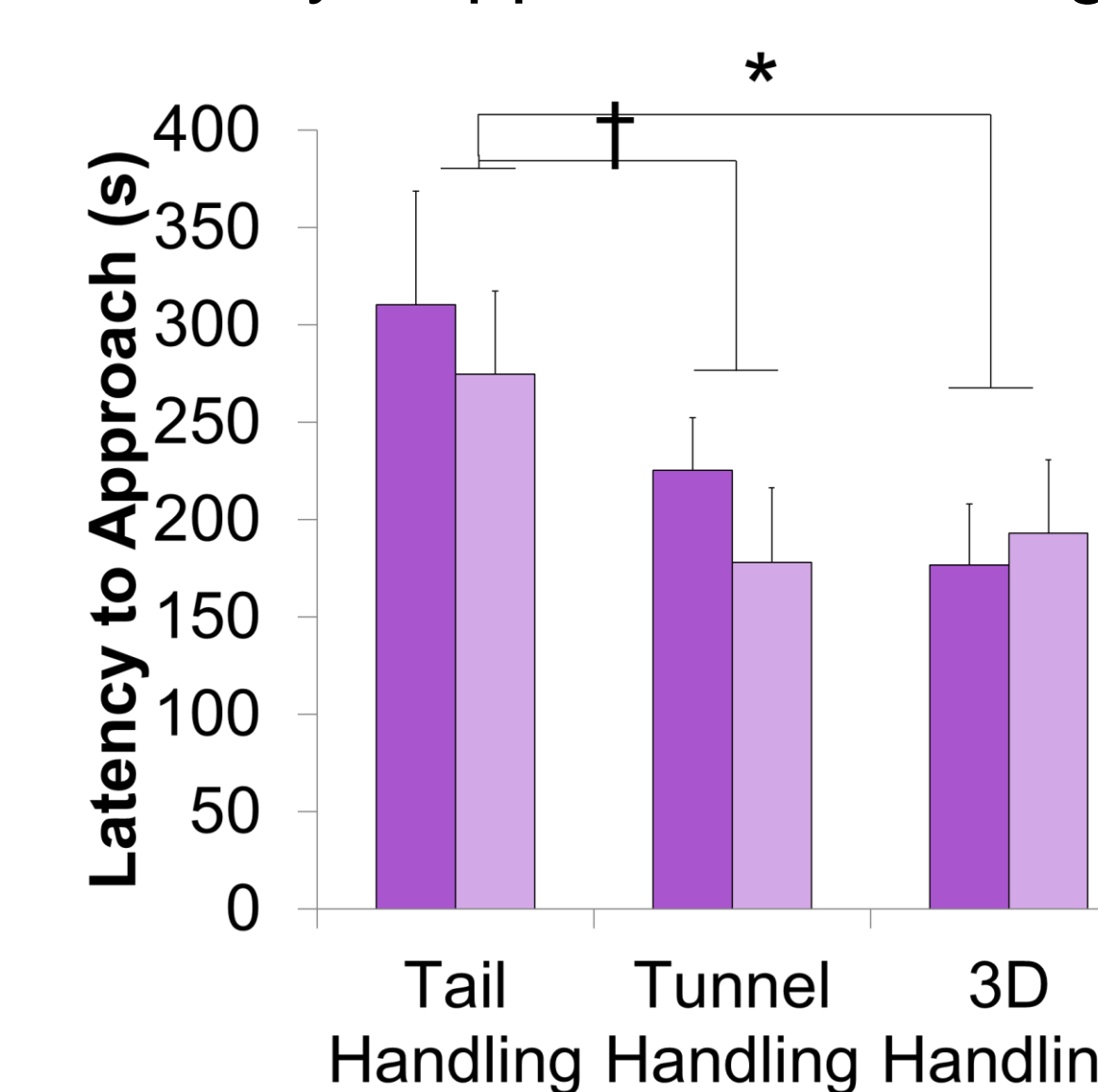
3D Handling



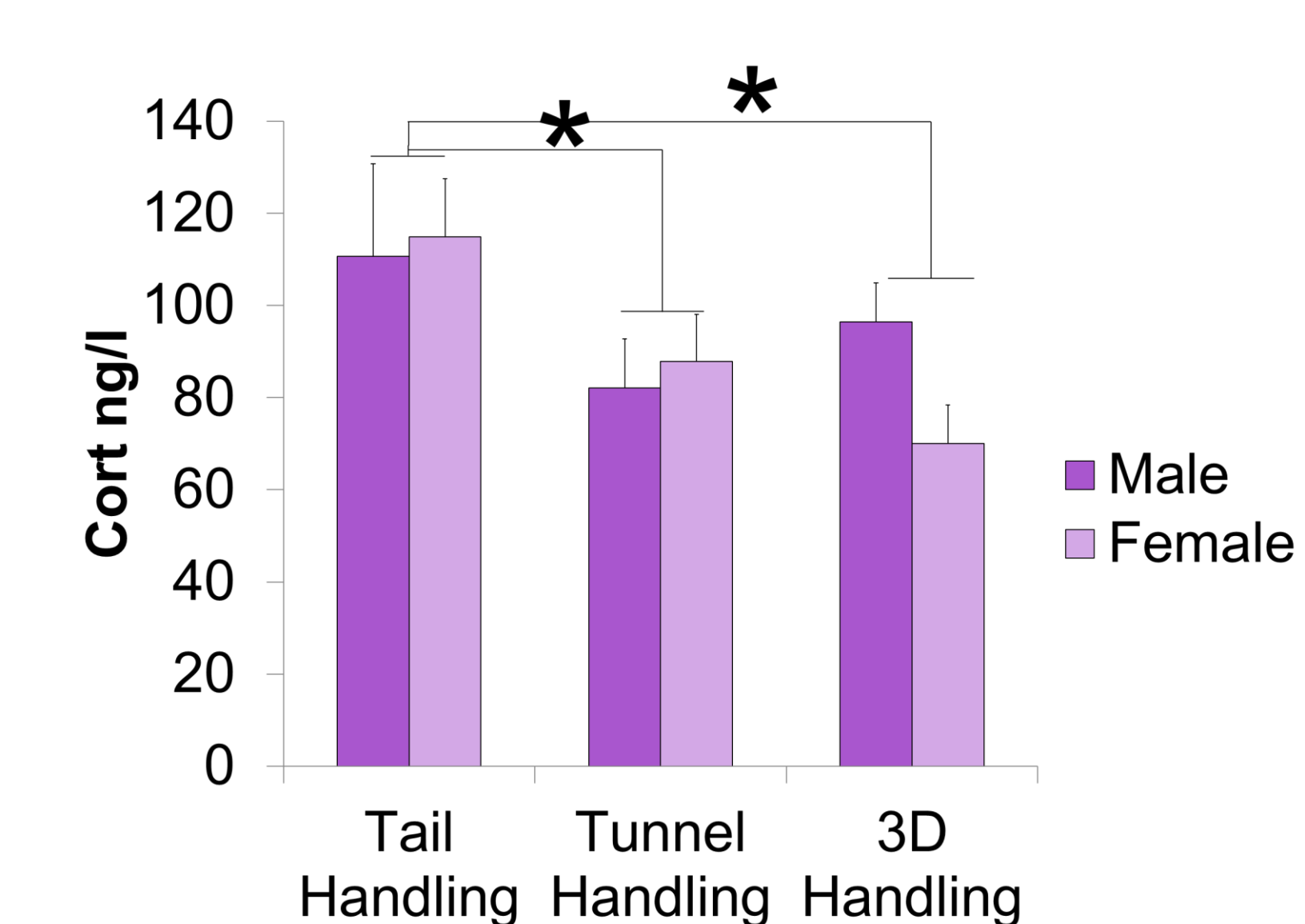
Time Low High

Reduced anxiety Behaviours and reduced CORT levels

Novelty Suppressed Feeding test



Plasma corticosterone levels



CONCLUSION & PERSPECTIVES

This new handling technique reduces baseline anxiety and stress levels in mice, after only 3 days. It also reduces corticosterone levels (stress hormone) and increases interaction with experimenters, particularly in males. Beneficial effects are comparable with what is observed after 10 days of tunnel handling, while tunnel handling does not facilitate interaction with human handlers. Future studies will need to assess if longer handling can have stronger effects, potentially in females.