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Effects on different caging systems on behavioural testing in mice

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INTRODUCTION

Individually ventilated caging systems are becoming more and more popular in modern laboratory animal facilities. Depending on the way the air is supplied, forced air and motor free individually ventilated caging systems for mice are commercially available.

THE AIM

The aim of the present study was to compare the influence of the Forced Air Ventilated Caging System (FAVCS) with the Motor Free Ventilated Caging System (MFVCS) on three classical anxiety-related behaviour tests, namely the open field, the light/dark box and the elevated plus maze.

MATERIAL AND METHODS

CAGING SYSTEMS

SYSTEM INFO	FAVCS	MFVCS
Cage capacity (number)	112	100
Cage surface (cm ²)	530	484
Air Changes per Hour	60	25 <i>(evaluated by using an anemometer connected to the exhaust pipe of the system)</i>
Air Supply	Forced by a blower via top rear inlet/outlet	Flowed through a filtered window at the front of the cage



ANIMALS USED:

38 male C57bl6/J mice at the age of 14 weeks were used for this study. All animals were bred in the animal facility of BRFAA (originally purchased from Charles Rivers Laboratories, France). The bedding material used was corn-cob and the bedding change frequency was every week.

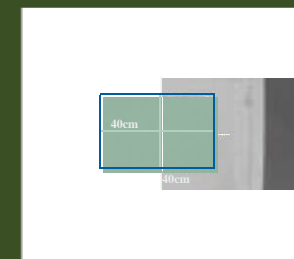
HOUSING CONDITIONS

MICE HOUSING PARAMETERS	FAVCS	MFVCS
Room temperature	22 ± 1°C	22 ± 1°C
Humidity	55 ± 10%	55 ± 10%
Light/dark cycle	12/12- hour (7:00am – 7:00pm)	12/12- hour (7:00am – 7:00pm)
Light density (lux)	300	300
Room pressure (+)	0.6 Pa	0.6 Pa
Feeding / Watering	ad libitum (Teklad diet 2910, Harlan, Italy / Tapped water)	ad libitum (Teklad diet 2910, Harlan, Italy / Tapped water)

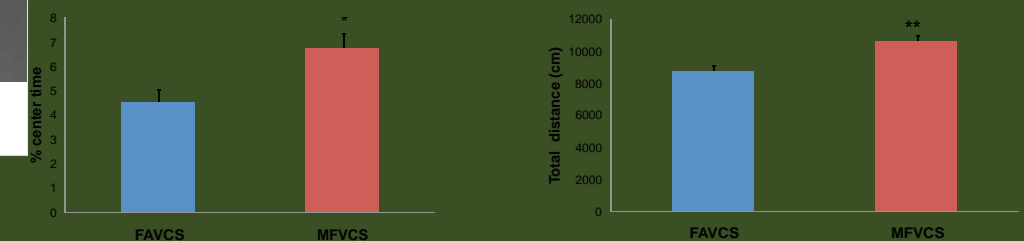
BEHAVIOURAL TESTS

Specialized video tracking software (Ethovision XT8, Noldus, The Netherlands) connected to an overhead camera was used to record video for subsequent analysis of behavioral indices. All behavioral testing was carried out between 9:00-17:00 of the light cycle

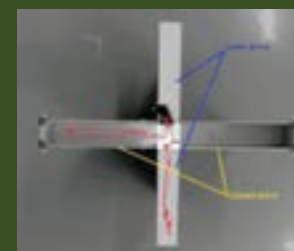
I. OPEN FIELD



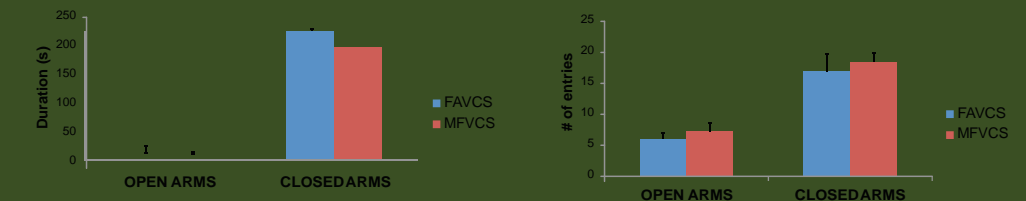
The open field consisted of a plexiglass chamber (40 x 40 x 35 cm) that was brightly illuminated (450 lux). Locomotor activity was assessed by measuring the total distance travelled (cm) by each mouse. As an index of anxiety, it was measured the total time spent (sec) in the center of the open field over a 30 min period.



II. ELEVATED PLUS MAZE



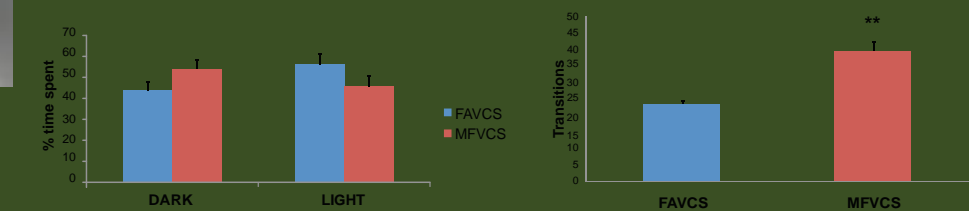
The elevated plus maze consisted of two open arms, two closed arms and a center platform (6 x 6 cm) that form a cross (65 x 65 x 15 cm), elevated above the floor (41 cm) (Panlab, Spain) placed in a room with indirect lighting (100 lux). Time spent (sec) and number of entries (frequency) into the open and closed arms as indexes of anxiety-like behaviour were measured for a 5 min period.



III. LIGHT-DARK BOX



The light-dark box apparatus contains a black plexiglass compartment (21 x 38 x 35 cm) and a clear, brightly lit (350 lux) plexiglass compartment (18 x 38 x 35 cm), separated by a small door (5 x 5 cm). Variables for estimating anxiety-like behaviour were the percentage of time spent in the light and dark compartments (sec) and the total number of transitions between the two compartments (frequency). The testing period was 10 min for each mouse.



CONCLUSIONS

Based on our findings it seems that (i) different caging systems have differential effects on locomotor activity, (ii) MFVCS housed mice display a lower level of anxiety-like behaviour, (iii) the light-dark box test showed that mice have increased transitions without increased general locomotor activity, further research is needed to clarify this behaviour.

REFERENCES

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