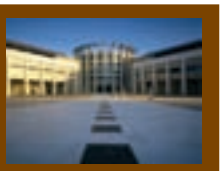
The effect of different ventilated caging systems on the growth rate of C57Bl/6J male mice



Pavlos Alexakos, Athanasia Doulou, Eleni Konsolaki, Christina Makrygiorgou, Nikolaos Kostomitsopoulos
Laboratory Animal Facilities, Center for Experimental Surgery, Biomedical Research Foundation of the Academy of Athens, Athens, Greece

INTRODUCTION

During the last decades there is an increasing tendency to use individually ventilated caging systems to avoid cross contamination between the different mice strains and to decrease exposure to laboratory animal allergens. Depending on the way the air is supplied within the cage, different systems are commercially available. In Forced Air Ventilated Cages (FAVC) the ventilation of the cages is achieved through an external air supply and exhaust unit while in Motor Free Ventilated Cages (MFVC) the ventilation of the cages is achieved by connecting the system directly to the building's HVAC exhaust system. The flexibility to better arrange the micro-environment of the cage by regulating the air changes per hour (ACH) on the one hand and the economy achieved and the less stressful micro-environment on the other are some of the advantages which are referred for FAVC and MFVC, respectively

The aim of the study was to compare the influence of the FAVC and the MFVC on the growth rate of animals.

MATERIAL & METHODS

The study was performed in the animal facility of the Center for Experimental Surgery of the Biomedical Research Foundation of the Academy of Athens.

50 C57Bl/6J male mice at the age of 4 weeks were randomly divided into two groups. In group A (n=25) animals were caged in 5, forced air individually ventilated cages (Sealsafe™, Tecniplast, Milan, Italy), with approximately 60 air changes per hour (ACH) while in group B (n=25) animals were caged in 5, motor free ventilated, cages (OptiMICE®, ACS, USA) with approximately 20 – 25 ACH. All animals were housed in animal rooms under specific pathogen-free conditions at a room temperature of 22 ±1°C, with 55 ± 10% relative humidity, a 12/12- hour light/dark cycle starting at 7:00 a.m. and with a light density of 300 Lux measured 1 m above the floor in the middle of the room. Animal rooms were operated with a positive air of 0.6 Pa. Tap water in drinking bottles and vacuum-packed pelleted food (Teklad diet 2918, Harlan, Italy) were provided *ad libitum*. After an acclimatization period of 8 days body weight, food and water consumption were regularly monitored for a total period of 87 days.

Two-way analysis of variance with repeated measurements (ANOVA) was performed for the weight of the animals, p-value was set to 0.001.

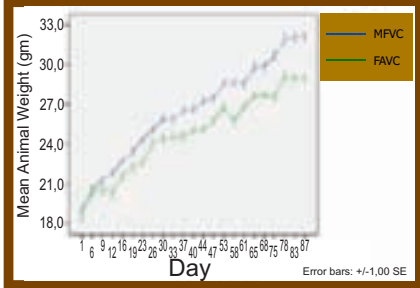
FORCED AIR (FAVC)

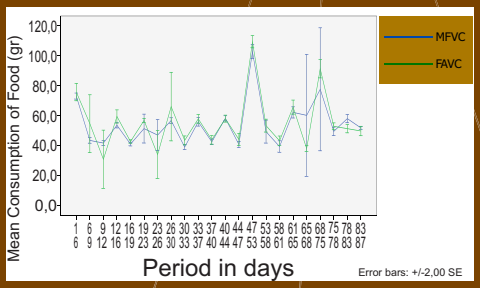
MOTOR FREE (MFVC)

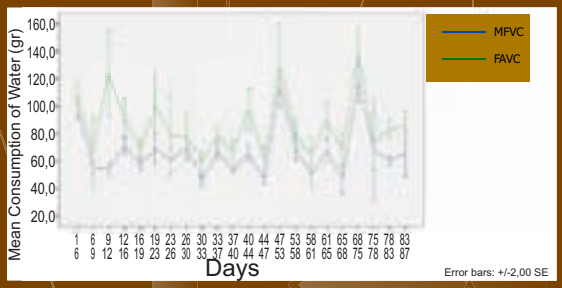
RESULTS

Body weight: Two-way Model X Day repeated measures analysis of variance (ANOVA) was performed for the weight of the animals. There is a significant interaction (F=11.870, p<0.001, Greenhouse-Geisser) of model and day on weight, mice in MFVC gain more weight. The observed power is 1.0.

Food and water consumption: General linear mixed model (AIC=455.215) was used for the effect of consumption of food on animals' weight in the two systems for these 87 days. There is no difference of consumption of food (t=1.617, p=0.111) which means that weight gain is not attributed to dietary habits of the animals. Although statistical analysis for the consumption of water was not conducted due to the different bottles of the two systems, the graph does not differ from that of food.







CONCLUSIONS

Different ACH as well as the turnover of dry air, the created noise or vibration and the differences on the cage design and structure could be some of the factors which may influence the growth rate of animals. Further research is now needed to clarify the exact mechanism of this altered growth rate.