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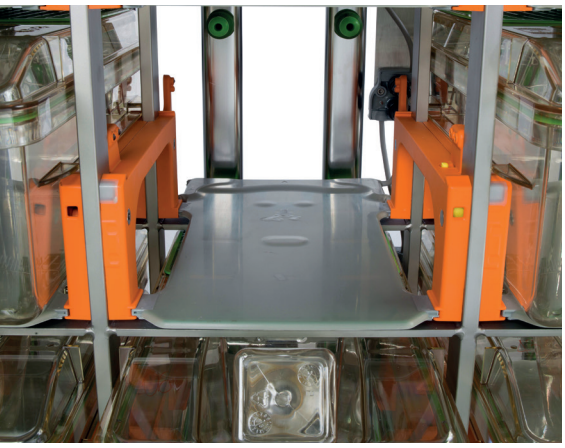

DISCOVER HOW THE DVC® SYSTEM IS HELPING RESEARCHERS TO IMPROVE THEIR SCIENTIFIC RESULTS

Effect of Environmental Enrichment on Aggression in BALB/cJ and BALB/cByJ Mice Monitored by Using an Automated System

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Aggression among mice remains a common undesirable problem in laboratory settings, and animal welfare and scientific outcomes may become compromised depending on the severity of aggression. This study evaluated the effect of cage enrichment comprising a bilevel, mounted 'mezzanine' compared with a cotton square or shelter on intracage male aggression over a 6-wk period. Our first study involved home-cage behavioral challenges to male mice from a high-aggression substrain (BALB/cJ) and low-aggression substrain (BALB/cByJ). Aggressive interactions and locomotor activity were scored manually and then compared with measures of activity obtained by using a continuous automated home-cage monitoring system, the Digital Ventilated Caging (DVC) system. BALB/cJ mice exhibited similar levels of aggression across housing conditions, whereas BALB/cByJ mice had lower aggression when housed with a mezzanine. In the second study, videorecordings and continuous DVC automated measures were collected over 24 h and divided into 12-h light and dark phases. BALB/cByJ mice—but not BALB/cJ—mice had increased aggressive behaviors during the dark phase. However, the DVC detected higher activity levels during the dark phase, compared with the light phase, in both substrains. Elevated activity levels recorded by the DVC correlated with fighting bouts and high levels of locomotion. These results show that a bilevel structural form of enrichment reduces aggression, depending on the BALB/c substrain, and confirms higher aggression levels in the BALB/cJ substrain. In addition, our findings provide evidence that the DVC is effective in identifying mouse cages with pat¬terns of high activity levels, signaling possible aggression incidences, thus potentially allowing for early intervention and consequently improving animal welfare.

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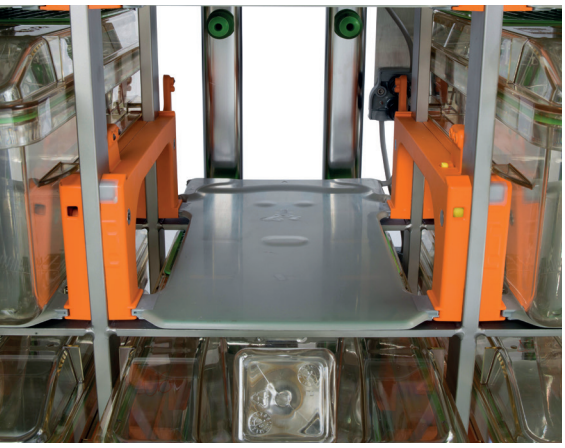

DISCOVER HOW THE DVC® SYSTEM IS HELPING RESEARCHERS TO IMPROVE THEIR SCIENTIFIC RESULTS

Food and water restriction lead to differential learning behaviors in a head-fixed two-choice visual discrimination task for mice

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Head-fixed behavioral tasks can provide important insights into cognitive processes in rodents. Despite the widespread use of this experimental approach, there is only limited knowledge of how differences in task parameters, such as motivational incentives, affect overall task performance. Here, we provide a detailed methodological description of the setup and procedures for training mice efficiently on a two-choice lick left/lick right visual discrimination task. We characterize the effects of two distinct restriction regimens, i.e. food and water restriction, on animal wellbeing, activity patterns, task acquisition, and performance. While we observed reduced behavioral activity during the period of food and water restriction, the average animal discomfort scores remained in the `sub-threshold' and `mild' categories throughout the experiment, irrespective of the restriction regimen. We found that the type of restriction significantly influenced specific aspects of task acquisition and engagement, i.e. the number of sessions until the learning criterion was reached and the number of trials performed per session, but it did not affect maximum learning curve performance. These results indicate that the choice of restriction paradigm does not strongly affect animal wellbeing, but it can have a significant effect on how mice perform in a task.

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