

## **Assessment of impulsivity and stimulus-response in a reaction time task in IntelliCage**

Colacicco G (1), Vannoni E (1), Voikar V (1), Wolfer DP (1,2,3)

(1) Institute of Anatomy, University of Zurich, Switzerland

(2) ZIHP, University of Zurich, Switzerland

(3) Institute for Human Movement Sciences, ETH Zurich, Switzerland

In previous research, C57BL/6 and DBA/2 mice have been found to differ in impulsivity and attentional performance in reaction time tasks. These conventional tasks are often very time-consuming requiring extensive training and multiple test sessions. We developed a protocol which assesses impulsivity and stimulus-response variability of socially housed mice in the fully-automated testing device IntelliCage. During the task, mice were allowed to drink in each of the four learning corners upon a nosepoke made during a light stimulus (correct response). This stimulus appeared at a random delay (1-3 sec) from the start of the corner visit. Premature responses (pre-stimulus nosepokes) prevented the light to turn on, therefore ending the trial. After stable performance was reached at 5 sec light duration, the stimulus was progressively shortened to 0.5 sec to increase the attentional load of the task. Finally, at 0.5 sec stimulus duration, the initial delay was increased to a random value between 2 and 4 sec. Both strains acquired the task and the percentage of correct responses decreased with increasing attentional load (increasing initial delay and decreasing stimulus duration). Strain differences were revealed at the longest initial delays where the difficulty of the task was more pronounced. At the stimulus duration of 5 sec, DBA/2 made fewer visits with an anticipatory response still performing more pre-stimulus nosepokes than C57BL/6 mice in such visits. At the shortest stimulus duration, DBA/2 mice had a lower percentage of correct responses than C57BL/6. This was mainly due to a difference in correct reaction time which can be considered as a measure of global attention. Our results are consistent with previous findings obtained with conventional experiments and suggest that the IntelliCage may be used to assess impulsivity and attentional processes in a more efficient and automated way..

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