

Motivating mice to learn difficult tasks in the IntelliCage without water restriction

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The IntelliCage allows automated testing of cognitive ability of mice in a social homecage environment. In previous learning protocols, water was only accessible by a correct response, potentially causing water restriction in poor learners. Although effective, this increases the burden on animal welfare and does not align with the 3R principles.

To address this, we previously established new protocols in which the mice had unlimited water, but their correct responses were rewarded with sweetened water. However, this positive reinforcement was only effective in easy learning tasks. In more difficult hippocampus-dependent tasks many mice lost interest.

To improve motivation, we further refined the protocol by adding a negative stimulus rendering the always available water less attractive, either with a bitter taste or a decreased probability of plain water access. Our results show that these interventions are very effective in motivating the mice to participate in difficult learning tasks. In future experiments, our modified protocols will minimize the risk of stress and water deprivation in poor learners, while decreasing variability in the data and providing more reliable results.