

Profiles of spontaneous behavior in the IntelliCage discriminate mouse strains, mutations and brain lesions

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Traditional behavioral tests for mice are inefficient. They involve isolation, exposure to unfamiliar apparatus, and repeated handling. Resulting stress responses introduce artifacts and make testing unreliable. Automated assessment of behavior in the home cage may eliminate many of these problems. The IntelliCage collects individual data from socially housed RFID tagged mice and thus also eliminates isolation stress and enables parallel testing of large numbers of mice. All mice begin testing with some days of free adaptation, during which spontaneous corner visits, nosepoking patterns and licking activity are already monitored 24/7. We have collected data on 50 behavioral parameters of >800 mice. Subsequent factor analysis extracted 12 orthogonal factors accounting for 81% of total variance. Comparison of factor scores of C57BL/6, DBA/2, BALB/c and 129S2 mice revealed a unique profile for each strain. Analysis of mice with excitotoxic or genetic brain lesions also yielded unique profiles for each condition. Monitoring of mutant mice with known deficits in hippocampus-dependent tests produced profiles very similar to those of hippocampal lesions. Thus, monitoring of spontaneous behavior in the IntelliCage prior to specific test protocols permits high throughput prescreening of mutant mice. On the other hand, our data indicate that tight control of genetic background remains essential also if behavioral testing occurs in the home cage. Supp. SNF NCCR Neuro, FP7 Consortium EUROSPIN.