

O Litvin¹, MJ Galsworthy², RM Deacon³, A Vyssotski², D Vyssotski², A Rau², M Knobloch⁴, G Colacicco², H Welzl², RM Nitsch⁴, H Würbel⁵, DP Wolfer² & HP Lipp²

1 Stowers Institute for Medical Research, Kansas City, MO, USA

2 Institute of Anatomy, University of Zurich, Zurich, Switzerland

3 Dept of Experimental Psychology, University of Oxford, Oxford, UK

4 Division of Psychiatric Research, University of Zurich, Zurich, Switzerland

5 Division of Animal Welfare and Ethology, University of Giessen, Giessen, Germany

Hippocampal and prefrontal cortex lesions in mice, comparison of standard behavioral tests with automated testing in Intellicage

Automated systems for testing mouse behavior, such as IntellicageTM, promise replicability of results within and between labs. Standardized micro-environments presenting complex learning tasks without need for handling are an excellent basis for collecting data unbiased lab and experimenter. However, the introduction of any new behavioral test systems poses two questions: i) what is the neuroanatomical substrate of the behaviors measured in the new set-up, and ii) how does the new test system relate to standard behavioral tests? We tested 44 female C57Bl/6 mice with hippocampal lesions (HIPP; n=8), infra/peri-limbic lesions (IPL; n=7), anterior-cingulate lesions (AC; n=10) and sham-lesions (CONT; n=20). They ran a battery of standard behavioral tests and also the Intellicage; an in-cage automated system assessing behavior of mice kept in social groups. HIPP mice showed the greatest differences across exploratory and cognitive tasks, with lower anxiety, higher activity, lower active exploration of novelty and lower cognitive performance, especially in burrowing tasks. Both IPL and AC groups were similar to CONT mice, with some minor differences in exploration. However, the IPL and AC mice were impaired in spontaneous olfactory discrimination and AC mice showed slight impairment in the Galsworthy puzzle box. The Intellicage revealed very similar data over a week of continuous recording: HIPP mice demonstrated initial neophobia, followed by higher activity with disrupted spatial learning and circadian activity. These data demonstrate that automatic in-cage recording systems can provide the information of a full behavior battery at a fraction of the experimenter effort. Supp. by SNF and NCCR "Neural Plasticity & Repair".