

## **Survival of hippocampally lesioned mice in outdoor pens: equal magnitude of lesion and genotype effects**

David P. Wolfer<sup>1</sup>, Robert Deacon<sup>2</sup>, J. Nicholas P. Rawlins<sup>2</sup>, Marina G. Pleskacheva<sup>3</sup>  
Alexei L. Vyssotski<sup>1</sup>, Irmgard Amrein<sup>1</sup>, Patrizia<sup>1</sup> and Hans-Peter Lipp<sup>1</sup>

<sup>1</sup>Neuroanatomy and Behavior, Institute of Anatomy, University of Zurich, Switzerland

<sup>2</sup>Department of Psychology, University of Oxford, UK

<sup>3</sup>Laboratory of Physiology & Genetics of Behavior, Moscow State University, Russia

In order to study the effects of hippocampal lesions on the ability of survival under semi-naturalistic conditions, 23 female mice received either sham surgery or bilateral cytotoxic lesions of the entire hippocampus by means of multiple slow injections of NMDA into the hippocampus. Stereotaxic injections were done in a field station in western Russia. 14 mice (6 controls, 8 hippocampals) were of pure C57BL/6 background, while 9 mice were selected from a randomly bred stock derived from a diallel cross between strains C57BL/6, DBA/2, NZB and C3H. After recovery, mice were tagged with passive transponders permitting electronic identification and released into an outdoor pen of 10x10 m containing two shelters of 2x2 m for protection. Inside the pen, 8 transponder antennae recorded mice visiting these locations. Food was placed first at two locations within the shelters, and then at various antenna sites outdoors. A computer system monitored visits over a period of 39 days. Hippocampal mice appeared rapidly at the within-shelter feeding sites, but were significantly slower to appear at the first outdoor feeding places. The most surprising finding resulted from a Kaplan-Meyer analysis of survival: as expected, mice with hippocampal lesions disappeared earlier from the pen ( $p < 0.05$ ). However, the genotype of the lesioned mice played a remarkable role. Lesioned mice with a C57 background disappeared most rapidly, but the survival of C57 control mice was not better than survival of lesioned mice with a mixed genetic background. These findings underline the importance of hybrid vigor in survival ability and imply that being a C57BL/6 mouse in an outdoor pen is about equally risky as being a mouse with mixed genetic background yet lacking both hippocampi.

This work was supported by Swiss National Foundation and the NCCR “Neural Plasticity and Repair”.