



Long-Term Patterns of Post-Stroke Depression in Rats



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Introduction

Depression is the most common neuropsychiatric sequelae after stroke, affecting nearly 30%–50% of patients within the first year. Post-stroke depression (PSD) has a significant impact on the recovery of motor and cognitive deficits, and is associated with an increased mortality. Early recognition of PSD symptoms and the introduction of pharmacological therapy is of great importance. Reliable animal models of PSD are necessary to investigate the pathophysiology and potential treatments. Most studies examine depression at one single time point after stroke and do not follow long-term changes. The goal of this study was to examine the development of PSD using a sucrose preference test, and to monitor changes of this condition over time. We conducted two additional tests to study the spectrum of depressive behavior.

Materials and Methods

25 Wistar rats (weight 300–350 gr) were randomly assigned into one of 2 groups. The first group was subjected to middle cerebral artery occlusion (MCAO) (stroke group) and second group was used as a control (sham) group. After an acclimatization period rats were subjected to the sucrose preference test at 1, 2, 4, and 6 month after stroke. The sucrose preference was calculated as sucrose preference (%) = sucrose consumption (ml) / (sucrose consumption [ml] + water consumption [ml]) × 100 %. 2 additional tests were performed at 2 month after stroke: an open field test and elevated plus-maze test. In the open field test we analyzed the total distance traveled, distance traveled in the central part of the field, time spent in the central part of the field, and mean velocity. In the plus-maze test, we analyzed the time spent on the open arms and on the platform, and on the open arm and platform entry points.

Results and Conclusions

- Rats in the stroke group (n=10) showed a significantly lower percentage of sucrose preference at 1, 2, and 4 month after stroke compared to the control group (n=10) (P<0.01).
- 6 month after injury rats demonstrated an improvement in sucrose preference that was similar to the control group.
- Rats in the control group did not exhibit any changes in sucrose preference during the 6 months of the study period.
- The results of the open field test demonstrated that rats from the stroke group had significantly decreased total distance traveled and mean velocity compared to the control group (p< 0.01).
- Furthermore, there was a more moderate decline in distance traveled in the central part of the field and time spent in central part of the field (p<0.05).
- The results of the plus-maze test demonstrated that rats from the stroke group had significantly decreased time spent in the open arms and open arms entry points (p< 0.01), and a more moderate decline in the time spent in the platform and platform entry points (p<0.05).
- In this study we demonstrated for the first time that the sucrose preference test could be used to monitor long-term changes of PSD.

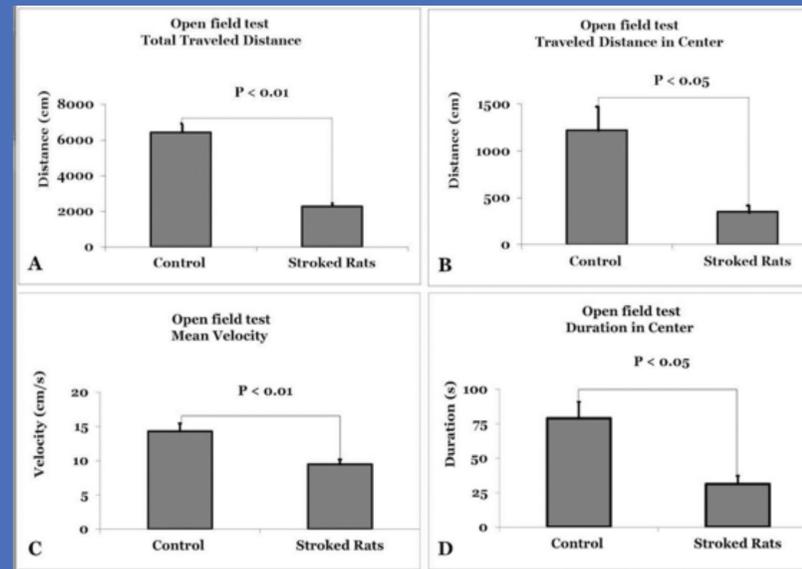


Figure 1: Open Field Test

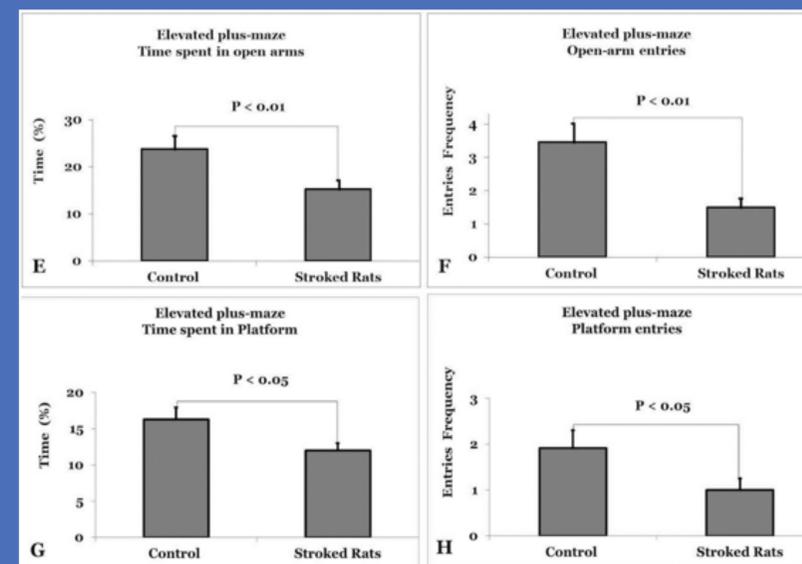


Figure 2: Elevated Plus Maze Test