



# Assessing cognitive function in a rat model of glial pathology

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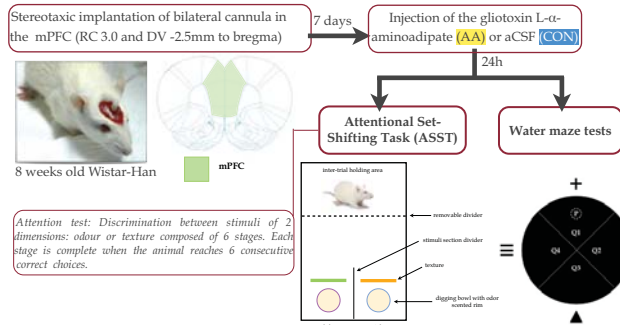
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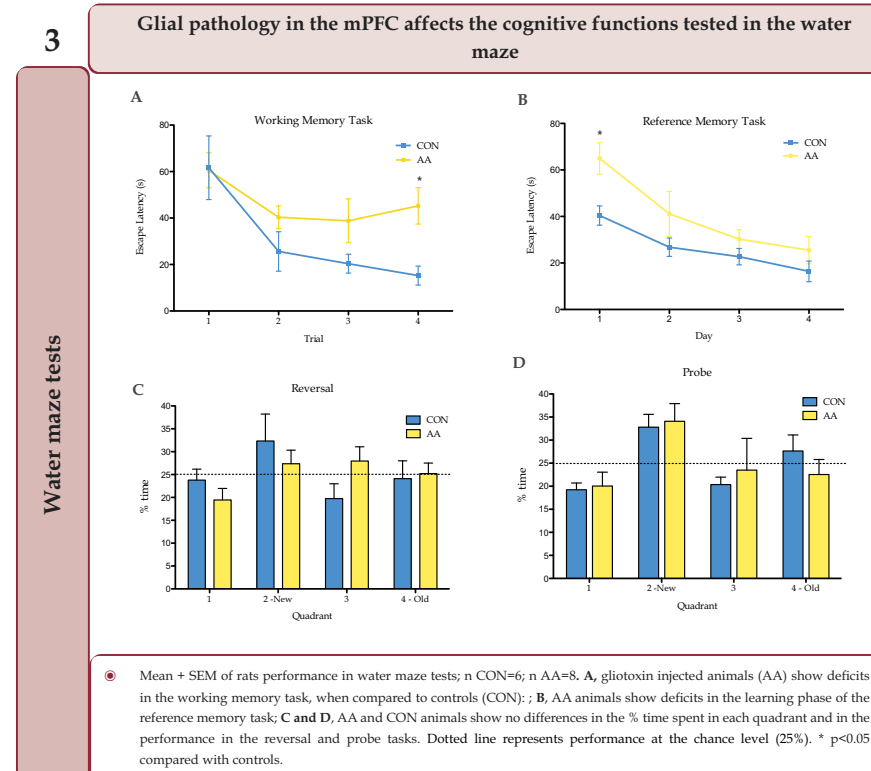
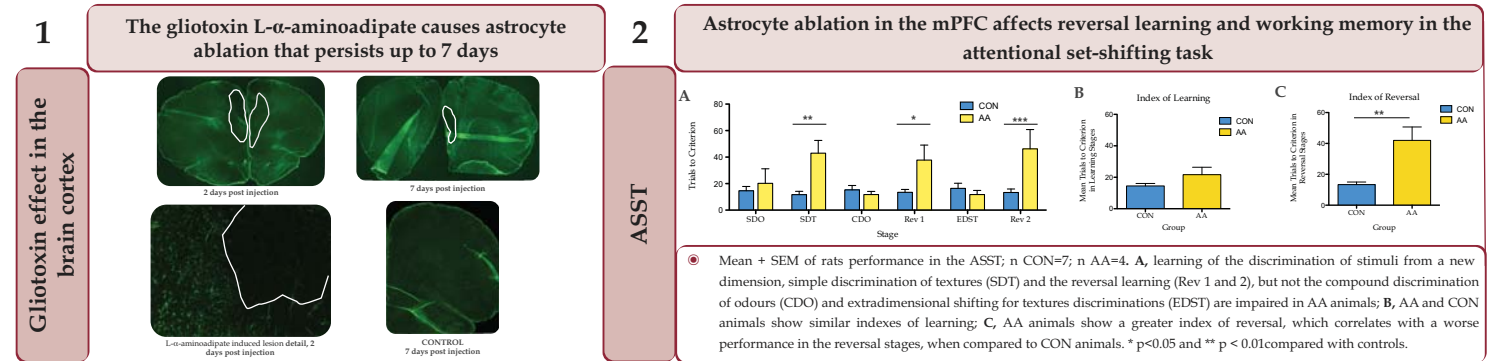
## Introduction

- The emerging of astrocyte-neuron interaction biology has been changing our perspective on the physiology of the nervous system. In fact, the classically accepted paradigm that brain function results exclusively from the neuronal activity is being challenged by recent findings.
- Apart from the classically accepted functions of astrocytes (brain metabolism and support of neuronal activity), recently discovered features bold the role of astrocytes in brain function:
  - ▶ modulation of the synaptic transmission (tripartite synapse);
  - ▶ astrocytic excitability, in the form of calcium waves;
  - ▶ gliotransmission- astrocytes release, among others, glutamate, D-serine, ATP, GABA.
- Astrocytic structure and protein expression were already shown to be altered in the context of brain disorders like depression, Parkinson's disease, Alzheimer's disease, namely affecting cognitive functions.
- The prefrontal cortex (PFC) is intimately related to the computation of complex cognitive and executive processes, such as working memory, behavioral flexibility and attentional set-shifting.
- The aim of this work was to test whether the induction of a glial pathology, by astrocyte ablation, in the medial PFC would affect the behavior performance dependent on this region.

## Experimental Design



## Results



## Conclusions

- The induction of glial pathology by astrocytic ablation in the medial prefrontal cortex (mPFC) caused cognitive impairments in functions such as:
  - ▶ reversal learning
  - ▶ working memory
  - ▶ learning of a spatial reference task
- Such impairments indicate that normal astrocytic function is crucial for the overall performance the mPFC.
- The impairments observed are similar to those attributed to pathological states such as depression or dementia, which suggests that the affection of astrocytes observed in these diseases may be related with the poorer cognitive performance of the patients.

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