



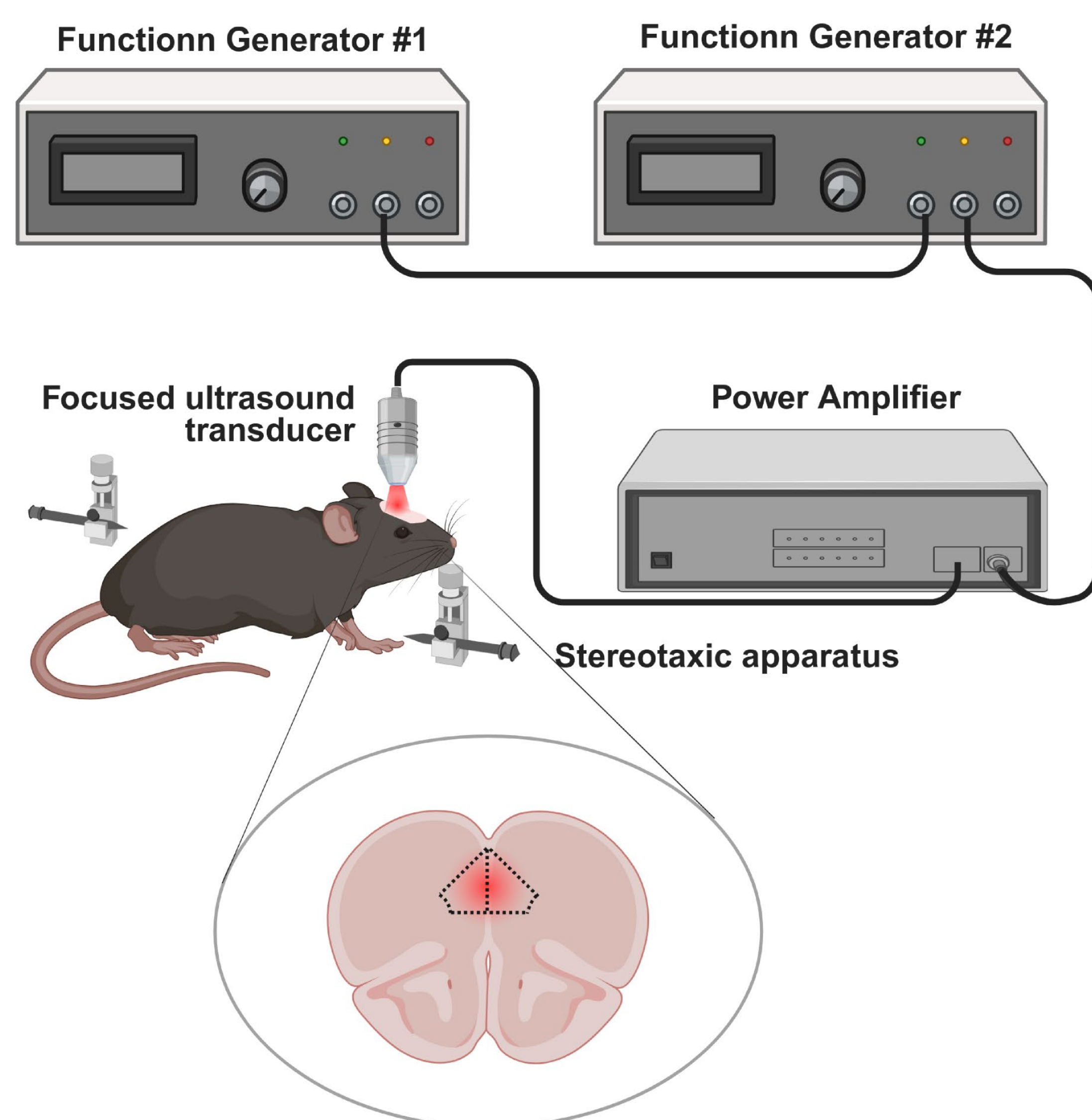
Bidirectional Glutamate/GABA Modulation by mPFC-Targeted Low-Intensity Focused Ultrasound Attenuates Allodynia and Emotional Comorbidities in Migraine Mice

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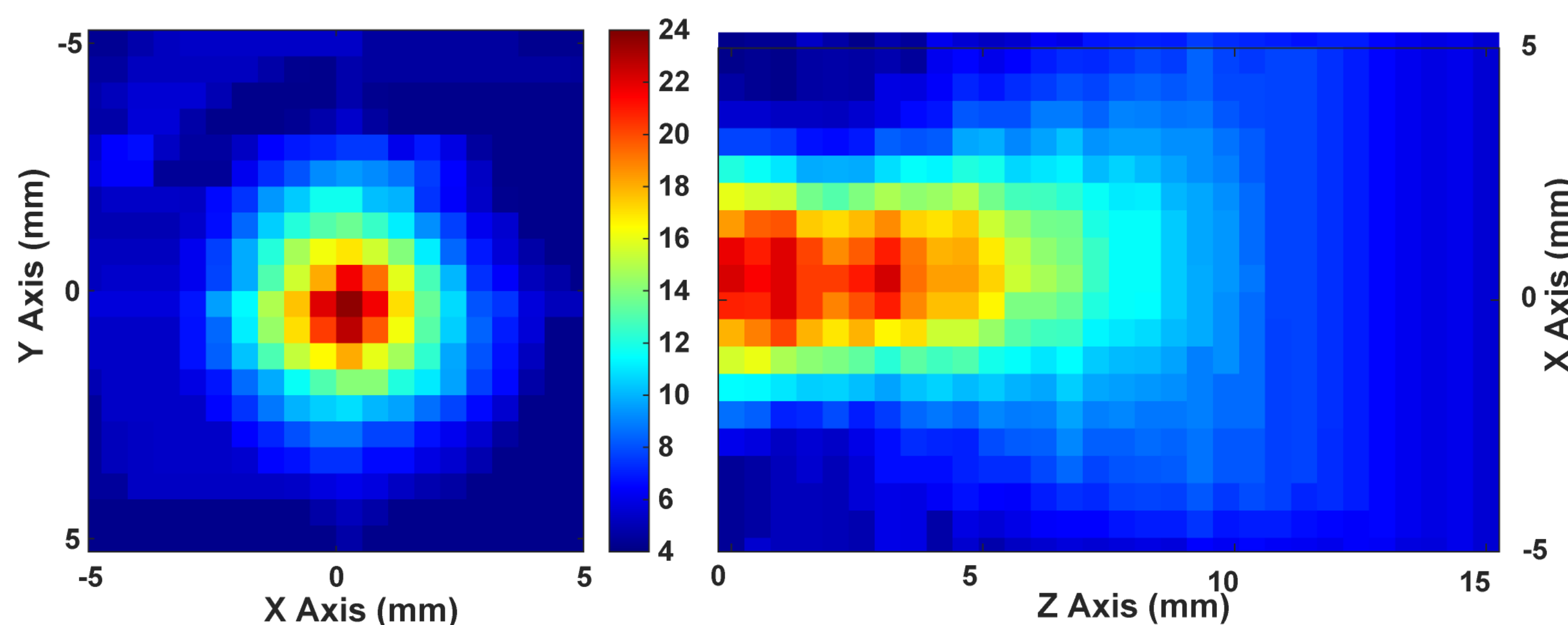
Background:

Migraine is a debilitating neurological disorder. This study explored low-intensity focused ultrasound (LIFU) as a novel, non-invasive method to modulate the medial prefrontal cortex (mPFC) for migraine treatment.



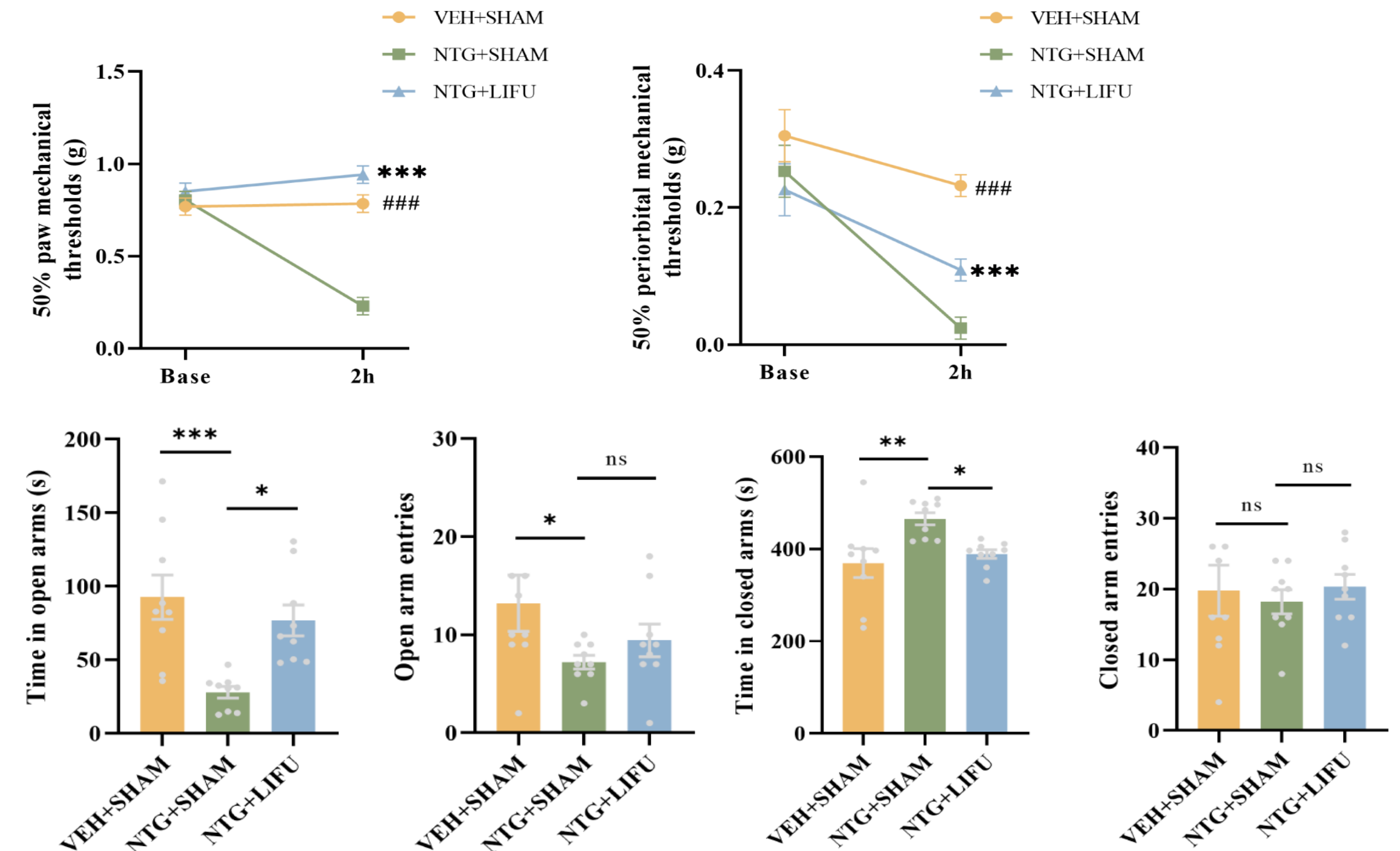
Methods:

A nitroglycerin-induced migraine model in mice was used. Behavioral tests and molecular analyses were performed to assess the effects of mPFC-targeted LIFU versus sham stimulation.

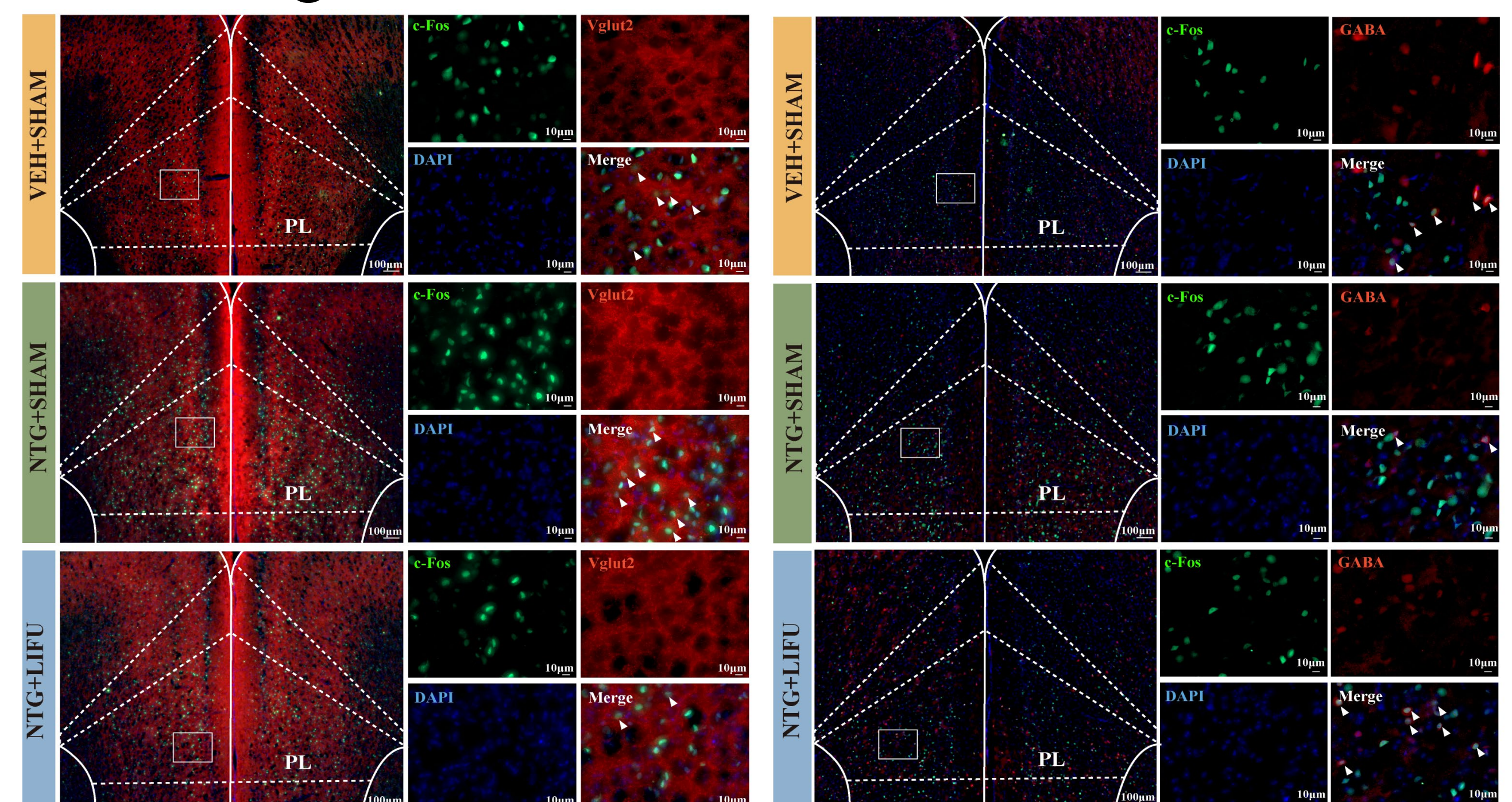


Results:

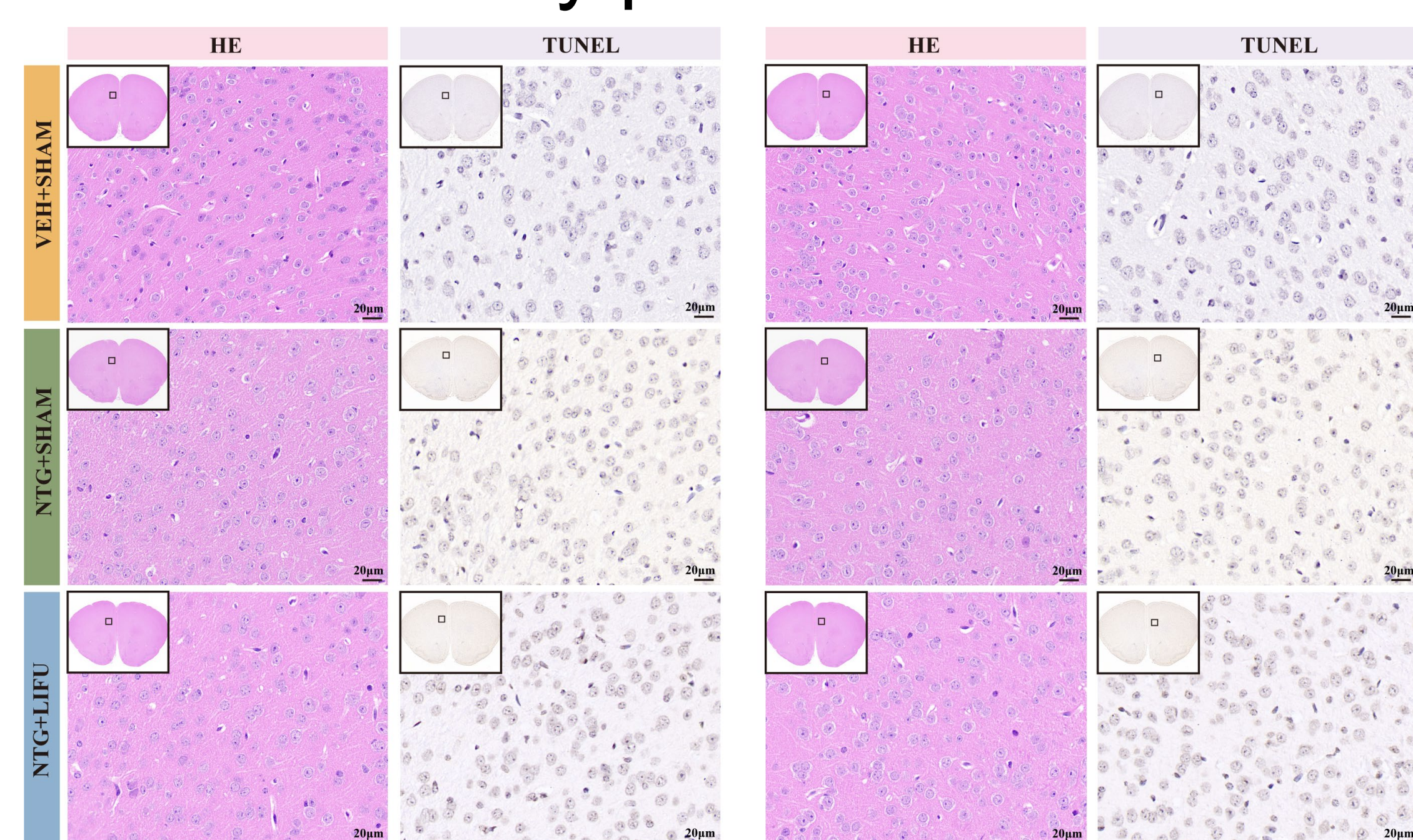
LIFU significantly alleviated migraine-related allodynia and anxiety-like behaviors.



It suppressed mPFC neuronal hyperactivation and restored excitatory/inhibitory (E/I) balance by increasing the proportion of activated GABAergic neurons.



No tissue damage was observed, indicating a favorable safety profile



Conclusion:

LIFU targeting the mPFC is a promising, non-invasive therapeutic strategy that can relieve migraine symptoms by correcting central E/I imbalance.