



# CORTICAL STROKE DISRUPTS CORTICO-HIPPOCAMPAL COMMUNICATION AND HIPPOCAMPAL FUNCTION

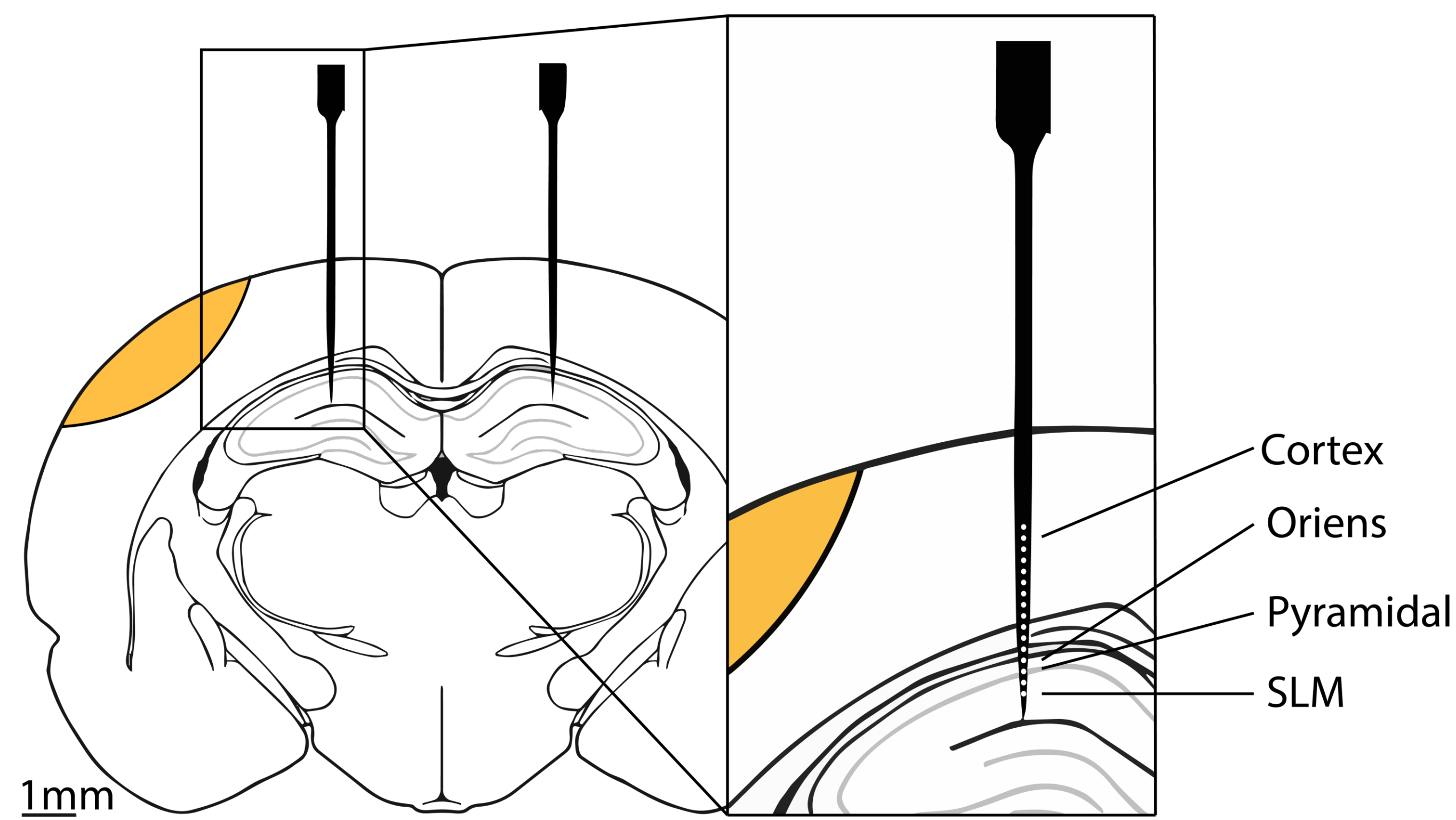
STUDENT: ZACHARY IP

## ABSTRACT

Stroke is a leading cause of disability globally; 15 million people suffer from stroke worldwide each year. Impaired cognition is a common outcome of stroke. The relationship between cortical stroke and cognitive deficient is not well understood. To study this we induced ischemic stroke in the left hemisphere of rats and used linear  $\mu$ -electrode arrays to record local field potentials from cortex & hippocampus simultaneously two weeks & one month following stroke.

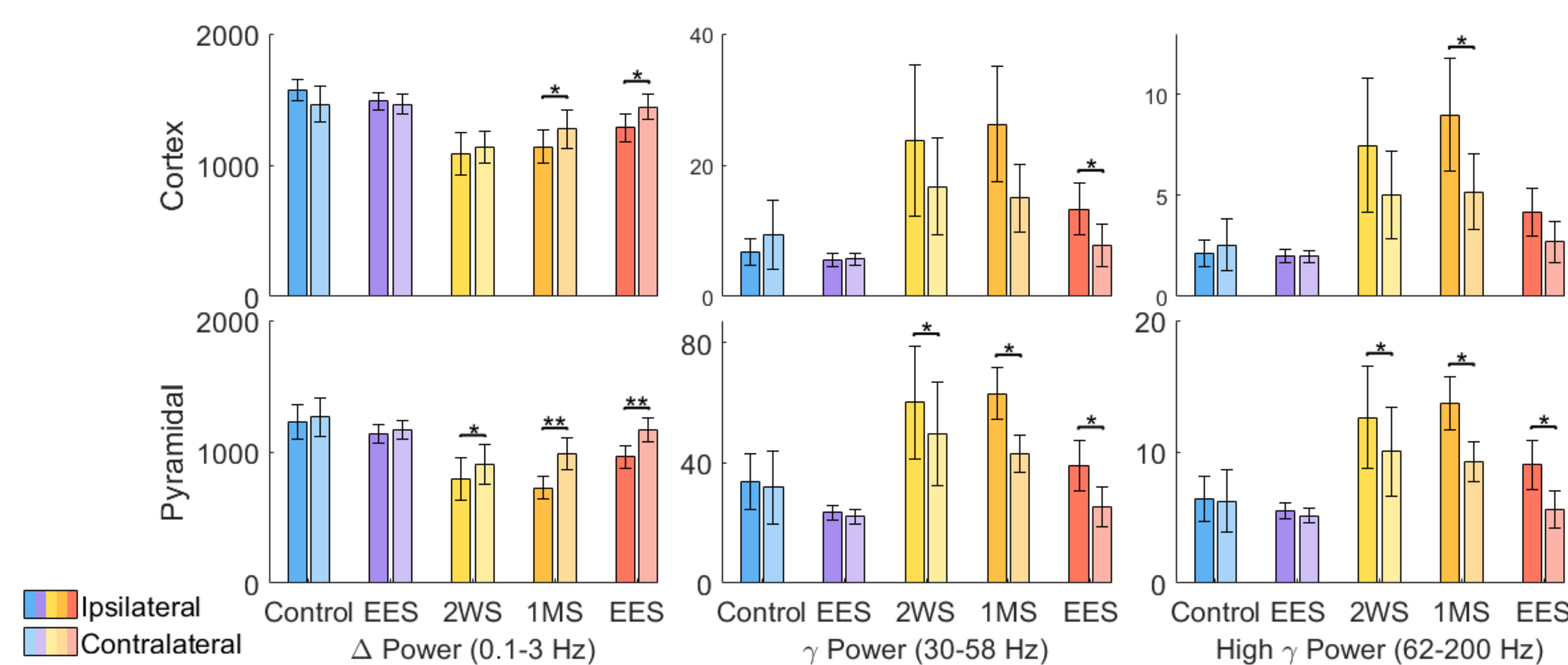
We analyzed signal power, stability of brain states, cross frequency coupling, and sharp wave associated ripples (SPW-Rs) to assess changes to functional networks. We have found that after stroke, all frequency bands increase in power except for delta. Theta/delta (TD) states are destabilized, and during high TD states theta-gamma coupling is lowered. SPW-R duration transiently increases at two weeks before lowering below control levels after one month. SPW-R power is lower ipsilaterally, but higher contralaterally. The current source density aligned to a ripple shows a decrease in amplitude in both hemispheres. These results show that remote ischemic lesion causes significant change to cortico-hippocampal communication.

## METHODS

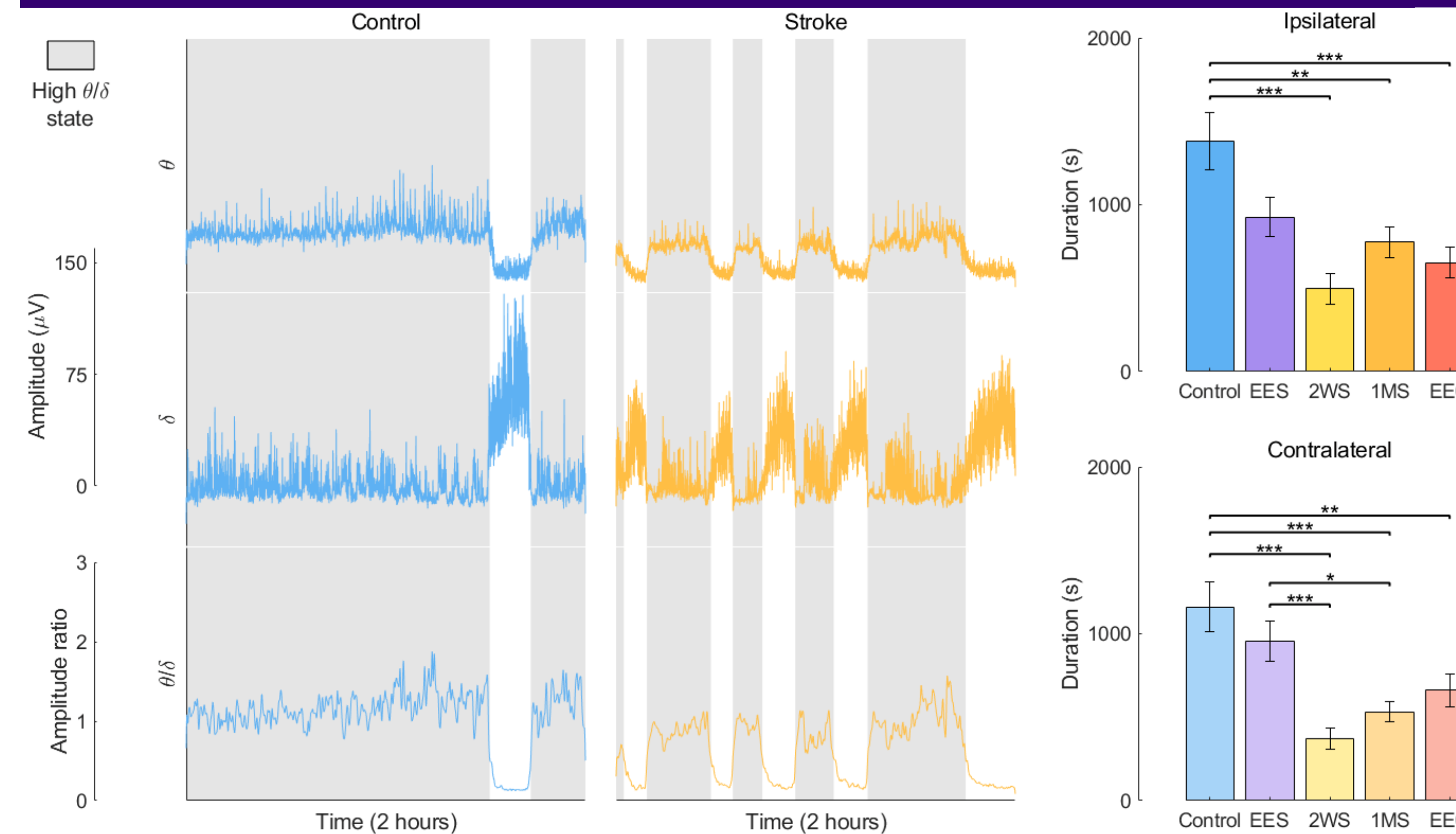


## RESULTS

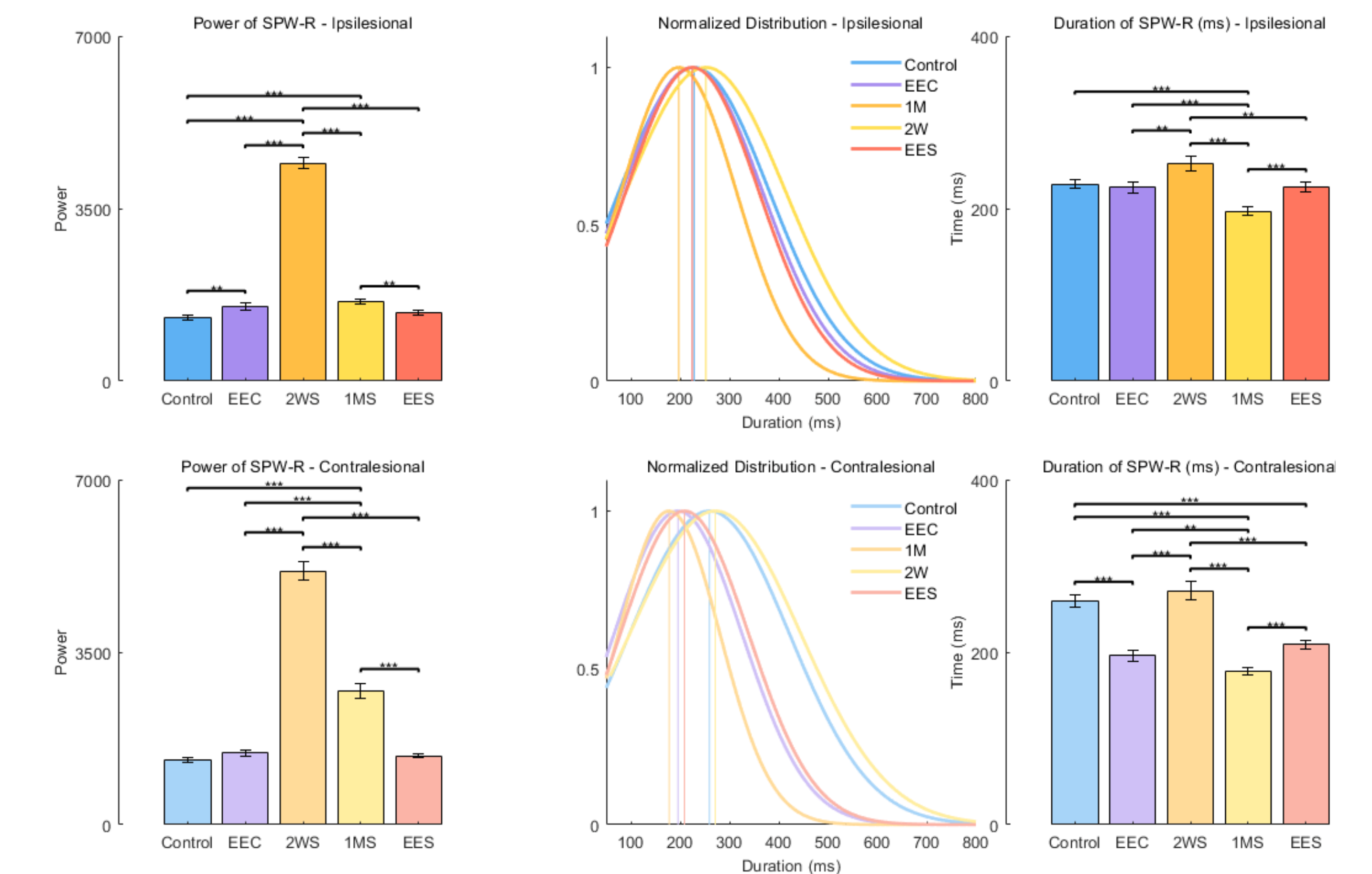
### Signal power changes across frequency bands



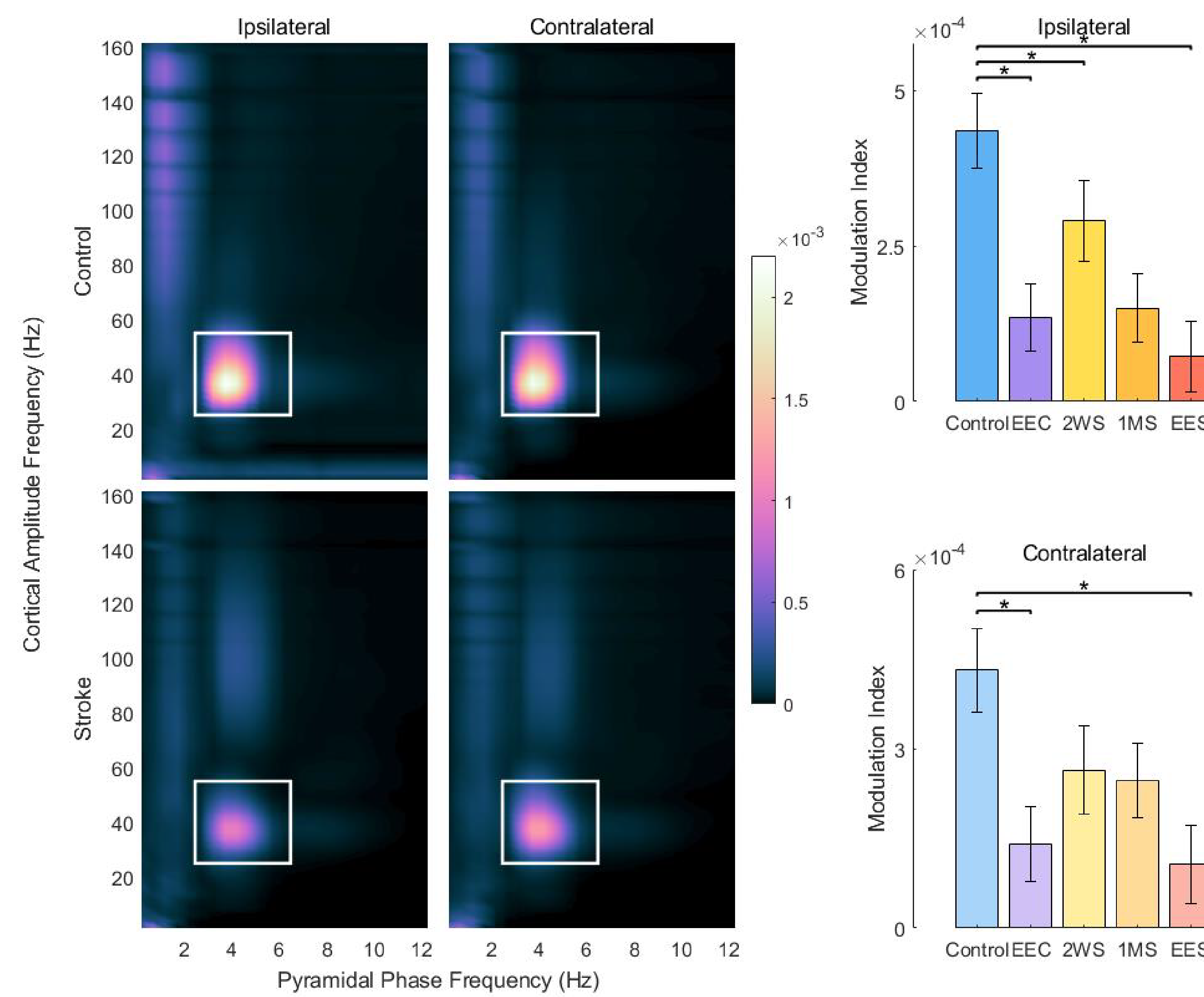
### Brain state stability is disrupted following stroke



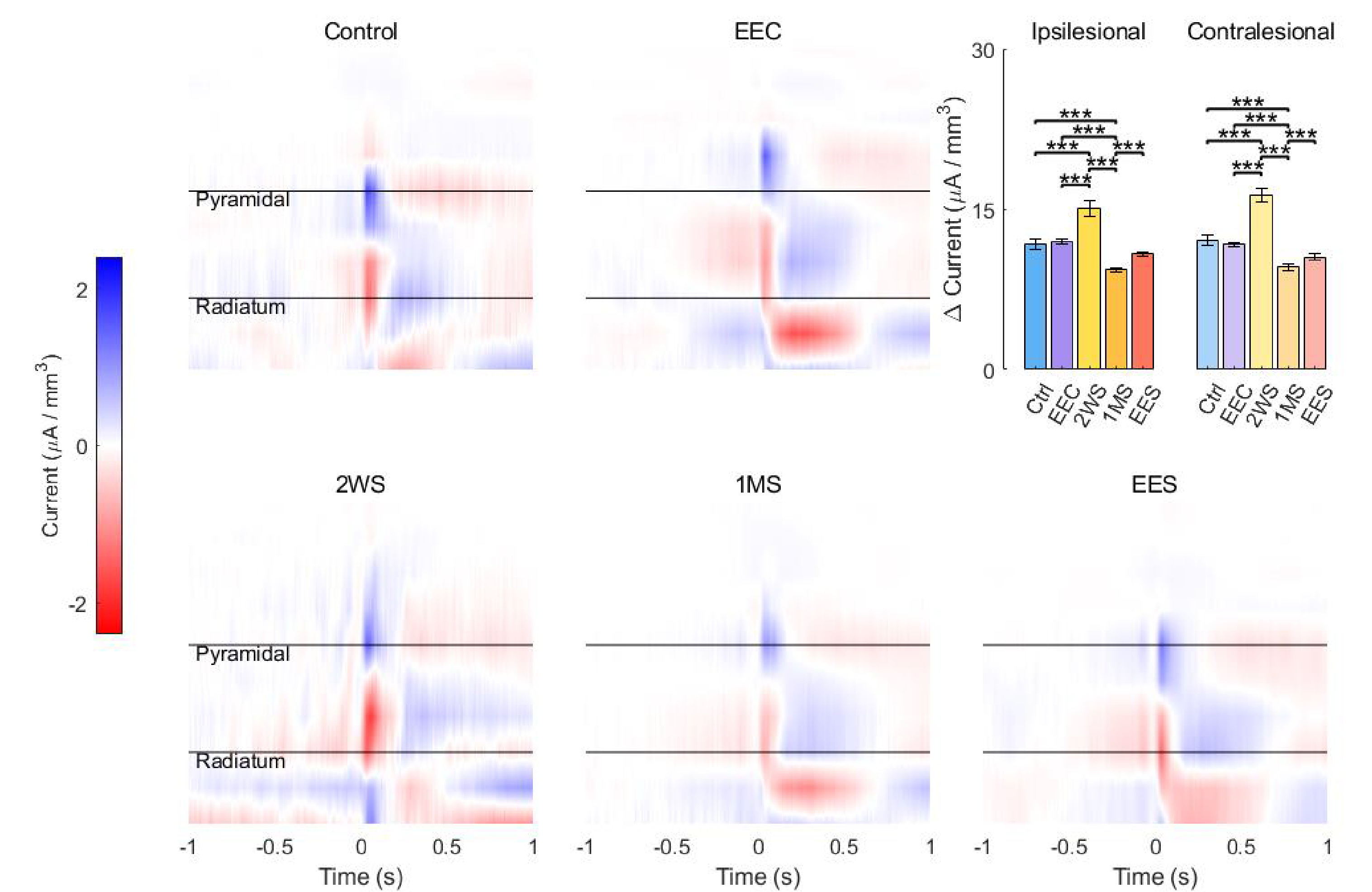
### SPW-R power and duration transiently increase



### Theta-gamma coupling is lowered



### Current-source-density dipoles are lowered



## ACKNOWLEDGMENTS

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