# Resting State Connectivity With Language Domains of the Cerebellum: Can Language Domains of the Brain Be Identified Using Resting State Magnetic Resonance Imaging?

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Traditionally, in neurosurgery planning cortical language areas are identified by having individuals actively perform a language task while the magnetic resonance image (MRI) scan is acquired. However, some individuals are impaired and unable to perform the language tasks making identification of the critical language network unachievable. The goal of this project was to determine if intrinsic connectivity within the brain's language network exists such that the language network can be identified using MRI scans acquired during rest. First, language areas in both the cerebrum and cerebellum were identified using functional MRI (fMRI) scans acquired while individuals were actively performing language tasks. The cerebellar area with the greatest task-based activation served as the seed region in the resting state analysis. For the resting state analysis 10-minutes of fMRI data was acquired. Connectivity with the cerebellum was measured by calculating the correlation between the measured cerebellar signal and the cerebral cortex. Resting state analysis revealed connectivity with Broca's area. Determining that connectivity between brain regions in the language network exist and are identifiable at rest - i.e. even when the brain is not actively engaged in a language task- may help surgeons better identify language domains especially in patients who cannot complete the pre-surgical language mapping scans. Identification of these areas will help identify which areas should not be included in tumor resection, and thus improve patient outcomes.

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