

Network anatomy in the logopenic variant of primary progressive aphasia

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The logopenic variant primary progressive aphasia (lvPPA) is characterized by repetition and naming deficits as well as left temporo-parietal atrophy. However, it is unclear which specific cortical loci are most typically involved in the early stage of the disease and which large-scale brain networks are associated with symptomatology and atrophy progression in lvPPA, according to the network-spreading hypothesis.

First, we identified the regions of peak atrophy in lvPPA patients who were in a milder disease stage (n=15) and derived the intrinsic connectivity networks (ICNs) anchored in these regions using functional MRI from healthy individuals. Second, we established the behavioral relevance of the ICNs in lvPPA patients (n=86) by correlating the structural integrity within each ICN with performance on two language tasks typically impaired in lvPPA: sentence repetition and confrontation naming. Finally, we assessed if the behaviorally relevant networks were significant predictors of atrophy progression in lvPPA patients with longitudinal structural MRIs (n=28).

Our analyses identified two distinct ICNs anchored in the anterior portion of the left angular gyrus and the posterior portion of the left superior temporal gyrus that were preferentially associated with repetition and naming abilities, respectively. Critically, the strength of connectivity within these two behaviorally relevant networks significantly predicted longitudinal atrophy progression in lvPPA.

Our findings of two anatomically and behaviorally dissociable networks deepen our understanding of disease pathogenesis and may explain, at least partially, the anatomical and clinical heterogeneity in individuals with lvPPA. Further studies are needed to determine the specific language functions subserved by these networks.

Conflicts of interest

No conflict of interest