

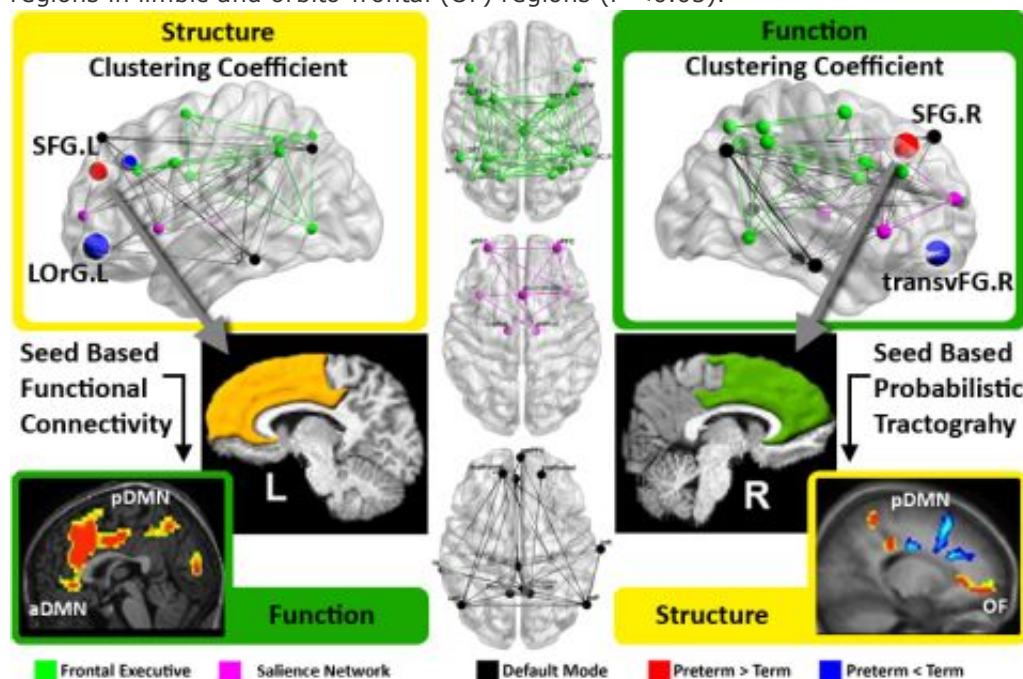
## [2185.7] Altered Glutamatergic Fronto-Limbic Network Connectivity in Late Preterm Preadolescents

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**BACKGROUND:** Glutamatergic fronto-limbic connections are vulnerable during late gestation. Preterm survivors show deficits in executive and behavioral functions likely arising from altered connectivity between fronto-limbic and other fronto-parietal networks, including the salience (SN), central executive (CEN), and default mode (DMN). **OBJECTIVE:** Determine whether alterations cortical network topology (SN,CEN,DMN) are mediated by glutamatergic fronto-limbic connectivity in preterm survivors.

**DESIGN/METHODS:** Using a 1.5T Philips Achieva, 40 pre-adolescent twins (20 late-preterm) underwent DTI, intrinsic connectivity (ic-fMRI) and MR spectroscopy (MRS) localized to the medial prefrontal cortex (mPFC). Cognitive function testing (CFT) included the Rey-Osterrieth Complex Figure Test /NEPSY-II. Graph analysis was performed following anatomic parcellation in BrainSuite (Shattuck). Seed-based probabilistic DTI and ic-fMRI analyses from the mPFC were also performed (Fig 1). Associations between fronto-limbic glutamatergic metabolism and network connectivity were assessed using regression and mediation models with bootstrapping to assess statistical significance.

**RESULTS:** Graph analyses demonstrated altered local interconnectivity (clustering coefficient) in mPFC and SN regions in limbic and orbito-frontal (OF) regions ( $P < 0.05$ ).



Seed-based analyses demonstrated increased and decreased structural connectivity between the mPFC and OF, SN and posterior DMN regions (Fig 1). Functionally, hyperconnectivity was found between mPFC and SN, DMN and CEN regions (Fig 1) despite decrease in global cost-efficiency correcting for CFT. The seed-based associations that predominately overlapped with the SN and OF regions were mediated by glutamatergic concentration in the mPFC ( $p < 0.05$ ).

**CONCLUSIONS:** Fronto-limbic network connectivity is altered in late preterm preadolescent survivors, potentially mediated by glutamatergic metabolism in mPFC regions.

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