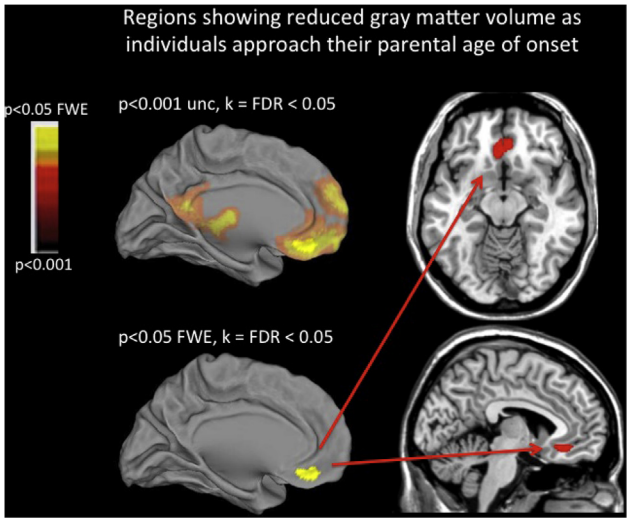
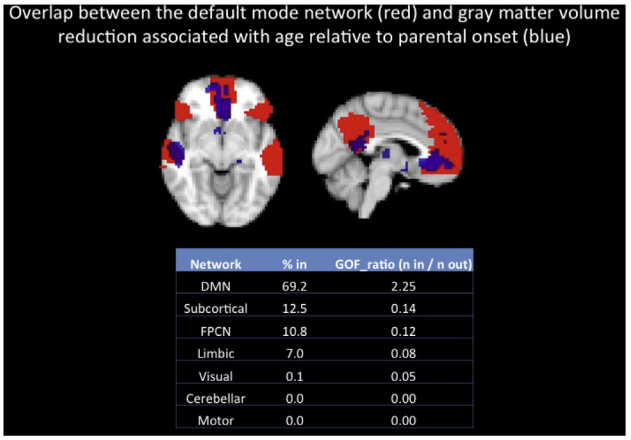
SATURDAY, JULY 23, 2016
ALZHEIMER'S IMAGING CONSORTIUM (AIC)
IC-03
BRAIN NETWORKS AND CONNECTOMICS

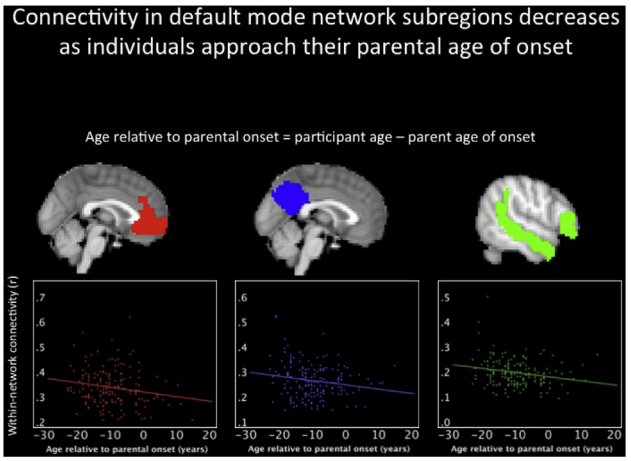
IC-03-01 REGIONAL GRAY MATTER VOLUME AND DEFAULT MODE NETWORK CONNECTIVITY ARE ASSOCIATED WITH AGE RELATIVE TO PARENTAL SYMPTOM ONSET IN SPORADIC ALZHEIMER'S DISEASE

Jacob W. Vogel[1,2], Pierre Orban[2,3,4], Alexa Pichet Binette[1,2], Renaud La Joie[5], Melissa Savard[6], Angela Tam[1,2,4], John C. S. Breitner[1,7], Pierre Bellec[3,4], Sylvia Villeneuve[1,2], the PREVENT-AD Research Group, *[1]McGill University, Montreal, QC, Canada; [2]Centre for Studies on Prevention of Alzheimer's Disease (StoP-AD Centre), Douglas Mental Health Institute, Montreal, QC, Canada; [3]University of Montreal, Montreal, QC, Canada; [4]Centre for Research, Institute of Geriatric Medicine, Montreal, QC, Canada; [5]The University of Caen Normandy U1077, Caen, France; [6]Centre for Studies on Prevention of Alzheimer's Disease (StoP-AD Centre), Douglas Hospital Research Centre, Montreal, QC, Canada; [7]Centre for Studies on Prevention of Alzheimer's Disease (StoP-AD Centre), Douglas Hospital Research Centre, Montreal, QC, Canada. Contact e-mail: jacobwvogel@gmail.com*

Background: In autosomal-dominant familial Alzheimer's disease, individual age of symptom onset correlates with parental onset age. Various AD biomarkers precede dementia onset and show increasing abnormality as mutation carriers approach their parent's onset age. We investigated whether this same principle applies in individuals with a family history of sporadic AD. We explored the association between age relative to parental symptom onset (aPSO) and AD biomarkers in PREVENT-AD, a cohort of cognitively intact persons aged 60+ with a parental history of AD. **Methods:** In 219 individuals, we assessed structural magnetic resonance (MR) images for regional gray matter (GM) volume, as well as functional brain connectivity (resting state fMRI) within the default mode network (DMN). Structural volumes were preprocessed and analyzed with SPM12, using the DARTEL method to define a population-specific template. Voxel-based morphometry (VBM) analysis was performed assessing the relation of aPSO with GM volume, adjusting for age, gender, ApoE4 status and total intracranial volume. Functional connectivity data were preprocessed and analyzed using NIAK. The association between aPSO and functional connectivity was explored within DMN regions defined on an independent dataset, again controlling for age, gender, and ApoE4 status, as well as motion. **Results:** VBM analysis revealed a region in the medial prefrontal cortex (mPFC) that displayed reduced GM volume as individuals approached their parental age of onset ($p < 0.05$ FWE corrected). Relaxing the statistical threshold revealed an atrophy pattern that extended into the posterior cingulate, the left middle temporal lobe, and large portions of the mPFC, as well as in the thalamus (Figure 1). The affected regions overlapped substantially with the DMN (Figure 2). We next carried out functional connectivity analysis within DMN subregions. As individuals approached their parental age of onset, within-region connectivity decreased in the anterior DMN and the lateral DMN (FDR < 0.05), with a similar trend for the posterior DMN (FDR $p < 0.1$; Figure 3). **Conclusions:** In individuals with a parental history of sporadic AD, brain structure and functional connectivity in the DMN appear to covary with aPSO. Longitudinal analyses and replication in separate samples are necessary to determine the predictive potential of tPAO in sporadic AD.







IC-03-02 GREY MATTER CONNECTIVITY IS ASSOCIATED WITH CLINICAL PROGRESSION IN NON-DEMENTED, AMYLOID POSITIVE PATIENTS

Betty M. Tijms[1,2], Mara ten Kate[2], Sander C. J. Verfaillie[1,3], Alida A. Gouw[1,4], Charlotte E. Teunissen[4,5], Frederik Barkhof[1,6,7], Philip Scheltens[1,4], Wiesje M. van der Flier[1,3], *[1]Neuroscience Campus*