Consistent functional connectivity pattern associated with Alzheimer’s disease genetic risk factor APOE4

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BACKGROUND

- Alzheimer’s disease (AD) is the most common cause of dementia in older adults and an effective treatment needs to be administered as early as possible [1].
- Advanced IMRI technics characterize brain change at earliest disease stages of AD [2].
- A genetic risk factor for late-onset sporadic AD is having at least one ApolipoproteinE4 (ApoE4) allele [3].

The aim of our study is to provide a better understanding of brain functional connectivity (FC) in individuals having the genetic risk factor. Our principal hypothesis are that (1) individuals with at least one ApoE4 allele present a different brain FC compared to non-carriers. (2) consistent ApoE4 associated differences in brain connectivity can be observed at all stages of AD.

AIMS

1. Centrality differences
   - APOE4 carriers < APOE4 non-carriers
2. Connectivity strength differences
   - APOE4 carriers < APOE4 non-carriers

RESULTS

- Supramarginal gyrus key region with FC disrupted in Alzheimer’s disease individuals (Kruskalwallis test FDR corrected X²=5.565, p-val=0.01)
- Parahippocampal area key memory region with FC disrupted in Alzheimer’s disease individuals (Kruskalwallis test FDR corrected X²=4.294, p-val=0.038)

CONCLUSION

- Consistent patterns of resting state FC are associated with carriers status of the APOE4 allele.
- This pattern was present in various clinical phenotypes, which may be associated with increased risk and progression of AD: CN, SMC, MCI, AD.
- Additional longitudinal studies are needed to characterize relevance for individual risk profiling and early therapeutical intervention.