

# DIFFERENCES IN DYNAMIC FUNCTIONAL CONNECTIVITY ACROSS THE ALZHEIMER'S DISEASE SPECTRUM

### Background

- Compared to stationary functional connectivity (FC), which averages the connectivity signal over the scan period, dynamic functional connectivity (DFC) allows to investigate temporal variations of FC during MRI acquisition [1]
- In MCI, the disruption of functional connectivity among brain regions may be an early outcome of the neurotoxic AB and tau aggregations in the brain, which may lead to a decline in high-level cognitive functions [2,3]

### **AIM:** To test whether the effects of AD pathology on cognitive decline is mediated by distinct dynamic functional connectivity characteristics

Methods				ADNI Alzheimer's Disease Neuroimaging Initiative
<ul> <li>Subjects:</li> <li>rsfMRI, Aβ and tau PET data of 117 participants were retrieved from the Alzheimer's Disease Neuroimaging Initiative (ADNI) database</li> <li>Aβ-positivity threshold: SUVR &gt; 1.1</li> </ul>		CN- (N= 53)	CN+ (N=36)	MCI+ (N=28)
	Age	72.6 (7.4)	76.4 (7.1)	73.6 (7.5)
	Sex, m/f	24/29	12/24	14/14
	Education	16.6 (2.4)	16.4 (2.5)	16.6 (2.7)
	APOE4, +/-	14/35 (4 NA)	15/16 (5NA)	15/11 (2NA)
	Aβ SUVR	1.09 (0.15)	1.25 (0.23)	1.27 (0.21)

### **Dynamic Functional Connectivity Analysis**



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Prim Vis Vis-Spat High Vis dDMN vDMN Language RECN

## Results



### Conclusion

Abnormally high levels of tau but not amyloid drive the changes in functional connectivity between distinct networks These changes in functional connectivity may be compensatory or maladaptive, given the observed mitigating effect on memory performance

Further investigations are needed to elicudate the effects of dynamic fluidity across the AD spectrum

**Patient organisation** 

Europe \*

### References

- [1] Fiorenzato et al., Brain, 2019
- [2] Sheline et al., Biol Psychiatry, 2013
- [3] Sorg et al., Proc Natl Acad Sci USA, 2007
- $A\beta = Amyloid-beta$ CN = Cognitively normal DFC = Dynamic functional connectivity



**Abbreviations** 

MCI = Mild cognitive impairment PET = Positron emission tomography rsfMRI = Resting state functional magnetic resonance imaging

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