MULTIVARIATE ANALYSIS TO ASSESS THE COMPATABILITY OF THE EUROPEAN ADDNEUROMED AND AMERICAN ADNI STUDIES

E. Westman¹, A. Simmons², J.-S. Muehlboeck¹, P. Mecocci³, B. Vellas⁴, M. Tsolaki⁵, I. Kloszewska⁶, H. Soininen⁷, M.W. Weiner⁸, S. Lovestone², C. Spencer¹, L.-O. Wahlund¹, for the AddNeuroMed Consortium and the Alzheimer's Disease Neuroimaging Initiative

¹Karolinska Institutet, Stockholm, Sweden, ²King's College London, London, UK, ³University of Perugia, Perugia, Italy, ⁴University of Toulouse, Toulouse, France, ⁵Aristotle University of Thessaloniki, Thessaloniki, Greece, ⁶Medical University of Lodz, Lodz, Poland, ⁷University and University Hospital of Kuopio, Kuopio, Finland, ⁸University of California, San Francisco, CA, USA

Introduction: The European Union AddNeuroMed project and the North American-based Alzheimer Disease Neuroimaging Initiative (ADNI) are two large multi-centre initiatives designed to collect and validate biomarker data for Alzheimer's disease (AD).

Aim: This study aims to compare and combine magnetic resonance imaging (MRI) data from the two study cohorts using an automated image analysis pipeline and multivariate data analysis.

Method: A total of 1088 subjects were included in this study (AD=307, MCI=444 and controls=337). MRI data acquisition for AddNeuroMed was set up to be compatible with the ADNI study. The Fischl and Dale method was used to generate regional volume and regional cortical thickness measures and a total of 57 MRI measures were used for multivariate analysis. Models were created for the two cohorts and for the combined cohort to discriminate between AD patients and controls. Finally the ADNI cohort was used as a replication dataset to validate the model created for the AddNeuroMed cohort and vice versa. The combined cohort model was used to predict conversion from MCI to AD.

Result: The AddNeuroMed, ADNI and combined cohorts showed similar patterns of atrophy and the classification accuracy was very similar (between 80-90%). The combined model also showed potential for predicting conversion from MCI to AD.

Conclusion: This study demonstrates that the analysis methods used are robust and that large data sets can be combined if MRI imaging protocols are carefully aligned.