NGF TREATMENT IN ALZHEIMER’S DISEASE: EFFECTS ON BRAIN STRUCTURES

D. Ferreira1,2, G. Spulber2, G. Lind3,4, P. Almqvist4,5, H. Eyjolfsdottir2,6, B. Linderoth3,4, Å. Seiger6,7,8, L.-O. Wahlund2,6, E. Westman2, L. Wahlberg5, M. Eriksdotter-Jönhagen5

1Psychobiology and Methodology, University of La Laguna, La Laguna, Spain, 2Neurobiology, Caring Sciences and Society, Div Clinical Geriatrics, Karolinska Institutet, 3Clinical Neuroscience, Karolinska Institutet, 4Neurosurgery, Karolinska University Hospital, Stockholm, Sweden, 5NsGene A/S, Ballerup, Denmark, 6Geriatrics, Karolinska University Hospital, 7Div Neurodegeneration, Karolinska Institutet, 8Stockholms Sjukhem, Stockholm, Sweden

Introduction: Mature nerve growth factor (NGF) levels are substantially reduced in the basal forebrain of aged animals and Alzheimer’s disease (AD) patients resulting in cell shrinkage, reduction of nerve fiber density and down-regulation of transmitter-associated enzymes with a decrease of cholinergic transmission. It is hypothesized that an unbalance in NGF processing may contribute and in some instances cause, the onset of AD neurodegeneration.

Aims: To study the effects of NGF treatment on brain structures.

Methods: We have treated 6 AD patients with NGF. Encapsulated NGF-producing cells were implanted bilaterally into the basal forebrain. 3 MRI scans were acquired, at baseline (before implantation), 3 months and 12 months from baseline. FreeSurfer longitudinal pipeline provided measures of brain structures and cortical thickness.

Results: All subjects showed shrinkage in grey matter. Positive rates of change were observed from baseline to 1 year follow-up for pallidum and caudate (bilaterally), right amygdala, and in a lesser extent in putamen and hippocampus (bilaterally), right accumbens and right ventral diencephalon. Cortical thickness positive rates of change were observed for the cuneus, lingual, medial orbitofrontal gyri, and right entorhinal cortex.

Conclusions: To our knowledge this is the first study that attempt to investigate effects of NGF on brain structures in AD patients. Preliminary analyses show increased volumes and thicknesses in several brain regions. We are currently exploring the potential information provided by the wealth of data produced by complex image analysis procedures. Further analyses are mandatory to clarify if these changes are related to treatment effects.