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BSc - Biomedical Sciences, University of Antwerp, 2007
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KEYWORDS

Dementia - Alzheimer's Disease - Down syndrome - Neuropsychiatric symptoms - Neurochemistry - Biogenic amines and metabolites - Reversed Phase High Performance Liquid Chromatography - Brain tissue - Cerebrospinal fluid

SCIENCE SUMMARY

Alzheimer's disease (AD) and related dementias are degenerative and irreversible brain illnesses characterized by memory loss, neuropsychiatric symptoms (NPS) and an (over)activated neuroimmune response. Interestingly, people with Down syndrome (DS), a congenital disorder, face accelerated aging and are at extremely high risk to develop AD over time. Along with (sub)cortical depositions of beta-amyloid (Aß) and hyperphosphorylated tau, the neuropathological hallmarks of AD, main monoaminergic nuclei with extensive connections across the brain undergo significant degeneration too. Strikingly, monoaminergic neurotransmitter changes could not only underlie specific NPS in AD or DS, which is important to improve psychotherapeutic options, but might also be of discriminative value to differentiate between these resembling conditions. Therefore, we aim to investigate the biological functionality of the monoaminergic neurotransmitter system in behaviorally rated AD, non-AD and DS with/without AD subjects compared to controls, related to NPS and receptor-associated, neuropathological and neuroinflammatory parameters. More specifically, levels of serotonin (5-HT), (nor)adrenaline ((N)A), dopamine (DA) and metabolites will be analyzed, the regional distribution of Aß and tau will be assessed, 5-HT/(N)A/DA receptor binding potential

differences and monoaminergic receptor mosaics will be studied, and, neuroinflammatory parameters, such as lipocalin-2, will be measured.

SELECTED PUBLICATIONS

Vermeiren, Y., Le Bastard, N., Van Hemelrijck, A., Drinkenburg, W., Engelborghs, S., De Deyn, P.P. (2013) *Behavioral correlates of cerebrospinal fluid amino acid and biogenic amine neurotransmitter alterations in dementia.* Alzheimers Dement. **9**(5): 488-498.

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Van Dam, D., **Vermeiren, Y.**, Aerts, T., De Deyn, P.P. (2014) *Novel and sensitive reversed-phase high-pressure liquid chromatography method with electrochemical detection for the simultaneous and fast determination of eight biogenic amines and metabolites in human brain tissue*. J. Chromatogr. A. **1353**, 28-39.

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