A peptide vaccine against Parkinson's Disease

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Research question and background

Many efforts aim at treatment of Parkinson's disease or at immunotherapy (1,2). The disease is a neurodegenerative disorder in which loss of dopaminergic neurons is a major hallmark. Neurons in decline accumulate insoluble large aggregates of the misfolded protein α-synuclein in so-called "Lewy bodies".

In spite of the intracellular accumulation of α-synuclein, misfolded smaller (soluble) aggregates have also been found in blood and cerebrospinal fluid of patients. In addition, transplantation of embryonic neurons to patients have indicated that α-synuclein behaves as a prion-like protein (3).

Methods and tissues used

An immunization study with transgenic model mice, expressing human α-synuclein, has been reported (4). The mice were immunized using human α-synuclein as antigen.

Results and conclusion

The results suggest that vaccination is effective in reducing neuronal accumulation of α-synuclein and that further refinement of this approach might become also effective in treatment of Parkinson's disease and dementia with Lewy bodies (5).

Intravacc has prepared experimental peptide vaccines. These vaccines have been used in preclinical studies. Since November 2014, mice sera obtained are being used for immunostaining of tissue provided by the Netherlands Brain Bank. In March 2015, analysis of the results was still in progress.

1. Nature Outlooks (August 26, 2010). Parkinson's disease.
2. Olanow and Schapira (2013). Therapeutic prospects for Parkinson disease. Ann. Neurol. **74**, 337-347.
3. Olanow and Brundin (2013). Parkinson's disease and alpha synuclein: is Parkinson's disease a prion-like disorder? Mov. Disord. **28**, 31-40.
4. Masliah et al. (2005). Effects of □-synuclein immunization in a mouse model of Parkinson's disease. Neuron **46**, 857-868.
5. Masliah et al. (2011). Passive immunization reduces behavioral and neuropathological deficits in an alpha-synuclein transgenic model of Lewy body disease. PLoS ONE. 6(4); e19338.