

TURUN YLIOPISTO

Lääketieteellinen tiedekunta

HEISKANEN LAURI: Season of death and nigral neuronal density in a high latitude region

Syventävien opintojen kirjallinen työ

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A recent study suggested that there may be large seasonal differences between the densities of midbrain tyrosine hydroxylase immunopositive (TH+) and immunonegative (TH-) neurons in the human brain. This is potentially important as a difference of this magnitude could be associated with clinical seasonal differences in the symptoms or epidemiology of dopamine-associated conditions, such as has been reported in schizophrenia.

The present study aimed to examine in detail if there are seasonal differences in the dopamine neurons of the substantia nigra pars compacta (SNc). Together with a larger sample of healthy subjects, we extended the analysis to Parkinson's disease (PD), a hypodopaminergic condition, and analysed the SNc of persons who had lived and died in Finland, a high latitude region with large seasonal daylight variations. A total of 40 cases were selected for the study (20 PD patients and 20 healthy controls). Half of the subjects had died during the long photoperiod and the other half had died during the short photoperiod.

The results showed that there were no significant differences in the densities of TH+ or TH- neurons between healthy subjects who had died in summer or in winter (TH+ $F=0.74$ $p=0.40$; TH- $F=2.6$ $p=0.13$). The effect was similarly non-significant in PD (TH+ $F=1.8$ $p=0.19$; TH- $F=0.35$ $p=0.56$). The only significant seasonal effect was observed in the SNc counting area, which was slightly smaller in patients who had died in the summer compared to patients who had died during the winter (Season effect $F=9.24$, $p=0.004$).

These results do not support clinically relevant photoperiodic seasonal changes in the healthy or diseased nigral dopamine system.

Keywords: Dopamine, substantia nigra, Parkinson's disease