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Depression and Parkinson's Disease: Role of the Locus Coeruleus

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Introduction:

Depression affects around 35% of patients with Parkinson's disease. There are some overlapping symptoms between both illnesses, and some evidence seems to suggest that there may exist a common underlying etiological factor, namely changes in cortico-striatal-thalamo-cortical circuits and in the *locus coeruleus*.

Objective:

To review the potential role of *locus coeruleus* alterations in patients with Depression and comorbid Parkinson's disease.

Methods:

A literature review was performed through MEDLINE and PsycINFO using the terms 'Depression", 'Parkinson's disease", 'neurobiology", '*locus coeruleus*", '*substantia nigra*", 'neuromelanin", 'neuroimaging", 'magnetic resonance imaging", 'Positron emission tomography". All articles found were selected according to their adequacy to the subject in question.

Results:

Noradrenergic pathways are important in the pathophysiology of Depression in Parkinson's disease. Magnetic Resonance Imaging (MRI) studies, with neuromelanin measurements have shown there is neuronal loss not only in the *substantia nigra* but also in the *locus coeruleus*. These changes in the *locus coeruleus* are different when patients with Parkinson's disease are compared with schizophrenic and normal controls. Patients with comorbid Depression and Parkinson's disease have a reduced uptake of [11C]RTI-32 in the *locus coeruleus*, with an inverse relationship between those changes and symptom severity. There is a higher prevalence of histopathologic changes (neuronal loss 7 times higher, gliosis) in the *locus coeruleus* of depressed vs. non-depressed patients with Parkinson's disease.

Conclusion:

These findings seem to substantiate the potential role of noradrenergic pathways in the aetiology of Depression in Parkinson's disease.

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