

This Week's Citation Classic

Poirier L J & Sourkes T L. Influence of the substantia nigra on the catecholamine content of the striatum. *Brain* 88:181-92, 1965.

[Dept. Sci. Neurologiques, Univ. Montreal and Allan Mem. Inst. Psychiatry, and McGill Univ., Montreal, Canada]

The evidence that a well-identified group of neurons (originating in the substantia nigra) exert through their efferent fibers a direct role in the elaboration of a specific substance (dopamine) in a distant structure (the striatum) contributes to a better understanding of brain circuitry. Moreover, this intracerebral 'dopaminergic' pathway is directly involved in Parkinson's and related diseases. [The SCⁱ® indicates that this paper has been cited over 265 times since 1965.]

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"This paper represents a typical example of novel conclusions derived from the pooling of biochemical and morphological expertise of two independent investigators. Without the conjunction of the two approaches the results could have been dealt with only speculatively. We began our collaboration in May 1963. Poirier, who was working as a neuroanatomist in the department of neurological sciences. University of Montreal, had a few years before suggested a close relationship between the dysfunction of the substantia nigra and the development of motor disorders associated with Parkinson's disease. He did so on the basis of the histopathological changes found in the brains of monkeys in which features of Parkinson's disease had been experimental-

ly reproduced.¹ Sourkes, head of the Neurochemical Laboratory at the Allan Memorial Institute of Psychiatry at McGill, had been studying the chemistry of extrapyramidal disorders.² The finding that the dopamine concentration was low in the striatum of the brains from Parkinsonian patients,³ together with Poirier's observation, led to the search for an intracerebral nervous pathway that plays a role in the synthesis of dopamine and which is at fault in Parkinson's disease.

"By making selective lesions of the brain and correlating the histopathological and biochemical data we disclosed a direct relationship between morphological changes in the substantia nigra and biochemical impairment in the striatum, thus leading us to deduce the existence of a nigrostriatal dopaminergic pathway functioning in the control of motor activity. By the fall of 1963, we were able to report some of our results at the Second Conference on Parkinson's Disease in Washington, DC.

"The data derived from this and related investigations provided the experimental basis for tying together the alterations in nigral histology and striatal dopamine with the pre-mortem existence of clinical Parkinsonism. Further, the work stimulated studies aimed at the identification of neurochemically defined pathways and their role in behavioral and psychoneuroendocrinological phenomena.

"This paper underlines the importance of collaborative work between investigators in different disciplines. By establishing a proper dialogue each researcher materially increases his contribution but, more so, the rate of progress of knowledge. In addition to the obvious advances contributed by specialized researchers and the multipolar experts, there is still a great need for investigations based on the combined efforts of scientists who agree to share their skills in order to achieve a synthesis that neither could attain working alone."

1. Poirier L J. Experimental and histological study of midbrain dyskinesias. *J. Neurophysiol.* 23:534-51, 1960.
2. Sourkes T L. Cerebral and other diseases with disturbances of amine metabolism. *Progr. Brain Res.* 8:186-200, 1964.
3. Ehringer H & Hornykiewicz O. The diffusion of nonadrenalin and dopamine (3-hydroxy-tyramin) in the human brain and their suppression in diseases of the extrapyramidal systems. *Klin. Wochenschr.* 38:1236-39. 1960.