

Immunohistochemical analysis of axillary skin biopsies for the detection of adrenergic innervation of sweat glands in normal subjects and Parkinson's disease patients

Ivan Presta¹ - Chiara Mignogna¹ - Gabriella Cardillo¹ - Anna Di Vito² - Giuseppe Donato¹ - Tullio Barni²

¹ Dipartimento di Scienze della Salute, Università degli Studi "Magna Graecia" di Catanzaro, Catanzaro, Italia

² Dipartimento di Medicina Sperimentale e Clinica, Università degli Studi "Magna Graecia" di Catanzaro, Catanzaro, Italia

Beside the typical motor symptoms Parkinson's disease (PD) is characterized, with varying severity, by autonomic dysfunction. Several studies have shed light on the anatomical and molecular changes that underlie the peripheral neuronal degeneration associated with PD and other Lewy body (LB) diseases (LBDs). By using skin biopsies from LBDs patients it was possible to detect misfolded phospho- α -synuclein (p-syn) deposits within dermal nerve fibers and correlate them with a reduced density of small nerve fibers. (1, 2). The skin biopsy approach is an inexpensive and minimally invasive technique. To date, there is not a standardized procedure for sampling site, tissue processing and nerve fibre assessment, so the goal of a diagnostic instrument for an early diagnosis of (LBDs) still remains a challenge. We have carried out a retrospective study setting up a novel protocol based on 10 μ m thick serial sections from FFPE axillary skin biopsies. This choice take advantage from the presence of apocrine glands in the axillary region, as they receive a dense sympathetic adrenergic innervation, exploitable for a clear nervous fibers tracking. The biopsies were taken from 14 individuals who had been, in the first instance, diagnosed with various traits of motor and neurological dysfunction and two control subjects. Serial tissue sections were analysed by IHC (DAB chromogen) and by immunofluorescent labelling, using anti-p- α -synuclein (S129), anti- α -synuclein, anti-PGP9.5 and anti-tyrosine hydroxylase antibodies. This particular setting has proven useful to well highlight the adrenergic fibers surrounding the apocrine sweat glands and to visualize the fibers α -synuclein deposition. Our results enabled us to support the first diagnosis in various cases with probable PD but gave a negative p-Syn-S129 immunoreactivity results for samples from vascular Parkinson, multiple system atrophy, essential tremor and frontotemporal dementia. Our methodological setting is able to detect the adrenergic innervation of sweat apocrine glands and both the presence of Lewy bodies and Lewy neurites in axillary skin biopsies.

References

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- [2] Wang et al. (2013) Alpha-synuclein in cutaneous autonomic nerves. *Neurology* 81:1604–1610.

Keywords

Parkinson's disease; apocrine sweat glands; skin biopsies; adrenergic fibers.