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Distribution and characterization of α-syn and VIP immunoreactivity in the enteric nervous system of human small intestine

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The enteric nervous system (ENS), our "second brain", consists of a complex network of neurons and glial cells located within the gastrointestinal (GI) tract. ENS interacts through numerous neurotransmitters, and it can work independently of the central nervous system (CNS), modulating several functions within the GI tract (1). The ENS has two ganglionated plexuses, the myenteric and submucosal plexuses. There is increasing evidence that several neurodegenerative diseases are not confined to the CNS but also to the peripheral nervous system (PNS), including the ENS (2). In 2003, Braak et al. theorized that the biological process underlying Parkinson Disease (PD) may originate in the ENS and may lead to CNS impairment (3). Alpha-synuclein (α-syn), a small presynaptic protein involved in the pathogenesis of PD, is abundantly expressed in the CNS, but also in the peripheral nerves of PD patients (4). In the normal gut, distribution of α-syn has been reported in the nerve fibers of the lamina propria, sub-mucosa, and in the ganglia (5). Dysfunctions of vasoactive intestinal peptide (VIP) have been associated with impaired motility in inflammatory bowel diseases (6). The present study aims to characterize the presence of α-syn and VIP in the normal human jejunum. Specimens of proximal jejunum were collected from patients and sections underwent immunohistochemical procedure using antibodies for α-syn and VIP. Alpha-syn immunoreactive (ir) structures were detected along both plexuses as well as in the circular and longitudinal muscular layers. We found perivascular α-syn-ir fibers in the submucosa and a dense ir periglandular network projecting in the axis of the villi. The distribution pattern of α-syn and VIP has been compared. Our preliminary observations of co-distribution of α-syn and VIP may elucidate their physiological role in the ENS and can shed light on how their structural alterations could contribute to the visceral pathogenesis of neurodegenerative disease.

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