

# Atrophic submucosal neurons in Parkinson's disease

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Parkinsonism often presents gastrointestinal (GI) symptoms, especially constipation. Studies of the enteric nervous system and microscopic details of enteric neuropathy have often been performed in the myenteric plexa, using full-thickness biopsy and immunostaining.

The *aim* of the present study was to examine if pathologic changes are present also in the submucosal plexa, and could be identified with conventional hematoxylin & eosin (H&E) staining.

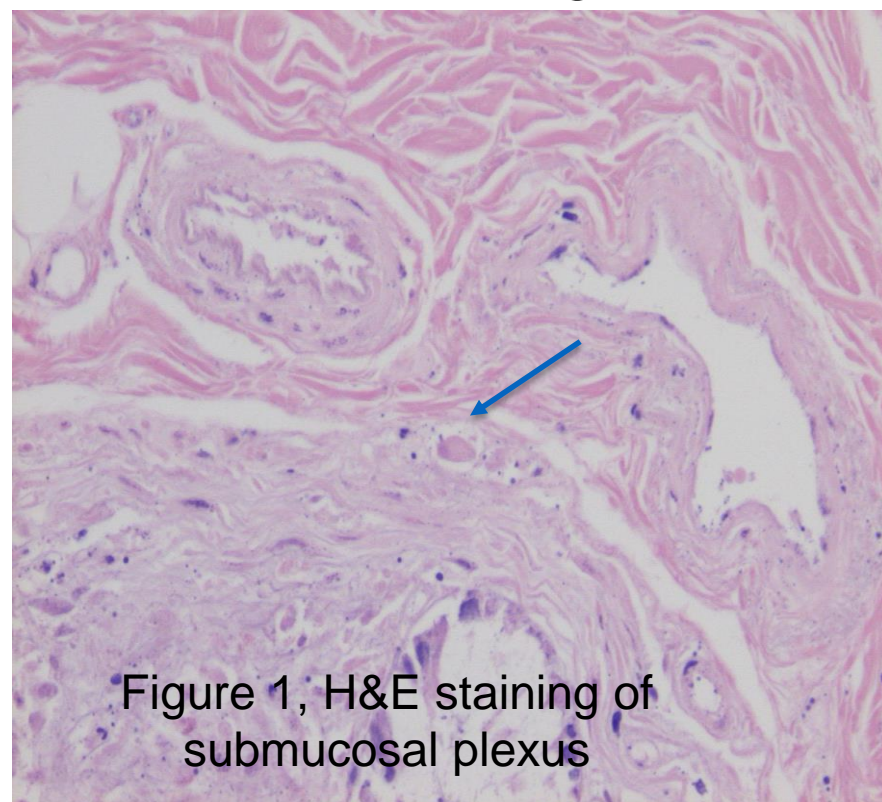


Figure 1, H&E staining of submucosal plexus

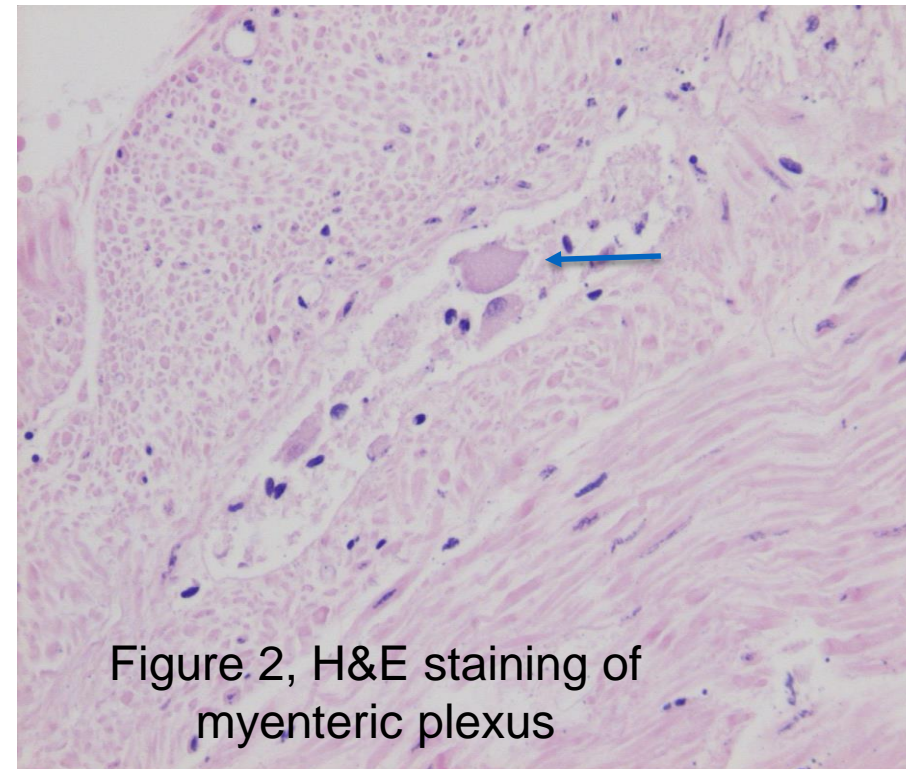


Figure 2, H&E staining of myenteric plexus

20 deceased cases (male/female 11/9, median age 77 (73-84) years) of Parkinson's disease with GI symptoms and 10 controls of non-Parkinson, intestinally asymptomatic individuals (male/female 7/3, median age 78 (62-83) years) were examined. The intestinal tract was sectioned at 5  $\mu$ m thickness and stained with H&E and immunostaining for alpha-synuclein. Magnification x200.

In 15 of these cases (male/female 7/8) expressed atrophic/pyknotic nerve plexus cells, i.e. signs of ganglionic degeneration in the submucosal (Figure 1) and/or myenteric plexa (Figure 2), mostly in both. The degenerative signs were corroborated by findings of positive alpha-synuclein immunostaining (Figure 3). The remaining 5 cases, revealed minimal alpha-synuclein deposits in 3 cases.

None of the controls showed any signs of ganglionic degeneration.

It seems possible to identify signs of ganglion cell pyknosis and degeneration in both submucosal and myenteric plexa.

This indicates a potential of diagnosing a ganglionic dysfunction by conventional histopathological methods in the more easily available submucosal plexa, which can be reached endoscopically.

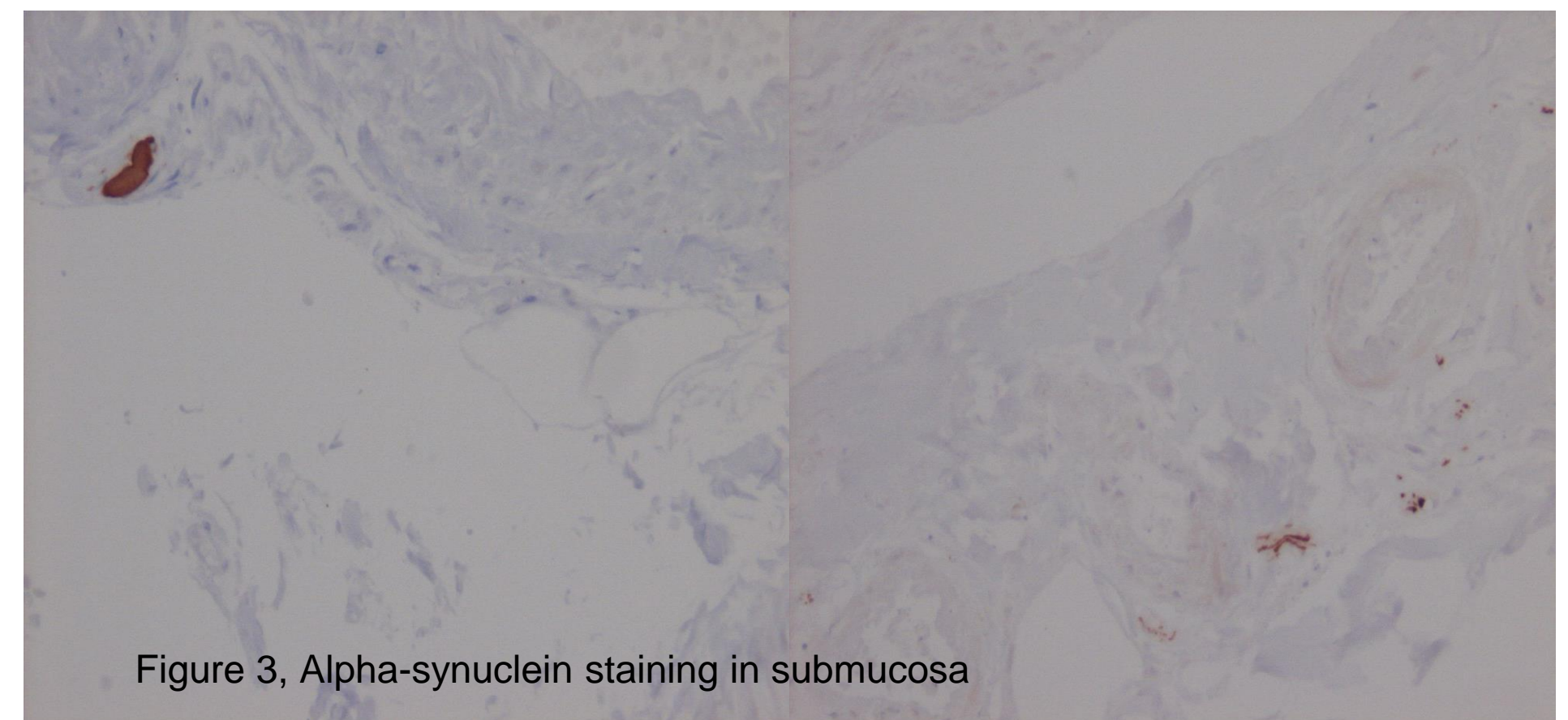


Figure 3, Alpha-synuclein staining in submucosa