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Nerve Remodelling and Inflammation in Diverticular Disease

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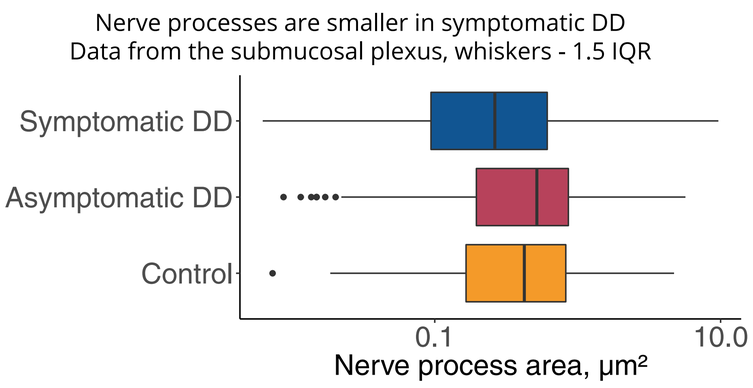
Research suggests that disrupted neural control of colonic motility plays a pathogenetic role in diverticular disease (DD). What changes are expected on an ultrastructural level?

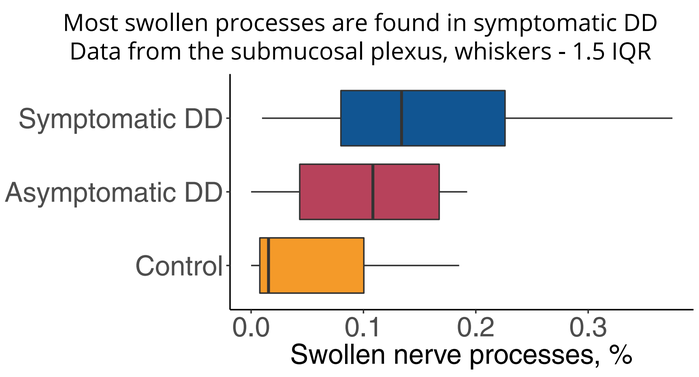
1. Nerve processes are affected by inflammation

Swollen nerve processes were more frequent in symptomatic disease compared to asymptomatic disease and control groups in the submucosal (SDD 16.19%, ADD 10.23%, control 6.69%) and myenteric (SDD 16.40%, ADD 6.52%, control 10.16%) plexuses.



2. Nerve processes show changes in area

In asymptomatic patients, the median area of healthy nerve process profiles was lower in the myenteric plexus. Healthy nerve process profiles of the submucosal plexus were smaller in symptomatic patients. Given the smaller variance of the submucosal plexus, the decrease could be a property of remodelling.



3. Mast cells adjacent to enteric nerves

In the inner submucosal plexus, we frequently found mast cells near enteric nerves in symptomatic patients. The nerves lacked a perineurium, indicating that the two interact, potentially engendering symptoms (such as constipation or abdominal pain) in patients.

Funding

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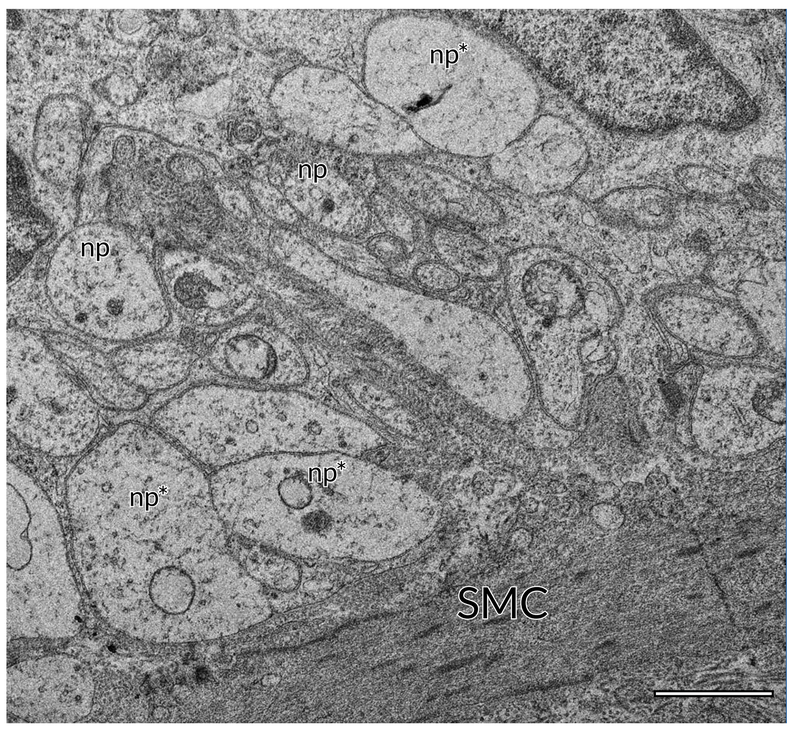
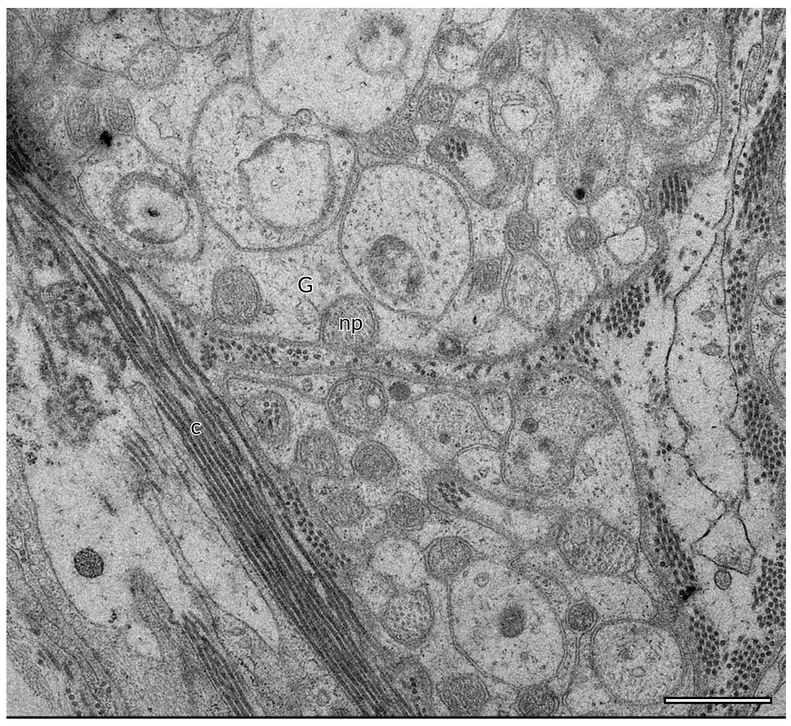
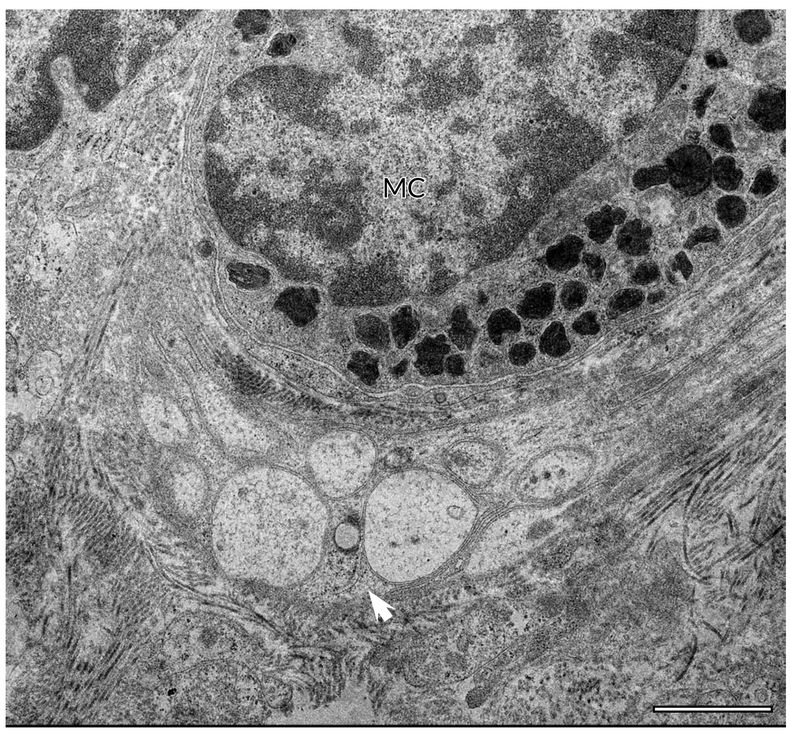


Electron micrograph of the myenteric plexus. Note the swollen axons as well as the decreased size of nerve processes. N - nerve process, * - swollen, SMC – smooth muscle cell. Scale bar = 1 μm



Electron micrograph of the submucosal plexus. While still enveloped by glial cell processes, axons are visibly smaller. np - nerve process, G – glial cell process, c – collagen.
Scale bar = 1 μm



Mast cell (MC) impinging on an enteric nerve (arrowhead). Scale bar = 1 μm

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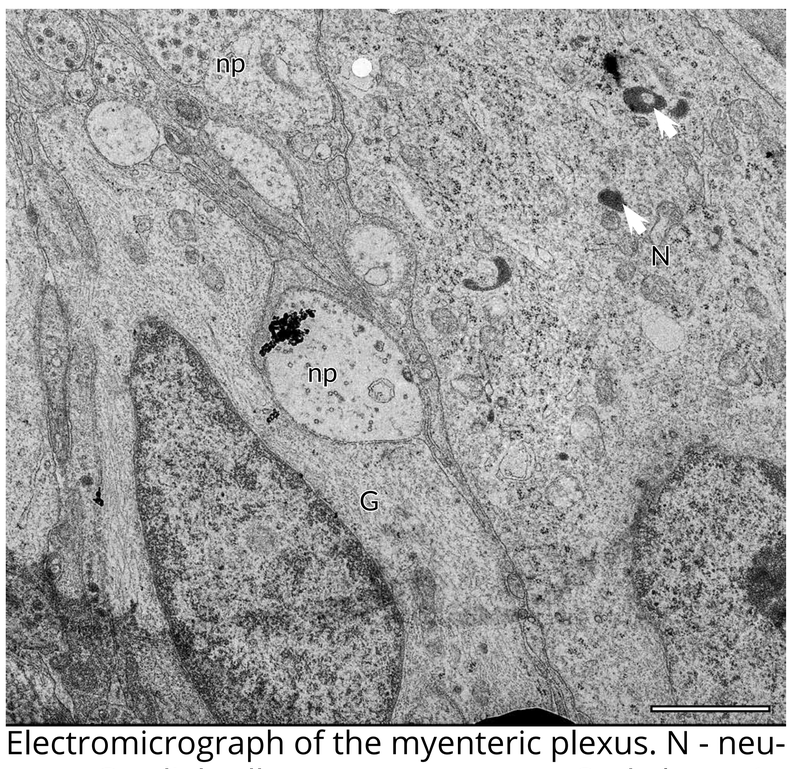
4. Enteric neurons contain lipofuscin-like inclusions

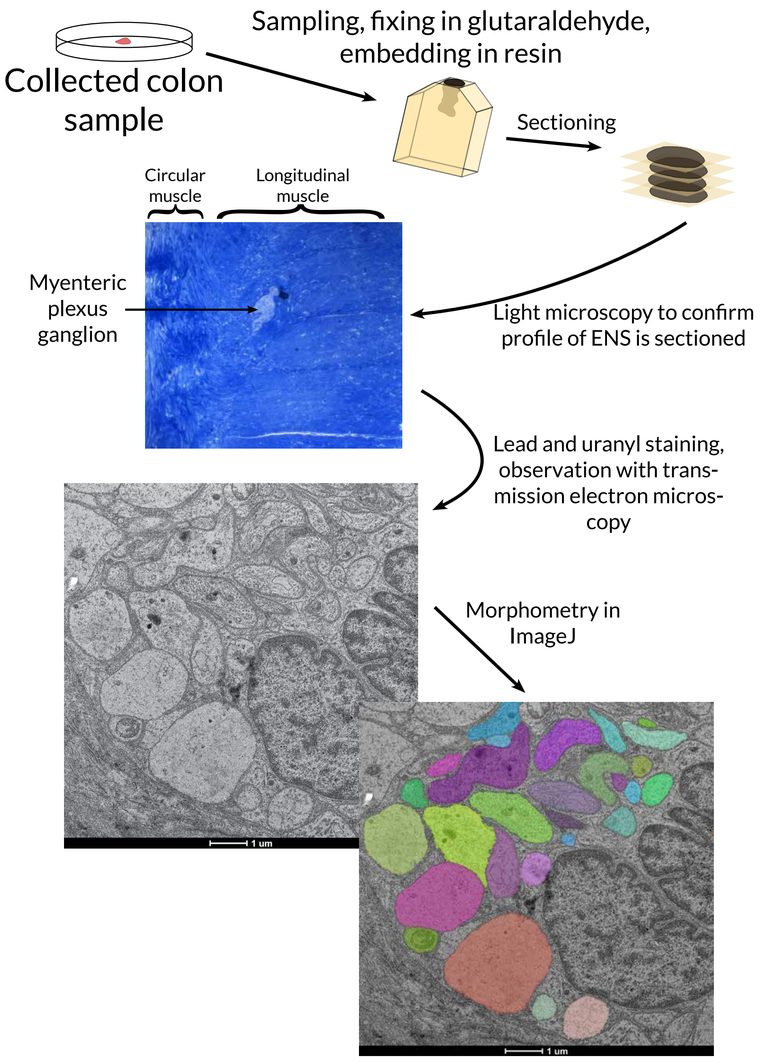
Neurons in both plexuses contained structurally heterogenous lipofuscin inclusions of various sizes in all patient groups.



Electromicrograph of the myenteric plexus. N - neuron, G - glial cell, np - nerve process. Scale bar = 1 μm

Methods

6 patients with asymptomatic DD (ADD), 10 with symptomatic DD (SDD), and 11 healthy patients were used for the study. SDD sigmoid colon samples were collected from patients who underwent elective surgery. Specimens of healthy (control) and ADD-affected sigmoid colon were collected from patients operated on for non-obstructing colon tumours.



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