ACCURATE AND ROBUST COLLAGENOUS COLITIS DETECTION IN HISTOLOGICAL IMAGES USING FEATURES EXTRACTED FROM SEGMENTED AREAS BASED ON SUPERPIXELS TOGETHER WITH DEEP LEARNING

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A pilot study developed a deep learning algorithm to segment histological images of collagenous colitis, achieving 80.7% accuracy in identifying the diagnostic feature of thickened subepithelial collagen layer.

KEY POINTS

- The algorithm was tested on 50 images from 5 treatment-naive patients with newly diagnosed collagenous colitis and achieved 80.7% accuracy, 80.1% sensitivity, and 81.3% specificity in classifying image segments.
- The approach used superpixel segmentation and a feed-forward neural network trained on expert-annotated histological specimens stained with H&E at 20x magnification to identify thickened subepithelial collagen layer.
- Collagenous colitis is a form of microscopic colitis diagnosed only by histological examination of biopsies from normal-appearing mucosa, with subjective interpretation leading to inter-rater variability.
- The authors propose that deep learning-based assistance could objectivise diagnostic feature selection and potentially minimize inter-rater variability in collagenous colitis diagnosis.
- This pilot study is relevant to pathologists and gastroenterologists interested in computer-assisted diagnostic tools for microscopic colitis.

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