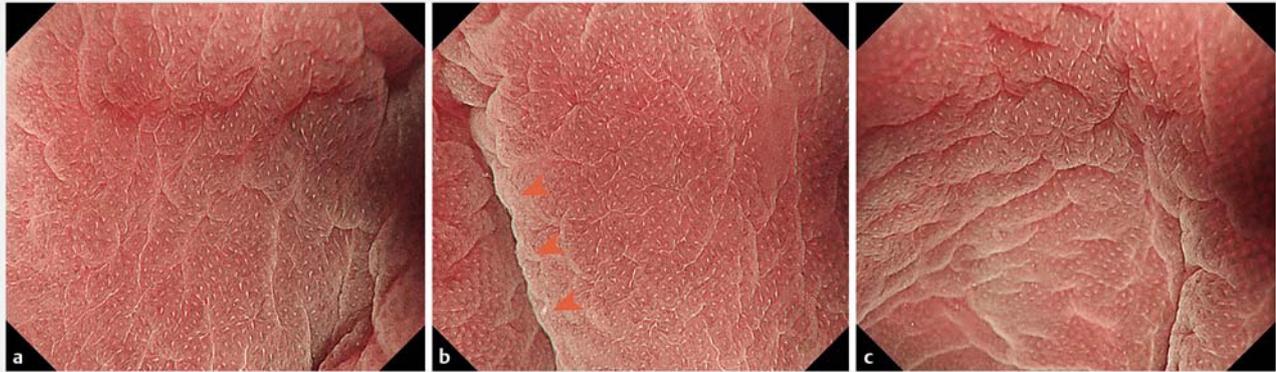


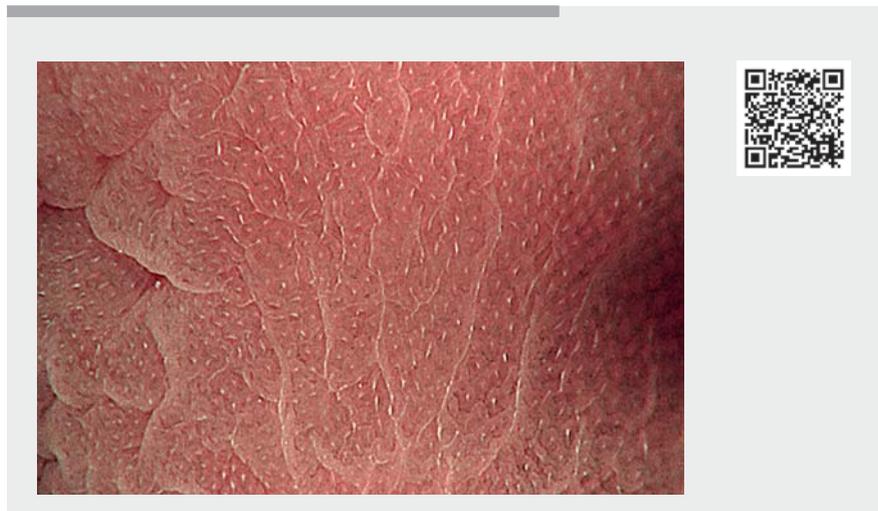
## Light blue crest sign visualized by magnifying endoscopy in normal colonic mucosa



► **Fig. 1** Normal colonic mucosa by magnifying endoscopy and narrow-band imaging. **a** The colon was partially collapsed and innominate grooves reappeared. Light blue crest (LBC) signs could be seen in the innominate grooves and crypt openings. **b** The long, linear, LBCs could be seen in tangential view of colonic mucosa (arrowheads). **c** Dot- or rod-like LBCs could be seen in partial crypt openings.

Light blue crest (LBC), defined as a fine, blue-white line on the crests of the epithelial surface/gyri, is always discerned at the edge of marginal crypt epithelium [1]. The optical sign has high specificity for the endoscopic identification of gastric intestinal metaplasia [1]. It can only be visualized by magnifying endoscopy with narrow-band imaging or blue-laser imaging, and is caused by the reflectance of short-wavelength light (400–430 nm) on the microvillous surface of the epithelium [1, 2]. LBC is naturally seen in normal small intestine due to regular microvilli arrangement [1]. Herein, we describe the LBC sign in normal colonic mucosa.

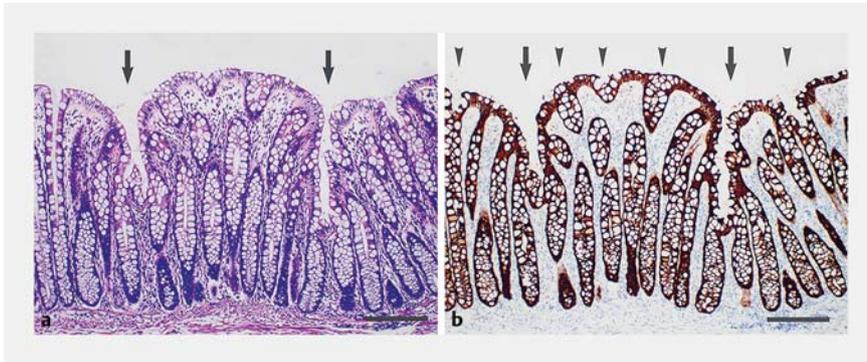
Colonic screening (GIF-H290Z; Olympus, Tokyo, Japan) was performed in a 40-year-old healthy man. When the colonic mucosa was fully dilated, the LBC sign could hardly be found. However, when the colon was partially collapsed and innominate grooves reappeared, creating a finely nodular surface, long linear LBCs could be seen in the corresponding grooves (► **Fig. 1 a**, ► **Video 1**) or in tangential view of the colonic mucosa (► **Fig. 1 b**). Dot- or rod-like LBCs could also be found in partial crypt openings (► **Fig. 1 c**).



► **Video 1** Light blue crest (LBC) sign is naturally seen at the edge of the villi in normal duodenum. Innominate grooves reappear in the colon following partial collapse. Linear, dot- or rod-like LBCs can be seen clearly in innominate grooves and crypt openings.

Numerous crypts of Lieberkühn and innominate grooves were observed on the surface of colonic mucosa by scanning electron microscopy [3]. Examination by light microscopy of sections treated with hematoxylin and eosin and with immunohistochemical stains revealed that several crypts of Lieberkühn opened into innominate grooves (► **Fig. 2**) [3]. Inno-

minate grooves and the upper part of Lieberkühn crypts were lined by mature absorptive cells [3], which possessed closely packed regular microvilli [4]. In tangential view of colonic mucosa (namely, perpendicular view of microvillous longitudinal axis), LBCs can be obtained by magnifying endoscopy, with regular microvilli illuminated by narrow-band



► **Fig. 2** Histological examination. **a** Hematoxylin and eosin staining revealed several crypts of Lieberkühn opening into innominate grooves (arrow) ( $\times 100$ ; bar  $200\ \mu\text{m}$ ). **b** Villin immunohistochemical staining. Villin is a structural protein of microvilli. Positive areas represent the distribution of microvilli on the surface of colonic epithelial cells in innominate grooves (arrow), crypts (arrowhead), and between crypts ( $\times 100$ ; bar  $200\ \mu\text{m}$ ).

blue light. No LBCs can be seen in normal gastric mucosa due to the lack of regular microvilli in foveolar epithelium [5].

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### Competing interests

The authors declare that they have no conflict of interest.

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