A DUAL-WAVELENGTH EXCITATION METHOD  
TO VISUALIZE COLONIC NEOPLASMS

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Hypoxia is commonly seen in primary solid neoplasms. Hypoxic stress induces the intracellular accumulation of nicotinamide adenine dinucleotide (NADH). The intestinal mucosa contains abundant NADH. In this study, we sought to investigate NADH fluorescence in human colonic adenomas and then develop a novel imaging method for detection of adenomas. For this purpose, 45 adenomas treated by endoscopic mucosal resection were studied. After serial acquisition of autofluorescence images (470 nm) illuminated with dual-wavelength excitation at 365 nm (F_{365}) and 405 nm (F_{405}) on the specimens, ratio images were produced by dividing F_{365} by F_{405}: The excitation-emission wavelength pairs in F_{365} and F_{405} were targeted at NADH fluorescence and reference fluorescence. The F_{365}/F_{405} ratio values of the adenomatous mucosa were higher than those of the normal mucosa. F_{365}/F_{405} ratio images clearly delineated diminutive adenomas as well as large adenomas from the normal mucosa. We conclude that the dual-wavelength excitation method is a promising technique applicable to endoscopic detection of early colonic neoplasms.

References