In vivo diagnosis of murine pancreatic intraepithelial neoplasia and early-stage pancreatic cancer by molecular imaging.

Pancreatic ductal adenocarcinoma (PDAC) is a fatal disease with poor patient outcome often resulting from late diagnosis in advanced stages. To date methods to diagnose early-stage PDAC are limited and in vivo detection of pancreatic intraepithelial neoplasia (PanIN), a preinvasive precursor of PDAC, is impossible. Using a cathepsin-activatable near-infrared probe in combination with flexible confocal fluorescence laser microscopy (CFL) in a genetically defined mouse model of PDAC we were able to detect and grade murine PanIN lesions in real time in vivo. Our diagnostic approach is highly sensitive and specific and proved superior to clinically established fluorescein-enhanced imaging. Translation of this endoscopic technique into the clinic should tremendously improve detection of pancreatic neoplasia, thus reforming management of patients at risk for PDAC.