

Smart Endoscope Systems by Using Soft Materials and Transparent Bioelectronics for Colon Cancer Treatment

이영식^{1,2}, 김대형^{1,2,†}

¹Center for nanoparticle research, Institute for basic science; ²School of chemical and biological engineering, Seoul national university

(dkim98@snu.ac.kr[†])

Although endoscopes provide imaging of gastrointestinal tracts and surgical therapies for diagnosis and therapy of tumors, current endoscopes are short of high resolution diagnosis and active therapy due to large size, deficient resolution, and shortened functions. To diagnose and treat diseased tissues precisely, a new integrated surgical system on the small area of an endoscope tip is required. Here, we present a smart endoscope system integrated with transparent bioelectronics and theranostic nanoparticles for diagnosis and therapy of the colon cancer. Transparent bioelectronics on the endoscope camera enable impedance- and pH-based tumor detection and RF ablation therapy, which present accurate diagnosis and removal of small and scattered tumors. Contact and temperature sensors give the deliberate control to RF ablation. In addition, theranostic NPs provide fluorescence-based imaging and localized photo- and chemotherapy by targeted delivery to the tumors. The multifunctional endoscope realize the effective diagnosis and therapy, which presents a closed-loop system for the colon cancer treatment.