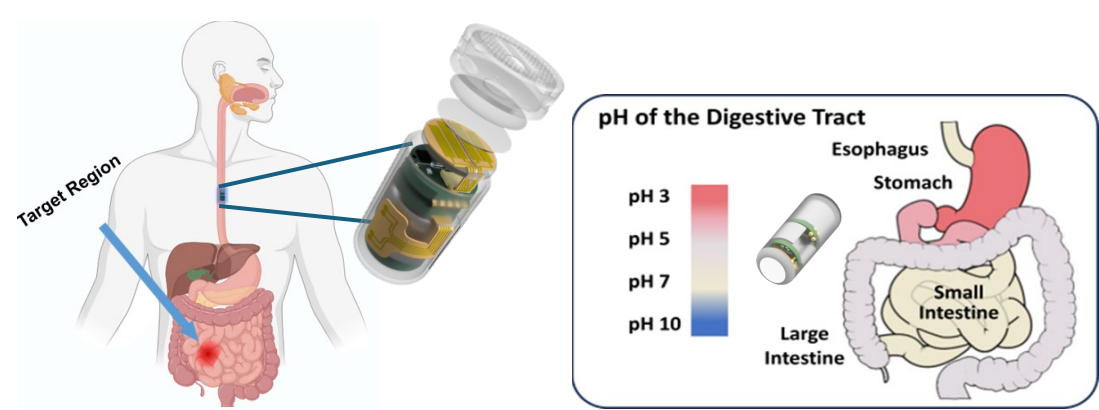
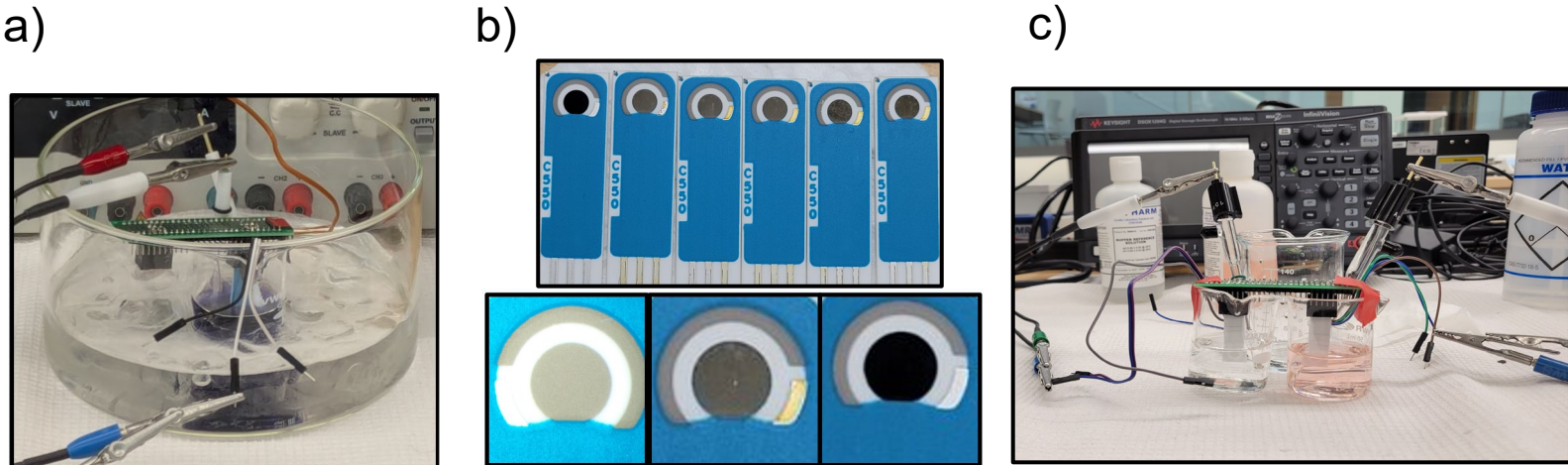


**Supplementary Figure S1:** Overview concept of an ingestible capsule using pH sensing for localization within the GI tract. The GI tract, from the esophagus to the large intestine, contains fluids of varying pH levels



**Supplementary Fig. S2:** (a) Setup for electrodeposition of the iridium oxide onto the Pt SPE using electrode Ag/AgCl RE and Pt-mesh CE. (b) Pictures of electrodeposited electrodes and close-up pictures of (b.1) Bare Pt SPE, (b.2) Chronopotentiometry deposition, and (b.3) Cyclic voltammetry deposition. (c) OCP measurement setup for sensing in pH buffer solutions: pH 6.68 (clear) and pH 4.00 (pink).



**Supplementary Fig. S3:** OCP measurements of (a) CV-pH sensor and (a.1) CP-pH sensor versus an Ag/AgCl reference electrode to benchmark sensor performance. (b) Calibration curve from (b) CV-pH sensor and (b.1) CP-pH sensor with linear fitting. (c) Simplified electronic connection of the pH sensor connected to the AD5940 analog front end dev kit.

