Supporting Information

An Enteric Micromotor Can Selectively Position and Spontaneously Propel in the Gastrointestinal Tract

Jinxing Li[†], Soracha Thamphiwatana[†], Wenjuan Liu[†], Berta Esteban-Fernández de Ávila, Pavimol Angsantikul, Elodie Sandraz, Jianxing Wang, Tailin Xu, Fernando Soto, Valentin Ramez, Xiaolei Wang, Weiwei Gao, Liangfang Zhang* & Joseph Wang*

Supporting Note

Estimation of the micromotor number in each administration

Density of micropores in the polycarbonate membrane:

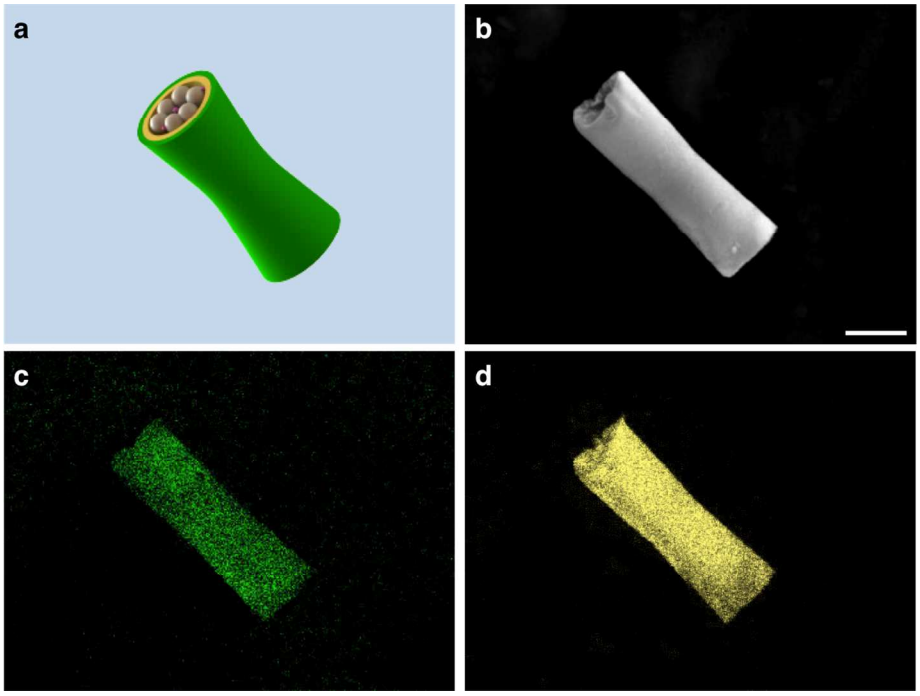
ρ=3.3×10^{-3} /μm^2 (examined by SEM, 166 pores in an imaging area of 50,000 μm^2)

Area of the polycarbonate membrane (diameter of 2.5 cm):

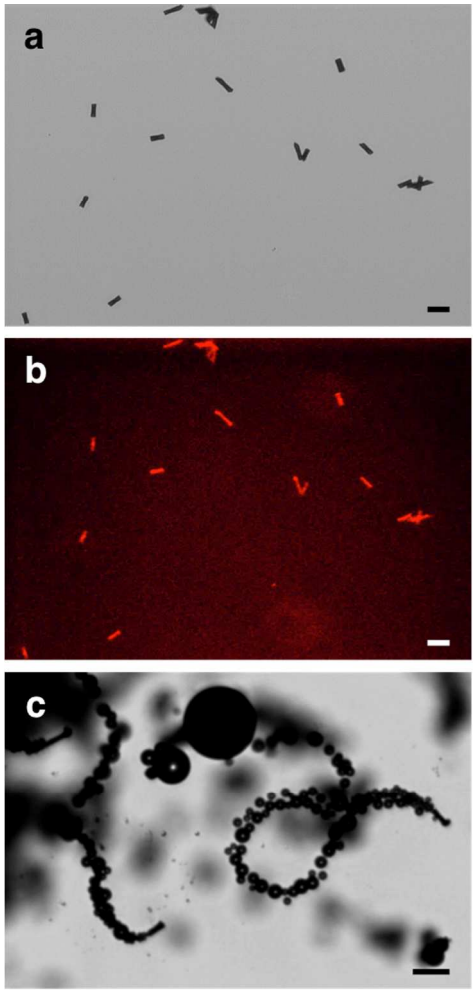
$S = \pi \times (1.25 \times 10^4\ \mu m)^2$

Multiple the area S by the pore density ρ we obtain the total micromotor number of $S\rho = 1.63 \times 10^6$ in each polycarbonate membrane.

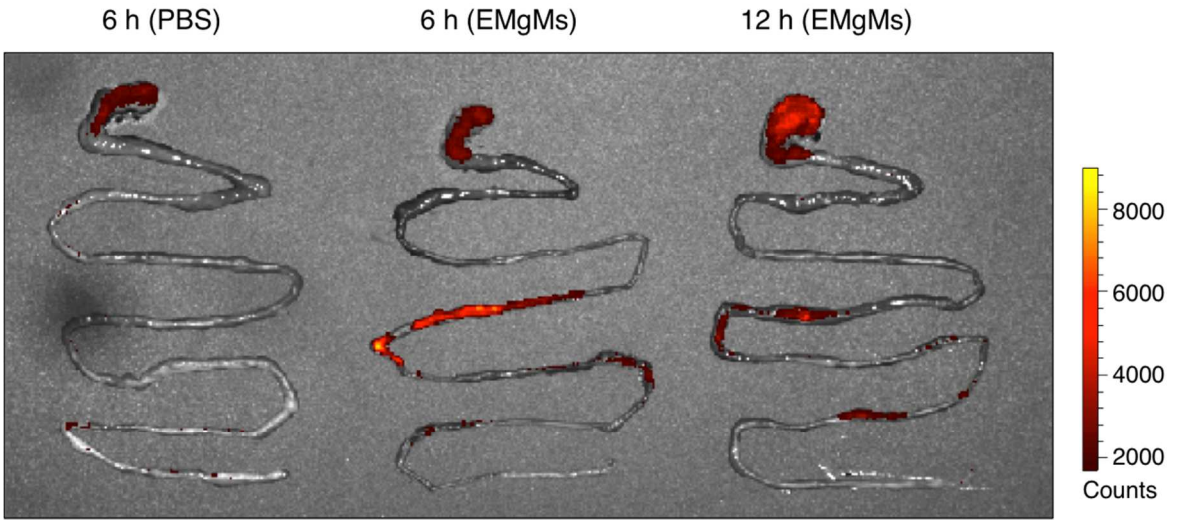
The number of micromotors retained in stomach and each GI segment is calculated by multiple the total micromotor number by the percentage of retained Au in the ICP-MS measurements.



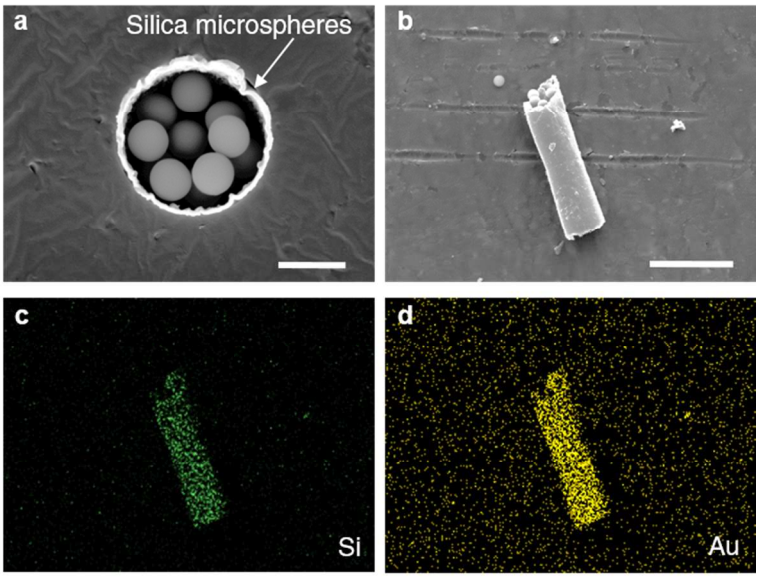
Supporting Figure 1. Characterization of Mg-based micromotors. (a) Schematic illustration of the Mg-based micromotors based on PEDOT/Au microtubes loaded with Mg microparticles. (b) SEM image of an Mg-based micromotor. Scale bar: 5μm. (c) EDX mapping of Mg in the Mg-based micromotor; (d) EDX mapping of Au in the Mg-based micromotor.



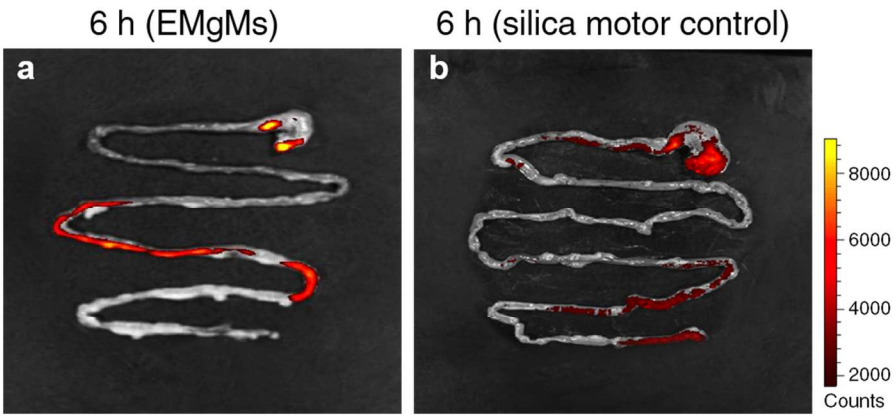
Supporting Figure 2. Characterization of R6G-labeled Mg-based micromotors. (a) Bright field and (b) fluorescence microcopy images showing the R6G-labeled Mg-based micromotors. Scale bars 20 μm. (c) Microscopic image showing the powerful propulsion of R6G-labeled Mg-based micromotors in intestinal fluid. Scale bar 20 μm.



Supporting Figure 3. Fluorescent images of mouse GI tracts. Mice were treated with PBS and EMgMs with medium polymer coating. At 6 h and 12 h post-administration, the whole GI tracts of all 3 groups were collected and imaged in one frame using IVIS, corresponding to Figure 3c.



Supporting Figure 4. Characterization of silica-loaded micromotor as inert control. (a) Top-view SEM showing PEDOT/Au microtubes loaded with silica microspheres (diameter 1.2 μm). Scale bar: 2 μm. (b) Side-view SEM image of a silica-loaded micromotor. Scale bar: 10 μm. (c) EDX mapping of Si in the silica-loaded micromotor; (d) EDX mapping of Au in the Mg-based micromotor.



Supporting Figure 5. Superimposed fluorescent images of mouse GI tracts at 6 hours post-administration of (a) EMgMs loaded with the dye Rhodamine 6G and covered with medium polymer coating and of (b) microtubes loaded with inert silica microspheres and Rhodamine 6G dye and covered with same polymer coating.