## Supplementary information

Zhixing Ge, ${ }^{\text {\&abc }}$ Junhua Zhao, ${ }^{\text {¿de }}$ Haibo Yu, ${ }^{*}{ }^{\text {ab }}$ Wenguang Yang, ${ }^{f}$ Peilin Zhou, ${ }^{a b c}$ Zhenning Wang, ${ }^{* d e}$ and Lianqing Liu, ${ }^{*} a b$
a. State Key Laboratory of Robotics, Shenyang Institute of Automation, Chinese Academy of Sciences, Shenyang 110016, China. E-mail: yuhaibo@sia.cn, lqliu@sia.cn.
b. Institutes for Robotics and Intelligent Manufacturing, Chinese Academy of Sciences. Shenyang 110016, China.
c. University of Chinese Academy of Sciences, Beijing 100049, China.
d. Department of Surgical Oncology and General Surgery, the First Hospital of China Medical University, Shenyang 110016, China. E-mail: josieon826@sina.cn.
e. Key Laboratory of Precision Diagnosis and Treatment of Gastrointestinal Tumors, Ministry of Education, Shenyang 110016, China.
f. School of Electromechanical and Automotive Engineering, Yantai University, Yantai 264005, China.
*: Corresponding authors, to whom correspondence should be addressed E-mail: Lianqing Liu, lqliu@sia.cn; Zhenning Wang, josieon826@sina.cn; Haibo Yu, yuhaibo@sia.cn.
\&: These authors contributed equally to this work and should be considered co-first authors.

## This file includes:

Figs. S1 to S4;

## Supporting Figures



Figure S1. The steps of fabricating the model I. (a) Fabrication of model I and simulation of peritoneal metastasis were performed in five steps. (b) Gastric cancer
cells adhering to blank glass and mesothelial cells. (c) The photo of grid microstructure.


methacrylic anhydride
$50^{\circ} \mathrm{C}$



Figure S2. The synthesis and crosslinking of GelMA.


Figure S3. The schematic of (a) AFM and photo of (b) MLCT-C tip.


Figure S4. Aspect ratios of gastric cancer cells adhering to collagen mixture and mesothelial cells. (a-b) Aspect ratios of SGC-7901 cells on (a) collagen mixture and (b) mesothelial cells. (c-d) Aspect ratios of HGC-27 cells on (c) collagen mixture and (d) mesothelial cells.

