Supporting Information for

pH-responsive Fluorescent Graphene Quantum Dots for Fluorescence-Guided Cancer Surgery and Diagnosis

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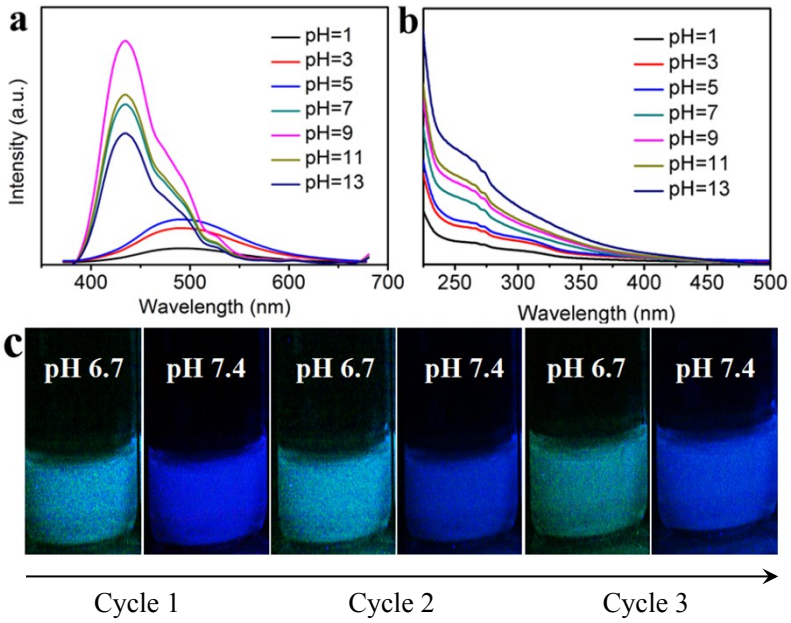

Fig. S1. Characterization of pRF-GQDs. Photoluminescence spectra excited at 365 nm (a) and UV-*vis* absorption spectra (b) of pRF-GQDs under different pHs. (c) Representative images of pRF-GQDs under indicated pHs. pRF-GQDs maintained the color change property after 3 cycles of buffer switch.

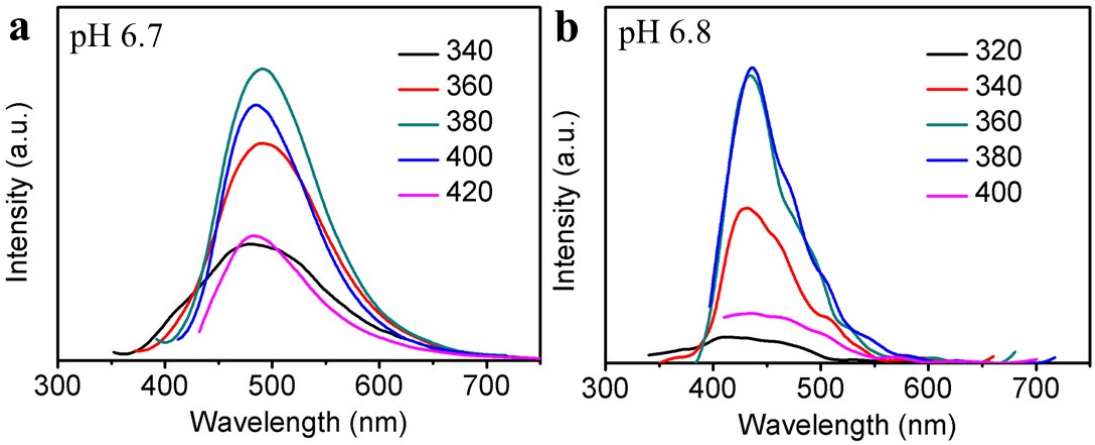

Fig. S2. Photoluminescence spectra of pRF-GQDs at pH 6.7 (a) and pH 6.8 (b).

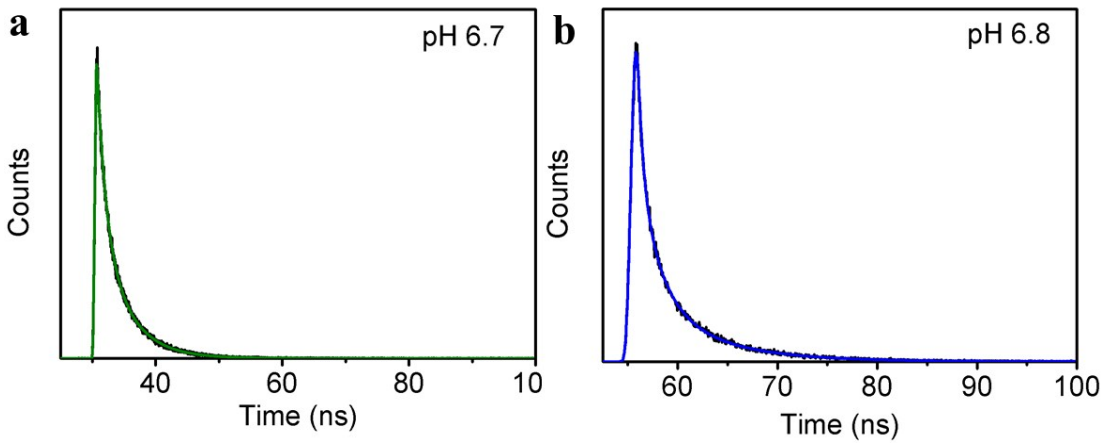

Fig. S3. Time-resolved fluorescence decay profile of pRF-GQDs at pH 6.7 (a) and pH 6.8 (b).

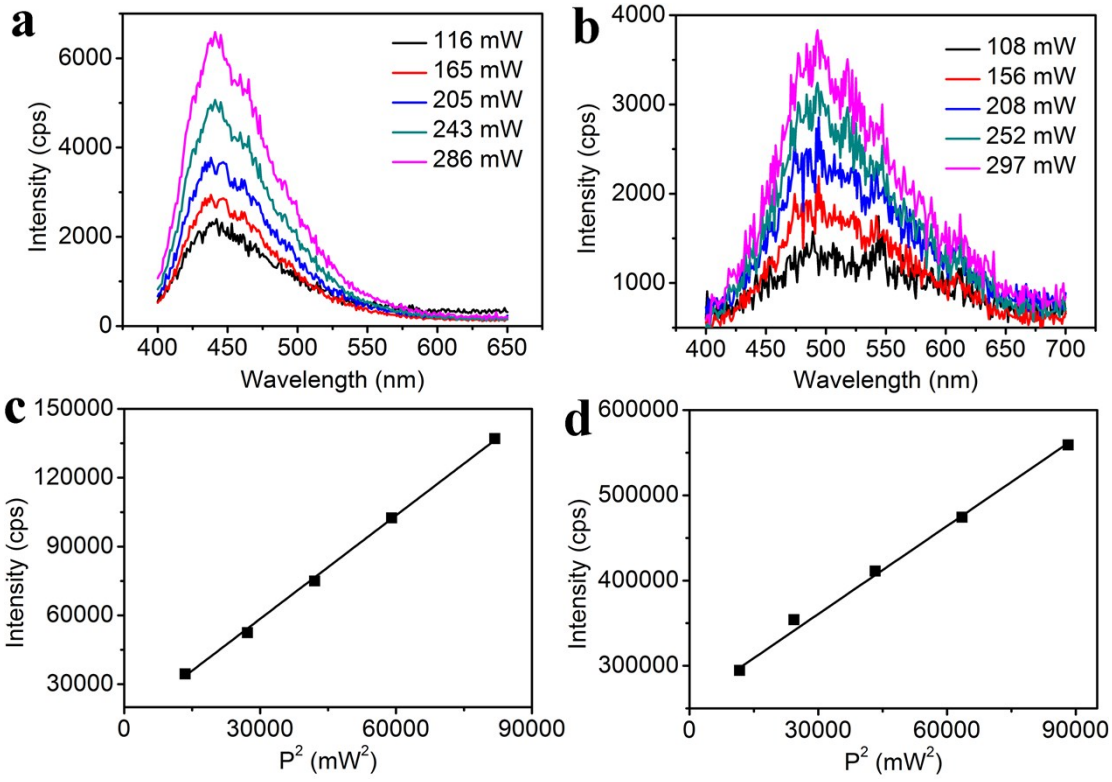

Fig. S4. UCPL characterization of pRF-GQDs. (a, b) UCPL spectra of pRF-GQDs at pH 6.8 (a) and pH 6.7. (b). (c, d) Correlation of UCPL integrated intensity of pRF-GQDs with laser powers (800 nm femtosecond pulsed laser) at pH 6.8 (c) and pH 6.7

(d).

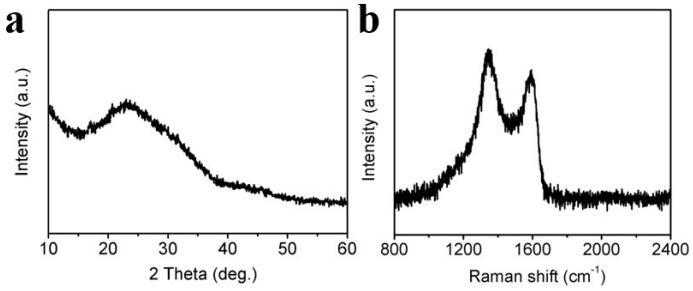

Fig. S5. Characterization of pRF-GQDs. (a) XRD pattern of pRF-GQDs. (b) Raman spectrum of pRF-GQDs.

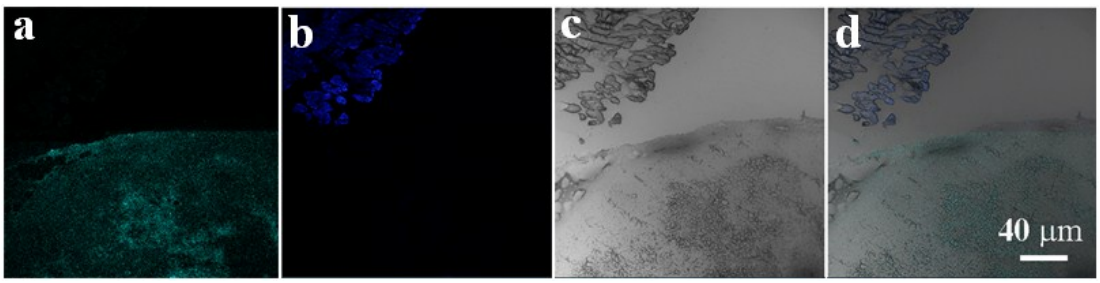

Fig. S6. Representative confocal microscopy images of HeLa tumors and adjacent muscles under (a) green fluorescence channel, (b) blue fluorescence channel, (c) bright field and (d) merge of three fields.

Table S1. Determination of the pKa of pRF-GQDs.

pH	2.00	6.51	6.72	7.50	7.88	12.00
A_{270nm}	1.621	1.917	1.982	2.065	2.072	2.205
pKa		6.53	6.71	6.86	6.48	
Average pKa	6.62					

pKa was determined by UV-*vis* absorption method with monobasic weak-acid approximation. The calculated equation was

$$pKa = pH - \log\frac{A - A_{In}}{A_{HIn} - A}$$

A_{In} and A_{HIn} respectively represents the absorbance values at 270 nm with pH 2.00 and pH 12.00.