



## Activatable Multispectral Photoacoustic Probes, Methods of Making Probes, and Methods of Use

Lei SUN<sup>1</sup>, Cheng LIU<sup>1</sup>, Yanjuan GU<sup>2</sup>, Shiyong LI<sup>2</sup>, Wing-tak WONG<sup>2</sup>

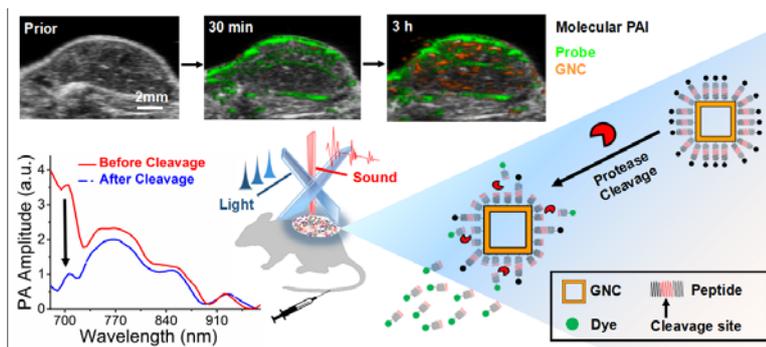
<sup>1</sup>Department of Biomedical Engineering

<sup>2</sup>Department of Applied Biology and Chemical Technology

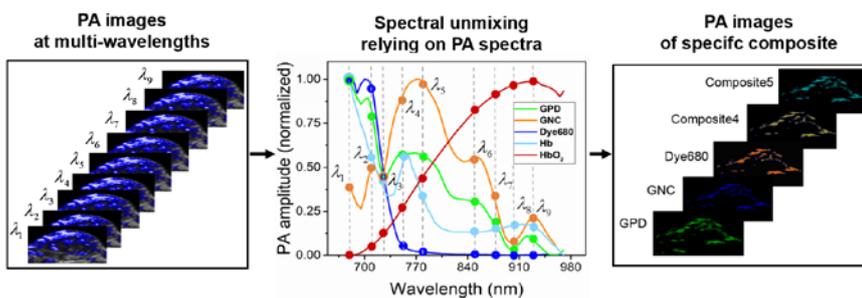
Biological  
Imaging

### . Multispectral Photoacoustic Imaging, Activatable Contrast Agent Tumor Protease Activity In Vivo .

Tumor proteases have been recognized as significant regulators in the tumor microenvironment, but the current strategies for *in vivo* protease imaging have tended to focus on the development of probe design rather than the investigation of novel imaging strategy by leveraging the imaging technique and probe. Herein, it is the first invention to investigate the ability of multispectral photoacoustic imaging (PAI) to estimate the distribution of protease cleavage sites inside living tumor tissue by using an activatable photoacoustic (PA) probe. This novel strategy is a potential to be translated into clinical applications in the future (e.g., non-invasive precise assessment of various types of cancer to increase prognosis, reduce medicine cost).



Novelty of present invention



Principal of multi-spectral photoacoustic imaging technique relying on distinct PA spectra signatures

### Representative Publications

1. Cheng LIU, Shiyong LI, Yanjuan GU, Huahua XIONG, Wing-tak WONG, Lei SUN, Multispectral Photoacoustic Imaging of Tumor Protease Activity with a Gold Nanocage-Based Activatable Probe, in *Molecular Imaging and Biology* 2018, DOI: 10.1007/s11307-018-1203-1 Accepted
2. Cheng LIU, Shiyong LI, Yanjuan GU, Lei SUN, *In Vivo* Spectroscopic Photoacoustic Imaging of Tumor Protease Activity by Using Gold Nanocage-based Activatable Nanoprobe, in *IEEE International Ultrasonics Symposium (IUS)*, Washington, D.C., US, 2017
3. Cheng LIU, Yaoheng Yang, Zhihai Qiu, Yongmin Huang, Lei Sun, *In vivo* assessment of protease activity in colorectal cancer by using activatable molecular photoacoustic imaging, in *IEEE International Ultrasonics Symposium (IUS)*, p. 1-4. IEEE, Taipei, Taiwan, 2015



Innovation and Technology  
Development Office  
創新及科技發展處

### Contact Us

Ms. Nelly Lam . Manager  
T // (852) 3400 2819  
E // nelly.lam@polyu.edu.hk

LH-R023/20180504