

Publication(s)

1. Han, C., Yan, P., He, T., Cheng, J., **Zheng, W.**, Zheng, L. T., and Zhen, X. (2020) PHLDA1 Promotes Microglia-Mediated Neuroinflammation Via Regulating K63-Linked Ubiquitination of TRAF6. *Brain Behav Immun* [5yr IF=6.616]
2. Cho, Y. L., Siong Tan, H. W., Saquib, Q., Ren, Y., Ahmad, J., Wahab, R., He, W., Bay, B. H., and **Shen, H. M.** (2020) Dual Role of Oxidative stress-JNK Activation in Autophagy and Apoptosis Induced by Nickel Oxide Nanoparticles in Human Cancer Cells. *Free Radic Biol Med* [5yr IF=6.401]
3. Jiang, M., Yang, L., Chen, Z. G., Lai, S. S., **Zheng, J.**, and Peng, B. (2020) Exogenous Maltose Enhances Zebrafish Immunity to Levofloxacin-Resistant *Vibrio Alginolyticus*. *Microb Biotechnol* [5yr IF=4.902]
4. Yan, F., Liao, R., Silva, M., Li, S., Jiang, Y., Peng, T., Lazarovici, P., and **Zheng, W.** (2020) Pristimerin-Induced Uveal Melanoma Cell Death Via Inhibiting PI3K/Akt/Foxo3a Signalling Pathway. *J Cell Mol Med* [5yr IF=4.408]
5. Liu, Y., Yang, E. J., Shi, C., Mou, P. K., Zhang, B., Wu, C., Lyu, J., and **Shim, J. S.** (2020) Histone Acetyltransferase (HAT) P300/CBP Inhibitors Induce Synthetic Lethality in PTEN-Deficient Colorectal Cancer Cells through Destabilizing AKT. *Int J Biol Sci* **16**, 1774-1784 [5yr IF=4.306]
6. Yang, S., Wei, W., and **Zhao, Q.** (2020) B7-H3, a Checkpoint Molecule, as a Target for Cancer Immunotherapy. *Int J Biol Sci* **16**, 1767-1773 [5yr IF=4.306]

ARTICLE SHARING

Prof. Zhen YUAN has Made New Progress in the Research of Intelligent Diagnosis and Photodynamic Treatment of Cancer

Prof. Zhen YUAN has made a new progress in medical molecular imaging and highly accurate tumor treatment. Prof. YUAN collaborates with Prof. Junle QU from Shenzhen University and has developed a superior tri-modality molecular imaging guided- and near-infrared light excited-intelligence cancer theranostics method, which opens up a new avenue to achieve precise photodynamic therapy of deep tumors. The research results were published online, titled "Inhibiting tumor oxygen metabolism and simultaneously generating oxygen by intelligent upconversion nanotherapeutics for enhanced photodynamic therapy" in the international top journal "Biomaterials" (2018 Impact Factor: 10.273).

Photodynamic therapy (PDT) is a noninvasive cancer treatment method with little side effect, and it is based on the interaction of three essential components: oxygen, photosensitizers and visible light. However, traditional PDT is usually applied to the treatment of skin cancer only due to the limited tissue penetration depth of the used ultraviolet light or white light that makes PDT difficult to perform tumor treatments in deep tissues. In particular, the key difficulties mainly come from three perspectives: 1) inaccurate tumor positioning in deep tissues, 2) low excitation light penetration depth, and 3) significant hypoxia in deep tissue tumors.

To resolve these challenging issues specifically for traditional PDT, Prof. YUAN's team has constructed a compound intelligent photodynamic diagnostic agent. The developed multifunctional cancer theranostic agent has: 1) the MRI, CT and second near-infrared (1300 nm) fluorescence imaging capabilities that offer the opportunity for localizing tumors in deep tissues (Fig. 1); 2) the con-

version of the 808 nm near infrared light into visible light that excites the photosensitizer to achieve deep tissue tumor treatment; 3) the capability to intelligently release the tumor respiration inhibitors that improve tumor hypoxia for enhancing cancer PDT at tumor sites (Figure 2). This new category of photodynamic diagnosis and treatment agent provides us a novel path for PDT to carry out a wider range of deep tumor treatment.

The excellent efficacy of cancer theranostics was validated for the developed intelligent photodynamic therapy agent through multimodal molecular imaging, confocal microscopy imaging, cell bioassays and *in vivo* animal tests. Meanwhile, the biological effects and molecular mechanisms of this new intelligent photodynamic diagnostic agent inducing tumor cell death were also carefully inspected. It was discovered that the constructed drug platform sheds new lights on a wider range of photodynamic therapy in deep tissue, and exhibits its essential potential clinical application value.

The research is led by Prof. Zhen YUAN, and the main participants are the research assistant Dan WANG, Bin XUE, Yubin LIU, and Ph.D. student Mengze XU of Prof. YUAN's team. This research was jointly supported by University of Macau (File no. MYRG2019-00082-FHS and MYRG2018-00081-FHS), and The Science and Technology Development Fund, Macau SAR (FDCT) (File no. 025/2015/A1 and 0011/2018/A1). The full text can be viewed at:
<https://www.sciencedirect.com/science/article/pii/S0142961220303343?via%3Dihub>.

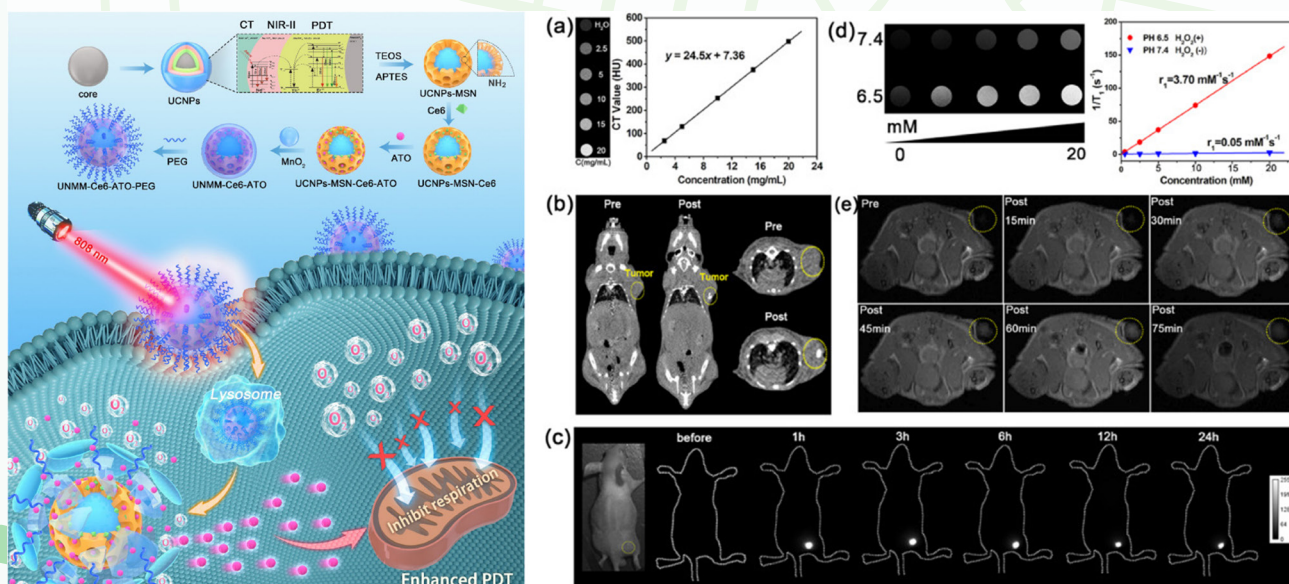


Fig. 1 Schematic of intelligent photodynamic diagnostic agent and multi-modal molecular imaging

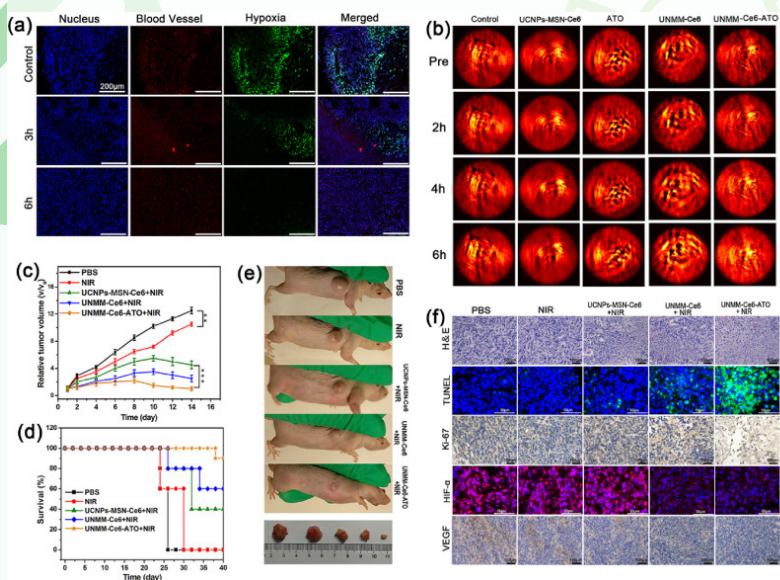


Fig. 2 Improvement of tumor hypoxia for intelligent photodynamic therapy of tumor

May / June 2020				
Mon	Tue	Wed	Thu	Fri
11	12	13	14	15
	Oral Defense Yue LI Supervisor : Prof. Tzu-Ming LIU Time: 15:00 Venue: N6-2022		FHS Postdoc/ Student Seminar Field: Aging and neural diseases Host: Prof. Wenhua ZHENG and Prof. Hongjie ZHANG Time: 17:00-18:00 Venue: N22-G002 and Zoom	Oral Defense Lunqing ZHANG Supervisor : Prof. Chuxia DENG Time: 15:00 Venue: N6-2022
18	19	20	21	22
	4th Symposium on Biomedical Sciences for Students, Post-doctoral Fellows and Research Assistants 2020 Time: 9:30-12:30 Venue: Zoom			
25	26	27	28	29
JUNE 1	2	3	4	5