

## **Chemiluminescence resonance energy transfer-based self-illuminating nanoparticles in cancer phototheranostics**

Dong Gil you<sup>1</sup>, Jae Hyung Park <sup>1,\*</sup>

<sup>1</sup>School of Chemical Engineering, College of Engineering, Sungkyunkwan University

There is a rapidly increasing interest in developing chemiluminescence resonance energy transfer (CRET)-based nanoplatform for diagnosis and treating a cancer. By enabling the high specific imaging locally at the sites of interest, it is possible to increase therapeutic efficacy of photodynamic therapy (PDT). However, the major translational barriers to most CRET-based nanoparticles for PDT are the limited in penetration depth of light, low-quantum yield of photosensitizer, and insufficient duration time of signal for imaging. To overcome these limitation, we report a CRET-based nanoplatform, capable of enhancing the photoacoustic (PA) and reactive oxygen species (ROS) quantum yields, simultaneously. In the presence of ROS, the CRET-based nanoplatform was designed to produce carbon dioxides, amplifying the PA signal by stable vaporization technique. In addition, CRET-based nanoplatform significantly increased the ROS quantum yield *via* electron transfer and self-illumination. CRET-based nanoplatform, which dramatically improves the quantum yield, might hold great translational potential as phototheranostics agents.