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From Fluorescent Probes to Phototherapy

The development of fluorescent probes for various analytes has been actively pursued by chemists. Since their inception, these efforts have led to many new sensors that have found wide applications in the fields of chemistry, biology, environmental science, and physiology.

Recently, a near-infrared two-photon fluorescent probe was developed to not only specially image carboxylesterase (CE) activity *in vivo* and *in situ* but also target orthotopic liver tumor after systemic administration.[1]

On the other hand, photodynamic therapy (PDT) and photothermal therapy (PTT) have attracted considerable interest as a noninvasive treatment method.[2] We devised a novel molecular design approach to create heavy-atom-free photosensitizers for thionapthalimides.[3] The *in vivo* specific binding between albumin and PcS, arising from the disassembly of injected NanoPcS, was also confirmed using an inducible transgenic mouse system.[4] We recently reported a viscosity-sensitive, endoplasmic reticulum (ER)-targeting fluorescent probe, ER-ZS, which can monitor ER stress-induced viscosity changes in real time. ER-ZS is also an excellent anti-hypoxia type I photosensitizer that activates tumor cell pyroptosis by damaging the ER pathway.[5]

Photodynamic antibacterial therapy is regarded as an innovative and promising antibacterial approach due to its minor side effects and lack of drug resistance.[6] Recently, we suggested that reactive differences may pave a general way to design selective photodynamic agents for ablating Gram-positive bacteria-infected diseases.[7]

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