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# Bilirubin-Coated Radio-Luminescent Particles, and Their Use for Radiation-Induced Photodynamic Therapy

**Bilirubin-coated nanoparticles activated by x-rays enable photodynamic therapy to target tumors in deeper tissue, showing a 1.4 fold improvement in cancer cell killing over x-rays alone.**

Researchers at Purdue University have developed nanoparticles for use in photodynamic therapy that are activated by x-rays and can target tumors in deeper tissue. Photodynamic therapy currently uses photosensitizing agents to directly kill cancer cells and is used in combination with radiation therapy to enhance its anti-tumor effects. However, the therapy is limited to skin tumors because it requires photosensitizing agents that are activated by light in the UV-visible range, which can only pass through ~1/3 of an inch. Unlike other competing nanoparticle enhancers which require administration of systemic photosensitizing agents, these nanoparticles are coated with bilirubin which acts as the photosensitizer. The nanoparticles demonstrated a 1.4 fold improvement over x-rays alone in killing cancer cells in a cell survival assay. Applications for this technology are in the treatment of cancer.

**Advantages**:

-Localized delivery of therapy

-1.4 fold improvement in killing cancer cells in vitro

-Low toxicity

Potential Applications:

-Photodynamic therapy

-Cancer treatment

Publication: Bilirubin-Coated Radio-Luminescent Particles for Radiation-Induced Photodynamic Therapy. ACS Applied Bio Materials 3(8), 4858-4872,

**Technology ID**
2019-WON-68496

**Category**
Pharmaceuticals/Drug Delivery & Formulations
Pharmaceuticals/Other

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2020 (DOI: 10.1021/acsabm.0c00354)

**TRL:** 3

**Intellectual Property:**

Provisional-Patent, 2019-01-22, United States | PCT-Patent, 2020-01-10, WO | NATL-Patent, 2021-07-10, United States | DIV-Patent, 2024-09-04, United States

**Keywords:** Nanoparticles, Photodynamic therapy, X-ray activated, Bilirubin, Photosensitizer, Cancer treatment, Deeper tissue tumors, Radio-luminescent particles, Low toxicity, Localized delivery