PURDUE INNOVATES | Office of Technology Commercialization

Radioluminescence for Cancer Treatment

Radioluminescent particles enhance cancer cell killing in deep tissue by combining radiation therapy with UV treatment, offering a novel method to improve cancer radiation efficacy.

Cancer is a leading cause of death worldwide and chemotherapy, radiation, and surgery are concomitantly used for treatment. However, use of radiation therapy is limited in late stage cancer therapy. Currently, radiosensitizers are used to make cancer cells more sensitive to killing via radiation therapy, which can be done through intercalation of DNA, arresting the cell cycle, or using metal or metal oxide nanoparticles and high-Z materials; however, these approaches have been unsatisfactory. Interactions of UV light with high energy ionizing radiation is efficient at killing cells, but this combination of radiation is not used for cancer therapy since UV light has limited penetration in tissue.

To solve these multitudes of issues, researchers at Purdue University have developed a new method of radiosensitization that uses radioluminescent particles (RLP). These particles emit light when exposed to ionizing radiation, and has potential to be used in cancer radiation therapy. Overall, this method induces cytotoxic effects two-fold, with gamma rays that are not seen with conventional radiosensitizers. Since it combines radiation therapy with UV treatment by using radioluminescent compounds, this secondary ionizing radiation can be generated in deep tissue tumors to enhance the killing of cancer cells. This is a novel and exciting approach of enhancing the use of radiation therapy for a variety of cancers.

Advantages:

-Enhances the killing of cancer cells by using radioluminescent compounds

-Induces cytotoxic effects two-fold

Potential Applications:

-Medical/Health

-Radiation therapy

Technology ID

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Category

Pharmaceuticals/Drug Delivery & Formulations

Pharmaceuticals/Other

Authors

Min Kyung Joo

Sang Yoon Kim

Beom Suk Lee

You-Yeon Won

Further information

Joe Kasper

JRKasper@prf.org

Nathan Smith

nesmith@prf.org

View online

-Cancer treatment

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Intellectual Property:

Provisional-Patent, 2015-01-08, United States | DIV-Patent, 2016-01-08, Europe | PCT-Patent, 2016-01-08, WO | NATL-Patent, 2017-07-06, United States | EP-Patent, 2017-08-08, United Kingdom | NATL-Patent, 2017-08-08, European Patent | EP-Patent, 2020-09-03, Italy | EP-Patent, 2020-09-11, Spain | EP-Patent, N/A, Germany | EP-Patent, N/A, France