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Fox Chase Researcher Presents Findings on 5-Aminolevulinic Acid-Mediated Radiation Therapy to Reduce Tumor Size at American Society for Radiation Oncology Meeting

PHILADELPHIA (October 2, 2023) — Radiodynamic therapy at specific energy levels help effectively reduce tumor size in combination with the amino acid 5-aminolevulinic acid, according to findings presented by a Fox Chase Cancer Center researcher recently at the American Society for Radiation Oncology (ASTRO) Annual Meeting in San Diego.

“Radiodynamic therapy is a combined treatment technique of photodynamic therapy and radiation therapy that treats cancer using light and radiation,” said Dae-Myoung Yang, PhD, an Assistant Professor in the [Department of Radiation Oncology](#) at Fox Chase.

The study used an *in-vivo* mouse model to investigate the effectiveness and energy dependency of radiodynamic therapy combined with 5-aminolevulinic acid and different ranges of megavoltage (MV) photon irradiation.

Photon radiation is a tool for treating cancer that uses a linear accelerator to produce high-energy X-rays that damage the DNA inside cancer cells. The naturally occurring amino acid derivative 5-aminolevulinic acid (5-ALA) accumulates in target tumor cells and is metabolized to a photosensitizer, a light absorber that alters the course of a photochemical reaction. This photosensitizer, protoporphyrin IX (PpIX), is activated by high-energy photon beams, which ultimately leads to cellular toxicities that kill malignant tumor cells.

To investigate the effectiveness of different ranges of megavoltage in combination with 5-ALA, Yang and colleagues compared 360 tumors randomized into eight groups. These groups included an untreated control group, a group using 5-ALA only, one group each of 6-, 15-, and 45-MV radiation treatment only, and one group each of 6-, 15-, and 45-MV radiodynamic therapy that consisted of a combination of 5-ALA administration and radiation treatment.

The study demonstrated that using 45 MV photon beam radiation and 5-ALA was more effective in activating PpIX, improving the combined effects of radiation and activated photosensitizer, than the other energy levels tested.

“My research showed improvements in killing tumor tissue and sparing healthy tissues. The preliminary results provide a foundation for new innovative treatment strategies that have the potential to improve cancer treatment,” said Yang.

The results of his study, “Tumor Regression With 5-Aminolevulinic Acid (5-ALA)-Mediated Radiodynamic Therapy (RDT) Using Different Megavolt Energies,” were presented during a poster session at the ASTRO meeting.

Fox Chase Cancer Center (Fox Chase), which includes the Institute for Cancer Research and the American Oncologic Hospital and is a part of Temple Health, is one of the leading comprehensive cancer centers in the United States. Founded in 1904 in Philadelphia as one of the nation’s first cancer hospitals, Fox Chase was also among the first institutions to be designated a National Cancer Institute Comprehensive Cancer Center in 1974. Fox Chase is also one of just 10 members of the Alliance of Dedicated Cancer Centers. Fox Chase researchers have won the highest awards in their fields, including two Nobel Prizes. Fox Chase physicians are also routinely recognized in national rankings, and the Center’s nursing program has received the Magnet recognition for excellence six consecutive times. Today, Fox Chase conducts a broad array of nationally competitive basic, translational, and clinical research, with special programs in cancer prevention, detection, survivorship, and community outreach. It is the policy of Fox Chase Cancer Center that there shall be no exclusion from, or participation in, and no one denied the benefits of, the delivery of quality medical care on the basis of race, ethnicity, religion, sexual orientation, gender, gender identity/expression, disability, age, ancestry, color, national origin, physical ability, level of education, or source of payment.

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