2013-085 REALTIME IMAGING AND RADIOTHERAPY OF MICROSCOPIC DISEASE

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Technology description

A Device for Simultaneous Imaging and Irradiation of Small Tumors

SUMMARY

UCLA researchers have developed a device to detect and irradiate solid tumors in the sub-millimeter size range. This device is a promising advancement to treating early stage cancer.

BACKGROUND

Early detection and treatment of tumors is correlated to improved prognoses for cancer patients. However, small tumors are difficult to detect. In fact, devices and methods for imaging sub-millimeter-sized tumors are not available, and methods for treating them are lacking. As a result, some cancers, such as ovarian cancer, can only be detected at late stages and are often fatal. Other small tumors that are large enough to be detected still pose difficulties for treatment as they are often "hidden" within normal tissues. Current imaging systems such as PET and ultrasound do not have the resolution to accurately guide treatment, leading to significant normal tissue damage. One treatment option, radio-guided surgery, requires several procedural steps between tumor localization and treatment, leading to inaccuracy that is not amenable for small tumors. Thus, there is a need for an effective method that allows for the detection and treatment of small tumors.

INNOVATION

UCLA researchers have developed a novel system for real-time imaging of sub-millimeter-sized tumor clusters. This technology combines a high-resolution tomographic imaging system with conformal radiation in a single, miniature device. The device detects small tumors embedded in a relatively large volume of normal tissues. It also allows the imaging and radiation therapy to be carried out simultaneously, enabling the irradiation to be precisely applied at the tumor site. This approach minimizes normal tissue damage, allowing for higher radiation doses, and thereby more effective treatment.

Application area

Tumor imaging for diagnosis, treatment, and monitoring treatment response

Radiotherapy

Post-surgical clean-up of the tumor bed

Advantages

High-resolution imaging system enables the detection of sub-millimeter-sized tumors embedded in tissues
Treats small tumors with high precision
Minimizes damage to normal tissues, thus allow a higher radiation dose to the tumor site
Device is portable
Probe is miniaturized, and compatible with minimal-invasive surgery if necessary

Institution

University of California, Los Angeles

Inventors

John Demarco
RAD ONC
Dan Ruan
Associate Professor
RAD ONC
Keisuke Iwamoto
Adjunct Professor
Magnus Dahlbom
Professor
PHARMACOL

联系我们

叶先生

电 话：021-65679356

手 机：13414935137

邮 箱：yeyingsheng@zf-ym.com