

Treating cancer with light: New LED device may help advance photodynamic therapy

October 18 2010

Can skin cancer be treated with light? Scientists at the University of California, Irvine (UC Irvine), believe so. They're exploring new ways to image cancerous lesions using LEDs that might advance a technique for treating cancer called photodynamic therapy (PDT) -- work that they will describe at the Optical Society's (OSA) 94th annual meeting, Frontiers in Optics (FiO) 2010 at the Rochester Riverside Convention Center in Rochester, N.Y., from Oct. 24-28.

In PDT, photosensitizing chemicals that absorb <u>light</u> are injected into a tumor, which is then exposed to light. The chemicals generate oxygen radicals from the <u>light energy</u>, destroying the <u>cancer cells</u>. PDT is currently approved by the U.S. <u>Food and Drug Administration</u> (FDA) for the treatment of esophageal and lung cancer.

Rolf Saager, who works in the lab of Anthony Durkin at the Beckman Laser Institute at UC Irvine in collaboration with Kristen Kelly, M.D., and Modulated Imaging Inc., believes that PDT could also be used to treat <u>skin cancer</u>. But one obstacle to this application is the lack of a detailed imaging technique to target and monitor the effectiveness of PDT.

Exploiting a technique known as spatial frequency domain imaging, the team has designed a new device with an array of five different colors of LEDs that illuminates skin with distinct intensity patterns. These patterns can change depending on the structure of the tissue and the pigments in the skin. With appropriate models of light propagation, the resulting



images reveal the biochemistry of the tissue.

"Through this imaging modality, it is now possible to assess how the therapeutic light will travel throughout the affected tissue, quantify the drug present within the lesion and monitor its efficacy during treatment," says Saager.

To evaluate this spatial frequency domain imaging system, the scientists imaged a small population of skin cancers prior to treatment to characterize the variability among subjects and within the lesions themselves. The process took 5-10 seconds and produced images with a resolution of 30 microns, revealing spatially resolved maps of the optical properties of the lesions, tissue oxygenation and quantitative distribution of the photosensitizing drug.

Saager and colleagues hope that this imaging technique will provide a better map for targeting and optimizing photodynamic therapy for basal cell carcinoma, the most common type of skin cancer. The next step for their ongoing experiment will be to enable the therapeutic aspects of the instrument and monitor the tissue dynamics during PDT treatment regimens.

More information: The talk, "A LED Based Spatial Frequency Domain Imaging System for Optimization of Photodynamic Therapy of Basal Cell Carcinoma (BCC)" is at 2 p.m. Tuesday, Oct. 26.

Provided by Optical Society of America

Citation: Treating cancer with light: New LED device may help advance photodynamic therapy (2010, October 18) retrieved 28 April 2024 from <u>https://phys.org/news/2010-10-cancer-device-advance-photodynamic-therapy.html</u>



This document is subject to copyright. Apart from any fair dealing for the purpose of private study or research, no part may be reproduced without the written permission. The content is provided for information purposes only.