LED-Based Lighting Treatment for Cancer

Marshall Space Flight Center
1995 Phase II

Quantum Devices, Inc.
Barneveld, WI

INNOVATION
Using technology derived from NASA Space Shuttle plant growth experiments, an MSFC SBIR team has used tiny, pinhead-sized light-emitting diodes (LEDs) in the treatment of cancer.

ACCOMPLISHMENTS
The U.S. Food and Drug Administration has approved human trials. Research has focused on photodynamic therapy (PDT), an adjunctive cancer therapy in which light-sensitive, tumor-treating drugs are injected intravenously. LED light activation allows drugs to destroy cancer cells, leaving surrounding tissue virtually untouched. Offering substantial improvement over lasers, a LED probe produces longer-wavelength, broad-spectrum, near-infrared light, enabling both deeper and wider penetrations. Quantum Devices altered the surgical probe to emit longer waves of red light to stimulate a drug called Benzoporphyrin Derivative (BPD), which delivers fewer side effects after surgery than similar drugs.

COMMERCIALIZATION
Commercial applications include PDT for primary brain tumors, as well as for other cancer oncologies, such as cancer of the liver, rectum, skin, and esophagus. After five years of research and experimentation, the LED probe has been used successfully in cancer patients who have exhausted other therapies. Cancer treatment trials have thus far included skin cancer and brain tumor patients, with promising results. One woman had endured six surgeries in ten years, as well as traditional radiation and chemotherapy. Her aggressive brain cancer kept coming back. It is estimated that the PDT treatment using the LED probe extended this patient’s life by 7 years.

GOVERNMENT / SCIENCE APPLICATIONS
LEDs have been used on seven Space Shuttle flights inside the Astroculture™, a plant growth chamber developed by the Wisconsin Center for Space. The LED therapy holds promise of being the operating technique of the future.