Photodynamic Therapy

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Photodynamic therapy (PDT), using light-emitting diodes (LEDs), is a promising new experimental cancer treatment. After the surgical removal of a tumor, PDT is performed to unsure cancer cells are eliminated from the body. The nine-inch neural probe illuminates through all nearby tissues and activates light-sensitive, tumor-treating drugs.

Quantum Devices, Inc. originally developed the probe for NASA's Space Shuttle plant growth experiments. Consisting of a metal tube and 144 pin-sized LEDs surrounded by a latex balloon, the probe disperses 680nm of light. Within the tube, there are three channels. One contains an insulated wire to provide electricity for the LEDs, the second holds sterile water to cool the tip, and the third carries intralipid fluid used to inflate the tiny balloon at the end of the probe helping scatter the light uniformly.

A photosensitizer is injected into the bloodstream and the doctors give it time to attach itself to the unwanted tissues. The drug eventually permeates into the tissue, leaving the surrounding tissues unaffected. The photosensitizer is activated when illuminated by LEDs and then destroys the tumor's cells. Porfimer Sodium (Protofrin II) is the only drug that is currently being used in clinical trials, but other photosensitizers do exist.

The LED has many characteristics that make it the obvious choice over the laser. LEDs can generate longer wavelengths of light, which penetrate deeper into tissue activating more of the drug. The chance of damaging surrounding tissue is lessened because the LED probe stays cooler and the design is more mechanically reliable. Not to mention, that it can be obtained at a fraction of the cost of a laser.

Dr. Harry Whelan, a pediatric neurologist at the Children's Hospital of Wisconsin and a professor of neurology at the Medical College of Milwaukee, obtained FDA approval in the removal of children's brain tumors on a trial basis. This allows him to use PDT and the new neural probe when all other treatment methods have failed. Several successful cases have been reported and a full FDA approval is anticipated in the near future.