High-tech bandages lighten the load of light therapy

Tiny electronic lights embedded in a small, flexible bandage may provide a new way to zap tumor cells in people with skin cancer.

The technology, emerging from two British companies, Polymertronics and Lumicure, harnesses a type of light source known as 'organic' light–emitting diodes (OLEDs). OLEDs are made from semiconducting organic polymers that can convert electrical energy into light and already form the basis for the displays in certain cellular phones and MP3 players. But OLEDs also have many potential nondisplay applications.

One of their main advantages is that, unlike conventional LEDs, OLEDs can be printed onto a wide range of materials, making them an ideal light source for light-emitting bandages. Polymertronics and Lumicure embed OLEDs in flexible plastic strips and pads, respectively.

These light-emitting bandages are designed to be used in conjunction with photodynamic therapy, in which patients with skin cancer receive an anticancer drug that is activated by red light.

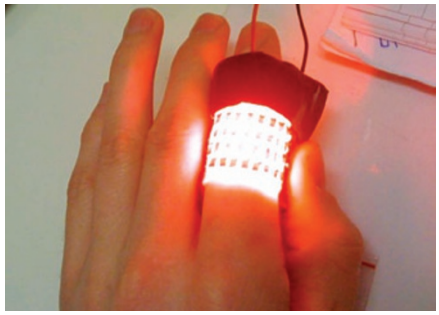
At the moment, lamps or lasers supply the light, and the procedure must be performed in a medical center and can be painful because of heat. The new technology offers a convenient way for people to treat themselves at home.

The idea is for patients to rub a cream containing the anticancer drug into the area of skin cancer and then attach the pad or strip for several hours. This allows the OLEDs to emit red light at levels that don't generate too much heat but that still activate the drug to selectively kill cancer cells.

"It's a different way of delivering the light; that's what it's all about," says Stephen Clemmet, chief executive officer of Polymertronics.

Clemmet presented his company's light-emitting bandage technology this April in London at a meeting entitled 'Polymer Electronics—Towards the Future'. The Oxfordshire-based company is printing square arrays of individually controllable OLEDs, each just four millimeters in size, onto flexible plastic strips. This setup means that the pattern of light-emitting OLEDs can be finely controlled to match the shape of the skin cancer, targeting the red light solely to the cancerous area.

Clemmet presented laboratory findings suggesting that Polymertronics's technology can kill cancer cells. The company now intends to conduct clinical trials with the aim of launching the product within two years. Lumicure, a Dundee-based spin-off from the University of St. Andrews in Scotland, has already conducted a pilot clinical trial of its pad. It is now in the process of obtaining regulatory approval and intends to launch the device later this year.



Polymertronics

Pointing the way: Light therapy bandage

Michael Unger, of Thomas Jefferson University and the Fox Chase Cancer Center, both in Philadelphia, says he's not yet convinced of the 'utility' of these kinds of light-emitting bandages.

Both companies say that their light bandages can also be adapted to treat other skin conditions, such as acne.

Jon Evans, Chichester, UK

Nuclear watchdog and WHO move forward against cancer

A pilot project coordinated jointly by the World Health Organization (WHO) and the International Atomic Energy Agency to assist developing nations in setting up cancer programs specific to their needs is hoping to expand delivery of therapy within some of the world's poorest countries.

The number of people with cancer in the developing world is expected to double from 5 million in 2000 to 10 million by the year 2020, a reality that no nation can afford to ignore.

The International Atomic Energy Agency (IAEA), which is headquartered in Vienna and was launched in 1957 as the 'Atoms for Peace' organization within the UN, offers nuclear technology transfer as its core competency. The agency has been working to deliver radiation equipment to those UN member states unable to afford them.

Realizing that nuclear medicine is a key component in the management of cancer from diagnosis, including treatment and palliative care, the IAEA embarked on an initiative four years ago to work more closely together with the WHO to help them bring their technological competency into a public health context.

Pilot projects are currently underway across several continents—in countries such as Sri Lanka, Tanzania, Albania, Nicaragua, Vietnam and Yemen—to help the local ministries establish cancer treatment plans. They are expected to be completed by the end of the year, with the ultimate goal of expansion to other countries.

The IAEA has helped provide radiation equipment known as external beam teletherapy system to the Ocean Road Cancer Institute in Dar-Es-Salaam, Tanzania and a similar system to the Centro Nacional de Radioterapia in Managua, Nicaragua. External beam teletherapy is used to treat cancers such as those affecting the cervix and esophagus.

"To just rely on technology [in cancer control] makes no sense," says Andreas Ullrich, who heads the WHO's cancer control program. That is why both agencies with mandates from the UN to prevent cancer globally have joined forces to combine the expertise inherent to their respective institutions.

Whereas the WHO specifies the requirements in terms of primary, secondary and tertiary cancer prevention, the IAEA has agreed to offer support by delivering radiation equipment—"but only within the framework of a working [national cancer] plan," says Ullrich.

"One important part of our mission is fundraising and resource mobilization," says Massoud Samiei, director of the IAEA's Program of Action for Cancer Therapy.

He expects the AEA to collaborate more with the World Bank and other nontraditional donors to help developing countries receive funding in support of newly established cancer plans.

Karen Dente, Hamburg, Germany