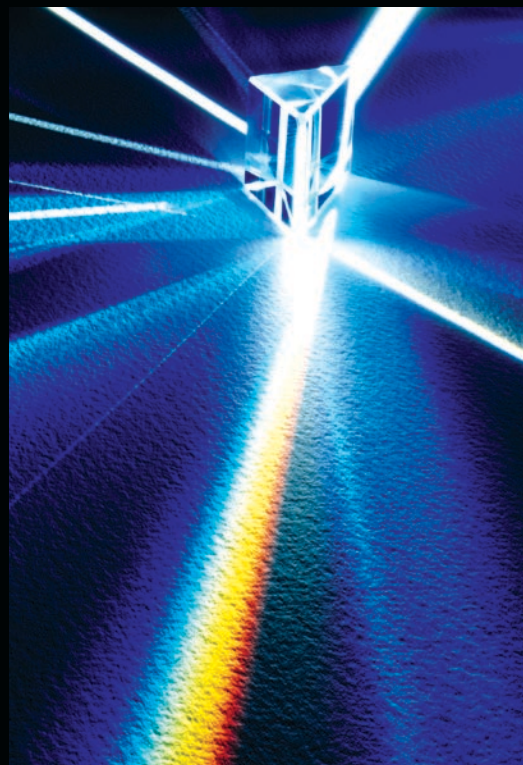


# Science Light

by Molly Brown



From incandescent bulbs to skin cancer, light has been given a bad rap, so we felt the need to clear the air. Engineered correctly, light is an amazing asset to our health and appearance.





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—Dr. David Goldberg



**For decades,** we’ve been told that light is the enemy. We’ve been warned to stay out of the sun and slather up with increasingly high SPFs if we want to preserve and protect our skin’s youthful, healthy appearance.

While it’s true that a few ounces of prevention and sunblock go a long way toward avoiding wrinkles, sunspots and especially skin cancer, all light isn’t harmful. In fact, it can be downright beneficial. Doctors and researchers are developing new ways to apply light to build collagen in cells, prevent aging, burn fat, and even treat and detect life-threatening diseases.

### **Beauty Is a Blast**

In the past, treating wrinkles, sunspots, sagging skin, acne and scars involved painful chemical peels, topical and oral medications that produced mixed results, or a snip and tuck. Those days are quickly becoming a thing of the past.

Carbon dioxide lasers were some of the very first lasers used to treat wrinkles, lines and scars. While effective, those lasers also came with the risk of extensive damage and lengthy healing times. As a result, the so-called “lunchtime” lasers were developed, which were less damaging and less effective.

“In 2008, we have the new versions of fractionated carbon dioxide lasers,” says Dr. David Goldberg, director of laser research in the department of dermatology at Mount Sinai School of Medicine in New York. “They take the old method, which always had the best results, and fractionated the process. Fractionated hits a spot, skips a spot, instead of blasting the whole skin.”

The next generation of fractional CO<sub>2</sub> lasers will be released throughout this year, including versions from companies Lumenis and Reliant Technologies. Goldberg says it takes about three days to recover from a CO<sub>2</sub> treatment, which has a price tag of anywhere from \$2,500 to \$5,000—but it only takes one session to achieve results.

Another laser is in development that may be an effective alternative for those who can’t tolerate the CO<sub>2</sub> lasers. Dr. Arielle Kauvar, director of New York Laser & Skin Care and clinical associate professor of dermatology at New York University, is working on the Purfexion laser for the company Sciton. “It heats the surface skin,

without removing the skin, not in a pixilated fashion,” Kauvar says. “With conventional CO<sub>2</sub> you’re removing tissue. This is just heating it all over and is able to reduce the inflammation we see with CO<sub>2</sub>. There are no open wounds... Instead patients are producing new epidermis underneath the tissue.”

Kauvar says 75 to 95 percent of patients who received the Purfexion treatment reported “dramatically improved texture” with just one treatment. Purfexion also shows strong potential to be used in skin-tightening treatments in the future.

### **Get the LED Out**

Many skin rejuvenation treatments—chemical peels and laser resurfacing—can be painful and involve significant healing times. However, the latest LED, or light-emitting diode, technologies are replacing those techniques. A study conducted by Goldberg on LED treatments showed that they significantly improved wrinkles, and the majority of those tested reported that their skin was softer, smoother and firmer—LED use has shown that it can strengthen collagen.

“LED technology is not meant to reverse anything,” Goldberg says. “It’s meant to protect your skin from future damage. LED has no heat effect at all, is painless and has no affect on pigment. It passes through skin into the cells, actually making (skin) stronger.”

While it’s only been used on the face to date, Goldberg says that LED treatments will be applied to the body later this year. A typical LED treatment involves one 40-minute session per month for six months, then once every six months, at a cost of \$400 to \$600 for each session.

### **Zapping Skin Cancer**

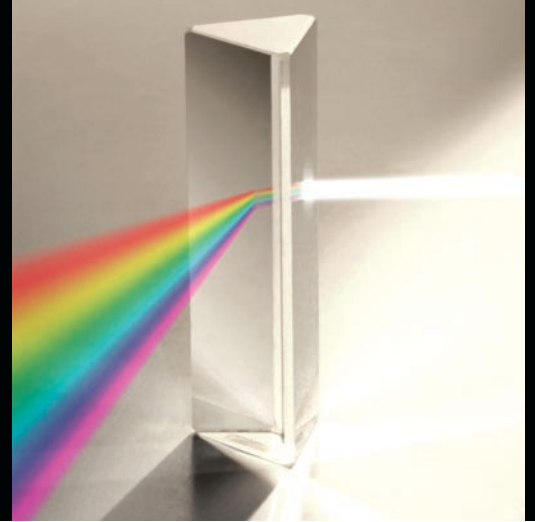
What if precancerous cells could be targeted with a simple light treatment? It’s now possible with photodynamic therapies, or PDT. To date, PDT has primarily been used to treat acne and rough, discolored or scaly patches on the skin. “Those with lots of sun exposure will develop red, scaly spots,” says Dr. Tina West, a member of the American Society for Dermatologic Surgery. “These things pop up like weeds and the only choice we had before was to apply liquid nitrogen and freeze them off. It was like Whac-a-Mole.” In ad-

## Hair-Free Without Leaving Home

Doctors are starting to make house calls again, but instead of antibiotics and thermometers, they're armed with syringes filled with Botox and light-based hair removal devices. Botox parties aren't new, but now they might be getting a little less hairy. The Food and Drug Administration gave the nod in March to the Silk'n home hair removal system, made by Home Pulsed Light.

The device won't be available to just anyone. The restrictions are similar to prescription medicine. Silk'n will be sold only at physicians' offices and only be released to those individuals who doctors deem able to administer the treatment to themselves safely.

During clinical studies, individuals who underwent three biweekly sessions for three consecutive months experienced a 50 percent reduction in hair density.



dition to treating existing spots, West says that PDT has a bonus: It also treats sun-damaged cells beneath the skin's surface.

The PDT procedure begins with a solution called Levulan Kerastick, which is applied to the area being treated and allowed to soak in for up to 30 minutes. The cells absorb the Levulan, then the skin is put under a blue light for 15 minutes, during which time a free radical oxygen reaction takes place within the cells. The procedure is painless and destroys all sun-damaged cells, including precancerous ones. Usually two to three treatments are recommended, at about \$450 each.

PDT is also showing that it can prevent future skin damage and improve acne as well. "Basically, for a lot of different conditions, it's an alternative treatment," West says. "It's very well tolerated and can treat the entire face or body at the same time, which is nice, and also will eventually be used for certain types of skin cancer."

### Lipo on the *Light* Side

A fat-melting laser already in use throughout Asia, Europe and Canada is set for its debut in the United States. The Lapex 2000 Lipo Laser reduces fat fast, and is relatively pain free and completely noninvasive. Researchers at Louisiana State University along with Vancouver-based Meridian Medical have been working toward Food and Drug Administration approval, which is expected this year, and the Lipo Laser will find its way into the American market by mid-2008.

"I like to compare it to natural weight loss," says Karmyn La Saw, who works in clinical research and development at Meridian. "When you lose weight naturally, dieting and exercise stimulate the fat cells to release the triglycerides into your system, where you burn that as fuel. The laser is fast-forwarding that process...It's very similar to how a healthy metabolism burns off fat."

The process includes strapping two laser paddles on the areas to be treated—usually the abdominals, back, thighs or arms—and two smaller lasers are placed on lymphatic glands for about 15 minutes, followed by a 10-minute stint on a vibration machine, which stimulates the lymphatic system to drain the fat out of the body. The benefits are clear—no incisions, no anesthetics, no downtime and less expensive than traditional liposuction. It also doesn't remove fat cells; it just drains fat out of existing cells, so there's no

danger of fat being stored where it can harm the body, such as the heart and other vital organs. The average course is eight treatments, which take about 40 minutes each, at a total estimated cost of about \$2,000.

However, to maintain results, patients must follow a healthy diet and exercise plan. "It is meant for people who are on a diet and exercise program," LaSaw says. "To keep the cells shrunk, you need to cut out the fats. If you don't keep burning the triglycerides in the system, the fat cells will grab them again."

“When you lose weight naturally, dieting and exercise stimulate the fat cells to release triglycerides...The laser is fast-forwarding that process.”

—Karmyn La Saw

### Breathing *Easy*

Your next diagnosis could soon be a breath away. Scientists at JILA, a joint institute of the University of Colorado and the National Institute of Standards and Technology, are developing a laser that can identify molecules in the breath that could indicate serious health problems. The technology, called optical frequency comb spectroscopy, is strong enough to sort through all the molecules in the breath. "Analysis of the pattern of light frequencies absorbed by molecules in the exhaled air can be used to detect diseases like asthma, cancer, and liver and kidney failure," says Jun Ye, PhD, the project's lead researcher. "With its combined sensitivity, selectivity, broad spectral coverage and real-time monitoring capability, the new device has the capability to identify a truly large range of breath ingredients."

Ye says they plan to make the laser 100 times more sensitive within the next year. Pending further engineering and testing, it could be in doctors' offices within five years with the obvious benefit of catching diseases earlier using a noninvasive, low-cost approach. 