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## LEDs rejuvenate without thermal injury

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Dr. McDaniel

Atlanta - Rejuvenation of skin with light - without causing thermal injury - may soon be available thanks to a new device currently in development that uses light emitting diodes, reported David H. McDaniel, M.D., at the American Society for Laser Medicine and Surgery annual meeting held recently.

"We were looking for a simple, safe, low cost, very reliable, very durable way to create skin rejuvenation, without using lasers," said Dr. McDaniel, in private practice, Virginia Beach, Va., and is assistant professor of clinical dermatology and plastic surgery, Eastern Virginia Medical School.

"You can put arrays of these LEDs together to create large panels, so that rather large surface areas can be treated simultaneously," he added.

**Photomodulation** With the appropriate manipulation of variables, including wavelength, LEDs can interact with cells in a process called photomodulation, he said. "Photomodulation is the new theory that we've introduced to explain the light-tissue interactions.

"With photomodulation, we are investigating using light to activate and energize cells or to 'flip the switches' on receptors," he added. Cells can be stimulated to produce or multiply with this technology. In the case of skin fibroblasts, which are "little protein factories," Dr. McDaniel said, our photomodulation research suggests LED light can increase the production of collagen and elastin, "all the things we want to make our skin appear more healthy and beautiful."

In addition to stimulating collagen production to regenerate aging or sun-damaged skin, research suggests LEDs can be used to inhibit collagen formation, which might be helpful in the case of scars. "Based on current laboratory investigations, one can literally use the same light energies to both activate and inhibit cell activity," Dr. McDaniel said.

These two types of photomodulation are referred to as photactivation and photoinhibition. How light actually accomplishes this photomodulation is still under study, Dr. McDaniel said. Robert Weiss, M.D., and Roy Geronemus, M.D., are leading other research teams in the ongoing clinical investigation of photomodulation.

**Photomodulation, other light therapies** Photomodulation is nonthermal and nonablative. Most skin therapies using light, including intense pulsed light and laser treatments, are thermal, Dr. McDaniel said. "They create some type of thermal injury to the skin, typically either to the collagen, or to tissue water, or to the blood vessels."

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TAKE SOME TIME



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All of these other light therapies have a common denominator, a thermal injury as the initiating factor, he said. "There's quite a bit of variability from patient to patient on what the final result is. And that's been the big complaint from patients about current nonablative anti-aging therapies. In contrast, current intense pulsed light "photofacial" procedures have strong patient satisfaction, but this is due primarily to their success in fading uneven pigment and unwanted blood vessels while collagen stimulation is often minimal.



"Photomodulation, by not working through the wound healing thermal mechanism, is not subject to all of these variables," he said.

Pretreatment (top) and five weeks posttreatment with GentleWaves LED device. (Photographs courtesy of David H. McDaniel, M.D.)

**LED treatment** Treatment times depend on the surface area being treated, the anatomic area, and which skin problem is being treated, Dr. McDaniel said, "But most of the treatments can be performed in probably 15 minutes or less."

Energy generated by the LED device is cool enough to treat all ethnic skin types.

A preliminary study reported by Dr. McDaniel indicated that there was a 46 percent global reduction in the appearance of wrinkles, and uneven pigment in 47 patients, aged 30 to 60, with skin types I-III.

Patients report a high degree of satisfaction with this procedure, Dr. McDaniel said, especially since they can be in and out of the office in approximately 30 minutes. Make-up can be applied immediately after a treatment. Drs. McDaniel, Weiss, and Geronemus emphasized that these LED treatments are investigational and that research is ongoing.

The LED device, called GentleWaves from Light BioScience, is not yet available. Dr. McDaniel is director of research and innovation for the firm, and is an inventor of some of its patented products.

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