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Harvesting Your
Own Cells: The
Cure for Aging Skin?



Natural Born Fillers

Say goodbye to synthetics. The answer to looking younger just may be found in your very own cells.

London's tony Hurlingham Clinic and Spa used to be a quiet practice, the province of ladies of a certain age seeking a little nip or tuck and Sloane Rangers dropping by for some pre-vention liposuction. Quiet, that is, until sought-after American-trained plastic surgeon Daniel P. Goldberg alerted his patients to a new therapy. With a few syringes of a cutting-edge injectable, he told them, they might finally banish their acne scars and wrinkles. Now his patients are competing to get on the waiting list—currently six months long and growing—to pay upwards of \$4,500 for the world's newest aesthetic fix.

The injectable is Isologen, an experimental collagen-producing material, and Goldberg is one of a handful of top London doctors who offer it. He may soon have company, however, and on these shores as well: While the product is currently available only in the UK and Australia, Isologen Inc., in Houston, anticipates obtaining FDA approval and introducing it in America in 2005. Doctors in the United States who recently completed clinical trials found that an injection of Isologen—which is composed entirely of fibroblasts, the connective tissue cells that prompt skin proteins to grow—plumped up and smoothed out everything from lip lines to crow's-feet.

What's groundbreaking here is neither Isologen's purportedly miraculous effects nor its allegedly long-term staying power but its provenance. First, a doctor removes a three-millimeter section—smaller than the diameter of a pencil eraser—of virgin skin, never exposed to the sun, from behind a patient's ear and sends it to Isologen's lab. There, scientists use the skin biopsy to reproduce the patient's fibroblasts by the millions. Six to eight weeks later, the company sends the doctor a syringe with enough material to inject one area of the patient's face, whether it be an eyebrow fold or a smile line. Within a month, the theory goes, those cells should have grown and melded with existing collagen, filling out the skin from within.

If this cell therapy proves to endure over the long term, it may herald a paradigm shift in aesthetic medicine, one in which the cure for aging skin is derived directly from the patient. But it won't come cheap. If Isologen gains FDA approval, three syringes of the stuff—enough to fill in crow's-feet around both eyes plus one scowl line—will run about \$5,000. Nor will the results be as instantaneous as with Botox: Once injected, Isologen takes a month to start showing its effects and six to 12 months for maximum results. The real draw is medical compatibility, the idea that patients would not be allergic to or infected by shots of their very own cells.

"My patients love the fact that Isologen is not a foreign substance but part and parcel of their own tissue," says W. Gregory Chernoff, a Santa Rosa, California, plastic surgeon who has been conducting Isologen clinical trials over the past decade. "My bet is that, once Isologen gets FDA approval, it will wipe out the rest of the injectable market."

"Why increase volume by injecting silicone or collagen if you can just put in your own natural cells?"

Doctors often used to differentiate treatments by their longevity. "Permanent" procedures, such as Gore-Tex chin implants, are intended to endure for a patient's lifetime, versus "temporary" treatments, such as collagen injections, which last for several months. But now doctors are starting to classify aesthetic options by their origins: synthetic, homologous (natural but not necessarily human) or autologous (derived from patients themselves).

"I stay away from permanent synthetics—especially silicone—which are artificial materials that have the potential to cause permanent damage," says New York facial surgeon Michael Ewan Sachs. "Some of the homologous biologically derived fillers are great, but others, such as bovine collagen, can cause allergic skin rashes. Which means that human-derived and self-derived are potentially the ideal fillers of the future—once they've been perfected."

So Sachs and other cutting-edge practitioners are all closely watching the advent of treatments, such as Isologen, in which patients are their own best medicine. "Why increase volume by injecting silicone or collagen if you can just put in your own natural cells, activate your body to repair itself, and regrow what you've lost?" says Marc G. Rubin, a Beverly Hills dermatologist who recently conducted an Isologen clinical trial on acne scars. "It's as if, instead of putting in dentures, you could sprinkle your own ground-up tooth powder in a gap where you are missing a tooth and just grow a new incisor."

Isologen is not the first autologous remedy for aging faces. The first comer

was fat transfer—fat cells removed from a patient's abdomen or love handles and reinserted into the face. First popularized in the late Eighties, today fat transfer is used by doctors both as an adjunct to a facelift—to add contours to facial features—and as a facelift alternative. The pioneer of this treatment is New York plastic surgeon Sydney Coleman, nicknamed the Michelangelo of Fat for his uncanny ability to interpret a patient's bone and tissue structure and flesh out a face with hundreds of minuscule droplets of fat.

Coleman developed his technique by treating other doctors' patients who suffered from skin dimples after too much liposuction. He found that fat, like tar over a pothole, could recontour patients' skin. And the smaller the droplets of fat he injected, the less likely they were to be reabsorbed into the body.

"With just one cc"—less than a teaspoonful—"of pure fat, I will inject 50 itty-bitty little drops around an eyelid, or in a tear trough. If I am sculpting a whole face, I could easily inject 3,000 droplets," explains Coleman, sitting in his TriBeCa office, fresh from the day's surgery in green hospital scrubs. He admits that fat transfer is a much more involved option than just getting a simple off-the-shelf shot of collagen. The fat removal process usually requires anesthesia, doctors have to inject extra fat to account for the percentage that will get reabsorbed, and monstrous postoperative facial swelling can last for weeks. "But a filler has to be safe—and fat is the patient's own autologous material," Coleman says. "It's a no-brainer."

Some doctors, such as American Society of Plastic Surgeons president Rod J. Rohrich, eschew fat grafting as "unpredictable, irregular and disappointing." Even Coleman admits that scientists are only now beginning to understand how and why some transferred cells survive in their new environment while others don't. One possible factor is adult stem cells—regenerative cells that are able to grow into blood vessels or muscle.

"I always thought I was just importing fat from one region of the body to another. But it turns out that fat contains a high percentage of adult stem cells—and stem cells may play a role in helping the fat stay alive when it's moved," says Coleman. He is currently working with the San Diego biotech company Macropore, where scientists, with patients' approval, isolate stem cells from fat and examine how the cells may assist in transferred fat's longevity. Researchers predict that if additional stem cells are added to a patient's extracted fat, a higher percentage of fat might remain in the face for a longer period of time. Envisioning a future where those cells could do even more, Macropore, for a fee, will cryogenically preserve patients' stem cells.

"Patients should know that, rather than have us discard their tissue after liposuction, they may have it preserved," argues Beverly Hills plastic surgeon Peter B. Fodor, one of 25 American surgeons working with Macropore's stem cell bank. "One day we may be able to grow bones, nerves, hearts, muscles and cartilage out of stem cells. When the patients

are 80 and break a hip, the cells preserved from their liposuction decades earlier might help them heal."

In other areas of medicine, forward-looking patients already store their own tissue, banking their blood before a major surgery or having their children's umbilical cords preserved. But Isologen and fat stem cells may be ushering the new high-tech era of regenerative medicine into aesthetic surgery.

As with all cutting-edge biotechnology, there are questions about the long-term effects—whether, for example, an injection of millions of extra cells might cause skin to plump up too much. In a statement, Isologen Inc. says that tissue overproduction is "not possible," because cells that are removed from behind the ear and transferred to the face "are subjected to the same powerful growth control mechanisms in the tissue that they have always been." And with no reports of side effects so far, doctors seem entranced.

"I'm so excited about Isologen," says Frederic Brandt, a New York and Miami dermatologist who is about to begin Isologen clinical trials. "We might be able to treat scars and burns that we could not satisfactorily address before and to improve skin texture, not just fill in volume. If it works as well as they say, Isologen won't be categorized with the other fillers," he predicts. "It will represent a whole new kind of living-cell therapy for the skin."

—NATASHA SINGER