

# Stem cells & facial rejuvenation

*Grafting concentrated fat stem cells helps to restore a youthful look via increased facial volume and improved skin tone and texture.*



Fat grafting and the use of adipocyte stem cells can add volume to an aging face, as it improves skin tone and texture over the course of months and sometimes even years.

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New York cosmetic surgeon and fat-grafting pioneer Sydney R. Coleman, M.D., has been using fat to add volume to aging faces for almost 20 years. Somewhere along the way, he began to take note of how the grafted fat not only provided added volume, but also appeared to reinvigorate surrounding facial tissue, seemingly making it thicker, rosier and generally more youthful-looking. His research and that of others suggests that stem cells within the grafted fat mediate this rejuvenation, and the process has become known as a "stem cell facelift."

Dr. Coleman does not typically use the term "stem cell facelift" when describing or marketing his own technique. "A facelift removes the signs of aging, whereas, fat grafting — by restoring volume and then by repairing the damage that is present — actually moves a patient closer to youth than often a facelift does, because the absence of a wrinkle is not



## Stem cells *continued*

the presence of youth," Dr. Coleman says.

What's more, he prefers to think of these hard-working cells as repair cells rather than stem cells. "Fat is not just a storage organ, it is a repair organ. It supplies repair cells that mend bone or skin or whatever part of the body it is called on to help," Dr. Coleman says. "If you put fat under sun-damaged, aging skin, then (apparently) it perceives that there is a problem, and it is directed by messengers or growth factors to repair the aging skin."

"In the early '90s, I noticed that the color of the skin and the texture of the skin remarkably improved after fat grafting. I would place a very thin layer of fat in an area, and not only did it fill, but the texture of the skin improved, the wrinkles diminished and often even disappeared. The pore size decreased, and the color of the skin — under the eye, for instance — would usually lighten or become a little rosier," Dr. Coleman recalls.

At the time, he says, he didn't know what was responsible for these effects.



Dr. Coleman

"I assumed that maybe there were some hormones that I was transferring with the fat — and I still think that might be a component," he says.

"But then about nine years ago, people started talking about the fact that there were many

stem cells in fat. So over the last few years I started rethinking what I was doing and I started concentrating the fat with a centrifuge and using only the densest fat for grafts, and I found that the rejuvenation effects including decreased pore size and improved skin texture were even greater."

Using the isolated stem cells of concentrated fat resulted in increased and more predictable results as far as adding volume and rejuvenating surrounding tissues.

**RELEVANT RESEARCH** Dr. Coleman's recent research involving the effects of fat stem cells on radiation damage in animal models supports his anecdotal observations. "Our research shows that you can actually reverse radiation damage with just the placement of fat into an area that's been irradiated," Dr. Coleman says. In the study, which he performed with colleagues at New York University, four weeks after irradiation, mice were fat-grafted with 1.5 cc of lipoaspirate or sham-grafted with sterile saline. Hair growth, skin color and degree of ulceration were analyzed following irradiation.

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Sydney R. Coleman, M.D.  
New York

Irradiated skin was harvested four weeks following grafting for analysis, and results showed that chronic ulceration and fibrotic skin thickening stabilized; alopecia, skin color/texture and ulceration improved in fat-grafted mice compared to sham-treated controls; antibody production significantly decreased in the treated animals; scar-index decreased 4.3-fold in the treated animals; and vascular density of irradiated skin increased in fat-grafted mice compared to controls.

Dr. Coleman says these findings suggest that fat grafting alleviates radiation skin damage by improving vascularity and downregulating the transforming growth factor pathway. This process is likely mediated by progenitor cells (stem cells) and angiogenic adipokines present in processed lipoaspirate/fat. The process probably is responsible for the improvement in skin quality in facial rejuvenation patients as well, Dr. Coleman points out.

**THE PROCESS** Dr. Coleman stresses that the fat grafting process must be done correctly to achieve the optimal rejuvenation effect. "I try to minimize the trauma that's involved in extracting, refining and filtering the fat," he says.

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Dr. Coleman says he uses a 10 cc syringe connected to a blunt-tip cannula to collect the fat from a donor site, usually on the patient's inner thigh. He then places the syringe into a centrifuge, which isolates the all-important stem cells. "After I've refined it and concentrated it, I put it into a 1 cc syringe and attach that to a much smaller blunt-tip cannula. To place that 1 cc of fat, I'll make between 50 and 100 passes — or injections — so it creates a fair amount of swelling, but this is essential to getting the best end result," he says.

In comparison to alternative facial rejuvenation techniques, Dr. Coleman says recovery is actually quicker in the cheeks, jaw line, temples and eyelids. However, recovery is somewhat lengthier in the lower eyelid and lips. "You can see the swelling more in these areas where the skin is very thin," he explains.

**PATIENT EDUCATION** Preparing patients for the amount of post-procedure swelling and bruising is the toughest part of the process, Dr. Coleman says, because patients rarely believe that they will look as bad as the photos he uses to prepare them. Perhaps it is because they have seen fully recovered patients who are already enjoying the benefits of the procedure, or perhaps it is simply because they never think their experience will be like the worst-case scenario recovery photos that they are shown.

Dr. Coleman says most patients stabilize and achieve their desired outcome in under a month, while some take a bit longer. "Within the first four months, the volume stabilizes, but the quality of the skin continues to improve for months or even years," he says. "What's probably happening is that somehow the fat and presumably the stem cells are continuing to act for a very long time. In that way, this is very different than a facelift. Basically, a facelift forms the skin into a different relationship with the face in order to eliminate wrinkles and the signs of aging. Fat grafting is a more physiologic process in that it actually plumps first to make the patient look more like they did, volume-wise, when they were young, and then it repairs the skin," Dr. Coleman says. ◀