

STEM CELLS AND AGING

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Over the past few years there has been a lot written, both in scientific literature and in the lay press, about the possibilities of stem cells and how they can rejuvenate certain organ systems in the body. These studies have shown that stem cells which are present in all our tissues actually work on a daily basis to repair tissue and renew body organ systems.

The question is, where do the stem cells come from, where do they reside normally in the body, which ones can we use for therapeutic purposes, and what exactly can be accomplished with this therapy? Each specialist has his own concept of how his or her patient population could be improved. Cardiologists would like to see stem cells improve the function of cardiac muscle, and the vascular surgeon would like to utilize them in the improvement of peripheral vascular disease. The orthopedic surgeon would like to see joint surfaces improved with growth of new cartilage from stem cells injected into the joint fluid. Plastic surgeons have known for some time that stem cells are present in large quantities in fat and are useful in rejuvenation of skin and contour defects in the face and other areas of the body. Treatment of these problem areas includes hollow cheeks, deep lines around the mouth or nasolabial folds, and improvement of sun damaged, scarred, or radiation damaged skin.

Stem cells from bone marrow possess multiple functions and can differentiate into fat tissue, bone, cartilage, muscle, or nerve tissue. However, this is a donor area which is difficult to use because of pain and the small quantities of tissue available from it. The stem cell population in processed fat grafts can differentiate into fat, bone, cartilage, and muscle. Because this is true, many uses have been discovered for these fat tissue origin stem cells. Fat can be harvested under local anesthesia in large quantities. Once the fat graft is obtained, stem cells can be concentrated and added to the fat which will be used to fill defects or rejuvenate the skin. Most surgeons who have been dealing with fat grafts over the past 15-20 years have discovered their remarkable qualities, but are also aware that the result can range from fair to excellent. Adding concentrated stem cells can improve the results of these grafts.

There are clinics which offer “non-surgical” techniques to treat arthritis and sports injuries utilizing stem cell therapy into the area of damaged articular cartilage of the knee or other joints. Usually several treatments are needed to improve this, and multiple injections into the knees, shoulder, neck, or other areas can be done. If fat is removed from an area such as the hip in a female, it carries the genetic characteristics of that fat, which is to say that hip fat doesn’t really atrophy or go away; it just continues to grow slowly with aging. If a good fat graft can be obtained in the face, including the cheeks and perioral areas, improvement of the aging process is immediate as well as long term.

We are now seeing an increasing number of breast cases where augmentation is performed by utilizing aspirated fat from liposuction. This gives patients reconstructed breasts using their own body fat from another source and has been quite effective.

I have found over the years that removal of fat from the lateral thigh and hip area gives the most active and dense fat cells, and these have been capable of many good changes which I have achieved in patients in their facial or breast areas. Abdominal fat has not been as effective as a donor area.

The Plastic Surgery Educational Foundation has invested to date \$540,000 in research for breast reconstruction using fat grafts with enhanced stem cell models. Much of this work is going to be productive in this area and will allow us to sharpen our clinical skills and get better results.

Regeneration of tissue by stem cells occurs in all animals and is different for each species. The salamander loses a limb and then is able to regrow that limb and have it function in a normal manner. A smaller organism, the hydra, can lose the head and can regenerate this and go on functioning normally. Stem cell research started back in 1963 and showed that bone marrow cells called HSC (hematopoietic stem cells) could actually reconstitute the bone marrow in someone who has maximum chemotherapy or radiation. This gave us the opportunity to actually be more aggressive with the tumors and obtain more cures. This has turned out to be a very useful clinical tool for people with severe leukemia or other types of malignancies.

There are protein “markers” on the surface of stem cells that can help predict how effective they might be in clinical use. These markers decline with age and are dependent on the same things upon which the aging process is dependent. That is, nutrition, freedom from stress, and a well-balanced diet full of nutrient-dense foods.

The usefulness of stem cells in cosmetic plastic surgery relate to their ability to increase specific function of the repair tissue in the body. For example, if laser, chemical peel, or microdermabrasion is done to the facial skin and if additional stem cell enhancement is present, then the repair process builds up new collagen and even new subdermal fat, which gives a more youthful appearance. Imagine having facial skin and a pleasing contour that will last 10-15 years instead of just a short period of time as extraneous fillers might be able to create. Imagine being able to improve cardiac function, liver function, and brain function with stem cells to maintain a youthfulness over a long period of time. This can now be done.

Stem cells are being used by some surgeons on a daily basis, and the improvements for isolating them and bolstering their activity is ongoing. The stem cells in fat grafts placed around the facial area and body are showing results which are very good. This is a whole new field of anti-aging for the individual who is motivated for improvement in those areas. Stay alert for more information about stem cells, as you will see this to be a “wave of the future” which will be highly utilized in practical clinical situations to make your

life and your looks better. I have certainly been happy with the use of this technique in my practice and have seen many good results over the years.