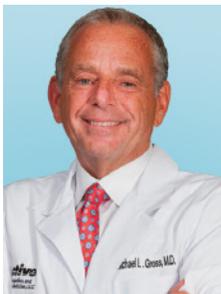
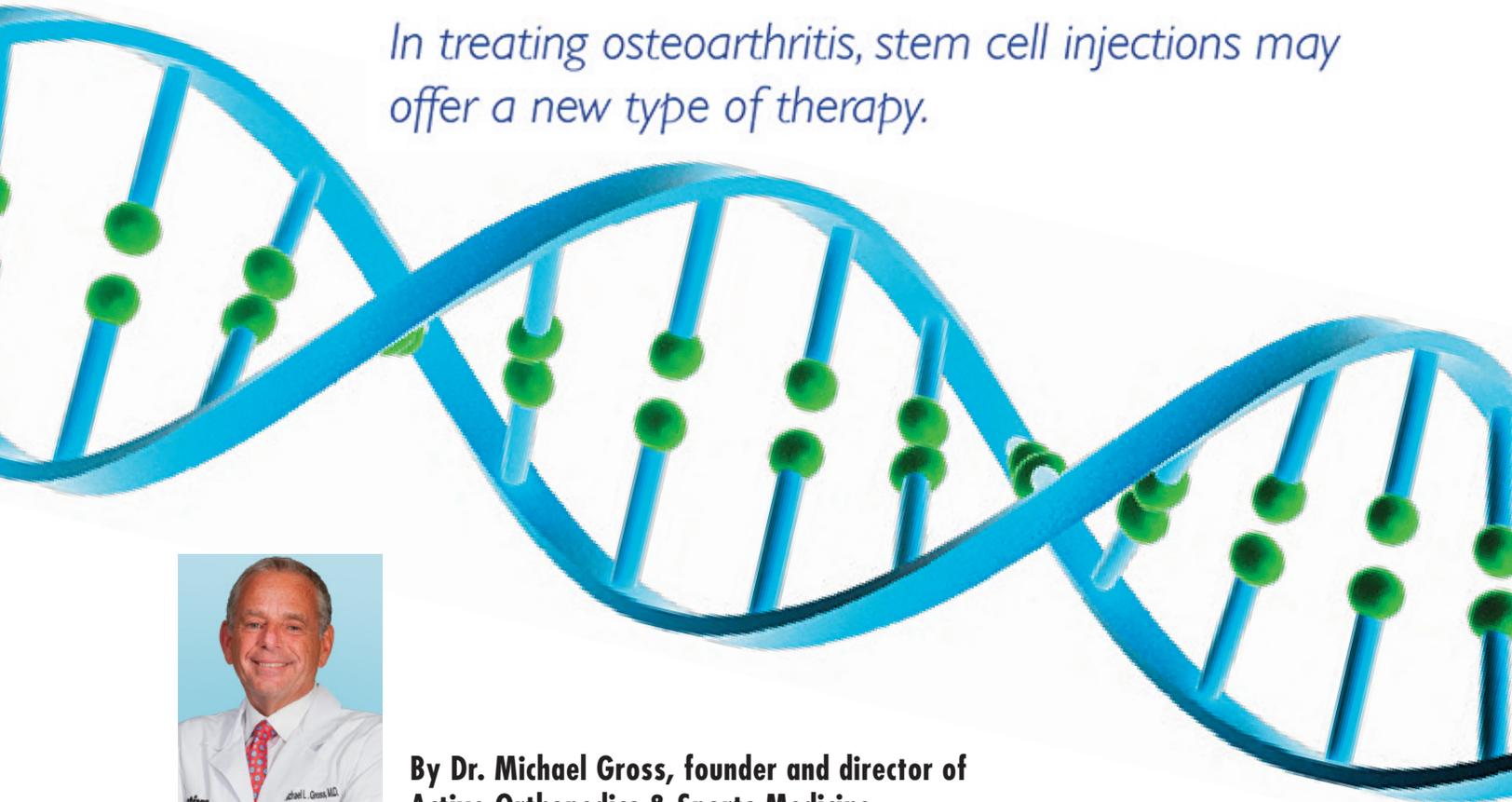


It All Stems From Here

In treating osteoarthritis, stem cell injections may offer a new type of therapy.



**By Dr. Michael Gross, founder and director of
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The majority of complications in osteoarthritis patients are related to the deterioration of cartilage that cushions the ends of bones in your joints. Cartilage is a firm, smooth tissue that permits nearly frictionless joint motion. Picture the white on the end of a chicken bone. In osteoarthritis, this surface becomes rough. Eventually, if the cartilage wears down completely, patients will be left with bone rubbing on bone.

Stem cell treatment is designed to target these areas within the joints to help with the creation of new cartilage cells. As stem cells are multipotent, they have the ability to differentiate into cartilage cells called chondrocytes. The goal of each stem cell treatment is to inject the stem cells into the joint to create cartilage chondrocyte cells. Stem cells are also natural anti-inflammatories, which can assist with osteoarthritis pain and swelling in the joint area. Stem cells have long been heralded as the possible answer to a number of medical conditions,

It All Stems From Here

Page 2

including osteoarthritis. In treating osteoarthritis, stem cell injections may offer a new type of therapy by either stopping the degenerative process or by regenerating the damaged cartilage. Several studies in animals show that stem cell injections may help by reducing the inflammation in the joint. Stem cells appear to have a natural capacity to produce anti-inflammatory molecules, and once injected in the joint, can slow down the degenerative process in osteoarthritis.

Essentially, there are several types of stem cells that are available for injection into arthritic joints. The most common types of stem cells available in the United States basically fall into two groups: autologous cells, derived from the patient's own body, and, allogenic cells, which are derived from another source. In both cases, these cells are considered adult cells. That is, they are not derived from fetuses or embryos.

The use of adult stem cells in research and therapy is not as controversial as the use of embryonic stem cells, because the production of adult stem cells does not require the destruction of an embryo. Additionally, in instances where adult stem cells are obtained from the intended recipient, the risk of rejection is essentially non-existent. Consequently, more U.S. government funding is being provided for adult stem cell research.

Stem cells reside in adult bone marrow and fat, as well as other tissues and organs of the body. While these types of cells have a natural ability to repair damaged tissue, in people with degenerative diseases, they are not released quickly enough to fully repair damaged tissue. In the case of fat stem cells they may not be released at all. The process of actively extracting, concentrating and administering these stem cells has been shown in clinical trials to have beneficial effects in degenerative conditions, including osteoarthritis. When the patient's own cells are used, they are typically derived from bone marrow or fat.

The use of autologous adipose tissue may have several advantages over bone marrow cells. Adipose (fat) tissue contains a concentrated amount of cells known as mesenchymal stem cells, which are capable of replication or becoming different types of cells (i.e., neurons, bone, cartilage, muscle, tendon) throughout the body.

The major advantage of using mesenchymal stem cells from your adipose fat is that they are one of the richest sources of stem cells in the body (2,500 times more stem cells reside in fat vs. bone marrow) and they are very easy to harvest via a mini-liposuction procedure. This may be less painful than bone marrow harvesting.

It All Stems From Here

Page 3

Adipose derived stem cells also have a much higher immunomodulatory capacity than those of bone marrow derived stem cells, which can greatly benefit patients with auto-immune conditions.

Adipose derived stem cell treatments are autologous, meaning they are derived from the patient's own body. Numerous studies have been done showing the safety and efficacy of autologous stem cell therapy throughout the years.

Recently, specialists have begun to utilize the potential of autologous adipose (fat)-derived from adult stem cells within non-manipulated fat graft structure, combined with high-density PRP concentrates to provide a potent biological therapeutic combination. With high levels of platelet-derived growth factors and cytokines, this combination provides both a living bio-scaffold and a multi-potent cell replenishment source useful for enhanced musculoskeletal healing. Fat is a complex tissue that is not only easiest to harvest, but offers markedly higher nucleated, undifferentiated stem cell counts. This procedure can be done in the office. It is a safe and sterile procedure that just takes a few hours. This procedure can be performed on anyone who needs build-up of cartilage due to osteoarthritis and many other joint, ligament and tendon problems. This treatment using adipose (fat) and bone marrow stem cells from one's own body is preferable because there is no risk of disease transfer, rejection or allergic reaction. Recent studies have shown the greatest success by combining stem cells from both fat and bone marrow. This is now the standard procedure in many clinics.

Allogenic mesenchymal cells are stem cells that are derived from outside source and then used to treat the effected patient. These cells are most commonly derived from human placentas, umbilical cords or amniotic fluid. It is important to note that these are considered adult stem cells. These cells are not obtained from either fetuses or embryos. Allogenic adult stem cells have several advantages. Anyone can be treated with these cells since allogenic mesenchymal stem cells are immune system privileged. Human Leukocyte Antigen (HLA) matching is not necessary. Additionally, the stem cells with the best anti-inflammatory activity, immune modulating capacity and ability to stimulate regeneration can be screened and selected. Other benefits: allogeneic stem cells can be administered multiple times over the course of days in uniform dosages that contain high cell counts. Umbilical cord tissue provides an abundant supply of mesenchymal stem cells and, there is no need to collect stem cells through invasive procedures such as liposuction or bone marrow collection. Finally, there is a growing body of evidence showing that mesenchymal stem cells from umbilical cords are more robust than mesenchymal stem cells from other sources such as fat.

It All Stems From Here

Page 4

At times, the stem cells may be mixed with other substances to enhance their effectiveness or to aid in the delivery or the application of the cells. The most common of these additives are platelet-rich plasma (PRP), hyaluronate, chondrocytes (cartilage cells) or various scaffolds.

When autologous cells are used, stem cells are extracted by a form of liposuction from abdominal fat pad and hip bone by marrow aspiration. Both are done by under local anesthetic, with minimal discomfort. These cells are processed, concentrated and injected into the injured areas. The entire procedure takes about four hours. When allogenic cells are used, no harvest is necessary. Many centers use fluoroscopic or ultrasound guidance to ensure proper placement of the injections. Some physicians use a surgicenter for the procedure, while many are moving towards doing the entire procedure in the office.

Stem cell therapy is a repair process that usually takes two to three months, but improvement is typically noted before then. Approximately four to six weeks after the stem cell injection, the procedure is repeated. These injections allow the stem cells to continue growing and multiplying into cartilage tissue. Some people begin to feel results immediately, although it's more likely that it will take a few days or even weeks to begin to see significant effects on your health or to feel your symptoms lessen. You can expect more energy within three weeks, but for deeper structural problems to improve, it may take six to eight weeks. Treatment protocols are still being developed and still vary from clinic to clinic. Some recommend repeating the process every four to six weeks, while others suggest up to every six months.

At this point it is important to remember that this is still an evolving treatment. Many variants and protocols are still under investigation. In addition, very few insurance companies presently cover this treatment for osteoarthritis since it is still considered investigational. It makes sense to utilize conventional therapy first, and proceed in a logical, step-wise fashion under the guidance of an experienced, qualified physician who has an entire array of treatment options available and can help you find the course that is best for you. Sometimes all that is needed is weight loss and simple activity modification. Beware of highly hyped centers offering magic bullet, one-size-fits-all treatments.

Stem cell therapy is an exciting and promising new treatment for the pain caused by a variety of orthopedic conditions. As it continues to grow, there will be more and more options available for patients. In addition, as it becomes more established and accepted, the costs will continue to drop and insurance coverage will broaden.