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September 08, 2017

# Stem Cell Therapy for Pain Management

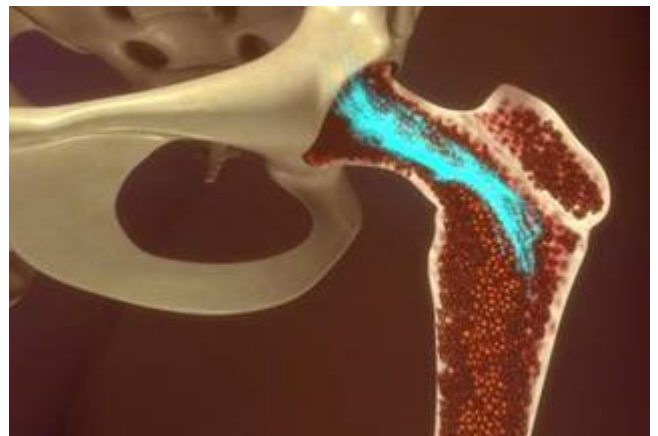
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The following article features coverage from PAINWeek 2017 in Las Vegas, Nevada. Click [here](#) to read more of *Clinical Pain Advisor's* conference coverage.

LAS VEGAS – In a presentation at [PAINWeek 2017](#), held September 5-9, Jay Joshi, MD, CEO and medical director of the National Pain Centers in Vernon Hills, Illinois, gave an overview of stem cell therapies used in regenerative medicine to treat a number of pain conditions.<sup>1</sup>

Dr Joshi emphasized the link between pain and inflammation, which can be triggered by an array of physical and chemical stimuli. Although inflammation is a mechanism normally used by the body to protect and heal itself, it can exceed its normal functions, thus delaying the healing process — the opposite of what it is meant to do. Such a nonresolving inflammation cycle may lead to the development of chronic pain.<sup>2</sup> Diagnosing the cause of nonresolving inflammation and determining whether it is



Non-resolving inflammation may lead to the development of chronic pain.

due to a suboptimal or prolonged response is essential, Dr Joshi pointed out. For example, certain food allergies or substances that contribute to the process are underdiagnosed, in his opinion. Other factors contributing to this perpetuating inflammation include autoimmune conditions, irritable bowel syndrome, and obesity.

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The immune and neurological systems are closely related, starting during early embryonic development. As the central nervous system develops and gains complexity, the body's ability to regenerate becomes less prevalent. Regenerative medicine, “a branch of medicine that deals with the process of replacing, repairing, and restoring normal tissue and function,” can therefore be leveraged to treat nonresolving inflammation, by growing *ex vitro* cells, tissues, or even organs that can be transplanted into the body.

Among the **stem cell therapies** that Dr Joshi highlighted during his presentation and uses to treat his patients, is autologous stem cell therapy, in which adult multipotent mesenchymal stem cells (MSCs) are collected from a patient's adipose tissue and transplanted back into damaged tissue, where they have the potential to differentiate into osteoblasts, chondrocytes, myocytes, and neural progenitors. In Dr Joshi's experience, approximately 1 million MSCs can be collected from 60 cc of adipose tissue. Autologous stem cells can also be obtained from bone marrow aspirate concentrates. The collected marrow stromal cells are indicated for **joint repair**; they are injected back into the patient with a combination of growth factors. It is not yet clear which of the stem cells or growth factors provide the most beneficial outcomes.

Stem cell therapy can also use nonautologous stem cells, which yield much higher concentrations of MSCs (approximately 2 million per cc of umbilical cord tissue), are epigenetically young, and do not require surgery. They are, however, associated with a risk for viral and bacterial infection and need to be stored in liquid nitrogen.

In addition, allogenic MSCs are generally derived from umbilical cord tissue, the matrix of which can also be used in regenerative medicine as it is rich in hyaluronic acid, cytokines, and growth factors. Amniotic membrane and amniotic liquid suspension are another source of material used to treat burns and wounds and repair soft tissue. MSCs can also be derived from Wharton's jelly, the umbilical cord's connective tissue, and are used to prevent inflammation.

A search on ClinicalTrials.gov using the term “umbilical cord MSCs” indicates that **145 clinical studies are ongoing**, which, says Dr Joshi, “shows that this is not a fad” and that, “if anything, [this field of regenerative medicine] is going to grow and get even more refined.”

Read more of *Clinical Pain Advisor's* coverage of PAINWeek 2017 by visiting the **conference page**.



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## References

1. Joshi J. Stem cells and regenerative medicine. Presented at: PainWeek 2017, September 5-9,2017, Las Vegas, Nevada.

2. Nathan C, Ding A. **Nonresolving inflammation**. *Cell*. 2010;140(6):871-882.

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