

# Argus Orthopaedic Zone

## A Peek Into Orthopaedic Surgery's Future

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### *Transforming patient information into patient understanding.*

To begin I will briefly review what stem cells are. As you realize, stem cells are a vast topic that is nearly impossible for most of us to clearly understand.

### **Types**

1. Embryonic stem cells (ESC) are what most people think of when the term stem cells come up. ESC are obtained from the inner cell mass of 5 to 6 day old embryos.
2. Stem cells from many adult tissues are the other type of stem cells. They are from adult tissue (Mesenchymal Stem Cells) such as bone marrow, blood and many other body tissues. They are cells living in “niches” and are quiet until specific stimuli are applied. Growth or synthesis of these stem cells can occur outside the body in a laboratory or inside the body itself.

### **Stem Cell Application**

#### **Articular Cartilage Healing**

For many years there have been different attempts to restore the surface of joints affected by injury or arthritis. In brief it has been an attempt to use the patients own cartilage cells in the area to regrow some of the damaged joint surface.

Future research will find ways of taking Mesenchymal Stem Cells from another place in the patient's body. After a period of incubation outside the body the cells will be placed in the damaged joint to form stable cartilage.

#### **Making New Bone**

Failure of bone repair, i.e. fractures that don't heal is a challenging problem in the management of fractures. I encounter this often and it is extremely discouraging to the patient when their fracture refuses to heal. Sometimes I know why the bone doesn't heal and other times we simply don't know why.

Mesenchymal stem cells hold great promise for healing of bone because of their capacity to change into osteoblasts which are the little cells that cause broken bones to heal. In addition these Mesenchymal stem cells are available from a wide variety of sources.

The future of stem cells in fracture healing looks bright as advances in tissue engineering and biomaterials come together to allow mesenchymal stem cells to play a major role in the repair and regeneration of bone.

### **Other Applications**

The whole spectrum of Regenerative Medicine is difficult to even describe in a brief article like this. Other areas besides bone include

- Engineering of other tissue – tendon, ligament
- Osteoporosis
- Cancer
- Children's genetic disorders

- Rheumatoid arthritis

### **The Future**

My crystal ball tells me that my often stated phrase that “Orthopaedic Surgery has more to do with gardening than carpentry” is coming true.

Conditions that I repair, fractures, arthritis, trauma to tissues ultimately heal because of

- Blood supply and oxygen to the area
- Tissue growth factors
- Osteoblasts, fibroblasts

How far along my specialty of Orthopaedic Surgery is in the quest for a “cure” of some of these conditions I don’t know. I do know that it will be way different than what we are doing today. I want my readers and patients to know that there are very exciting changes on the horizon for Orthopaedic Surgery patients.

Hope you have a good week and I’ll see you later.

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