Different Stem Cell Tissue Sources being Offered for Orthopedic Treatments

What cell sources are most commonly used in orthopedics?

Bone marrow nucleated cells, adipose stromal vascular fraction (SVF), adipose fat grafts, and amniotic fluid stem cells are the most common stem cell procedure types being used. A handful of sites are also offering cultured bone marrow or adipose mesenchymal stem cells.

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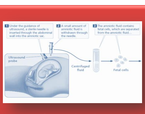
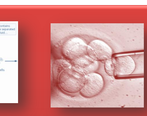
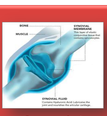
Cord Blood
Isolated from the blood in an umbilical cord of a fetus.



Amniotic
Cells taken from the fluid or membrane that surrounds a fetus.

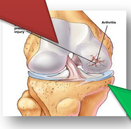


Embryonic
Cells taken from the developing embryo.



Synovial
Cells isolated from the synovial fluid or membrane.

Someone Else's Stem Cells (Allogeneic)



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Your Own Stem Cells (Autologous)

Bone Marrow Aspirate
Isolated from the liquid part of the bone marrow.

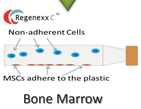
Adipose (Fatty Tissue)
Cells taken from fatty tissue.

Two Different Types of Bone Marrow Stem Cell Processes

Same Day

Bone Marrow Nucleated Cell Isolation
The stem cell fraction of bone marrow is isolated via a centrifuge and re-injected the same day.

Advanced



Bone Marrow Mesenchymal Stem Cell Culture
The stem cells themselves are isolated and cultured to greater numbers over a few weeks. This produces a "pure" population of stem cells which is different than the mix of cells produced by same day procedures.

Three Different Types of Fat Stem Cell Processes

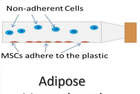
Same Day

Simple Adipose Graft
The fat is separated from the oil and liquid and the fat is injected (however the stem cells are still trapped in the fat and are not concentrated).

Same Day

Stromal Vascular Fraction (SVF)
The fat is separated and then chemically digested to release the stem cell fraction, which is then concentrated.

Advanced



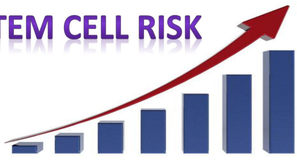
Adipose Mesenchymal Stem Cell Culture
The stem cells are isolated and cultured to greater numbers over a few weeks. This produces a "pure" population of stem cells which is different than the mix of cells produced by same day procedures.

Tissue	Drug	Tissue	Drug	Drug
No FDA Approval	Needs FDA Approval	No FDA Approval	Needs FDA Approval	Needs FDA Approval

Current FDA Regulatory Status of Above

(Under Current Court Challenge)

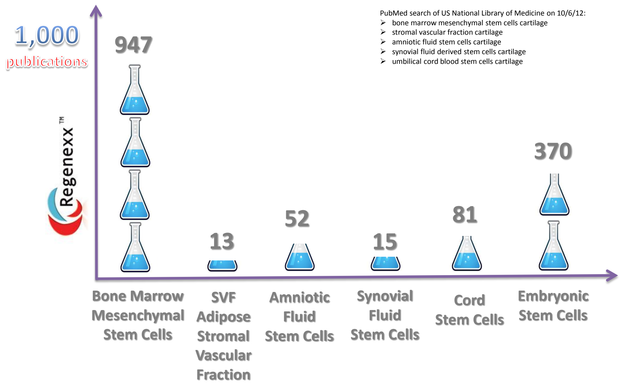
STEM CELL RISK



Stem Cell Risk

All things being equal, the risk of a stem cell therapy increases as the source changes. The safest cells are your own. Stem cells from others can carry the good and bad of their genetic material. Embryonic cells can form tumors.

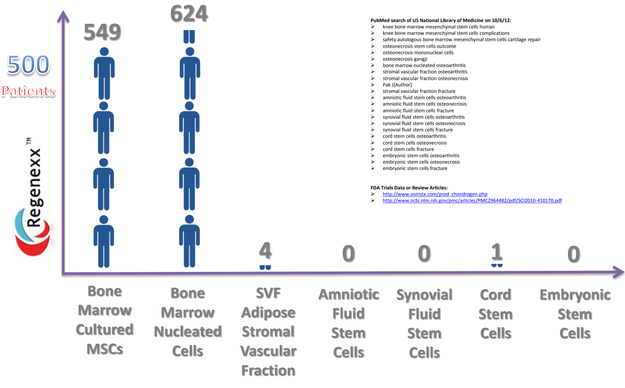
How do various stem cell sources compare on published animal models of cartilage repair?



PubMed search of US National Library of Medicine on 10/6/12:

- bone marrow mesenchymal stem cells cartilage
- stromal vascular fraction cartilage
- amniotic fluid stem cells cartilage
- synovial fluid derived stem cells cartilage
- umbilical cord blood stem cells cartilage

IN THE PUBLISHED RESEARCH OR PUBLISHED FDA TRIALS, HOW MANY PATIENTS HAVE BEEN TREATED FOR ARTHRITIS OR BONE DISEASES?



PubMed search of US National Library of Medicine on 10/6/12:

- knee bone marrow mesenchymal stem cells human
- knee bone marrow mesenchymal stem cells complications
- safety autologous bone marrow mesenchymal stem cells cartilage repair
- osteonecrosis stem cells outcome
- osteonecrosis mononuclear cells
- osteonecrosis gangi
- bone marrow nucleated osteoarthritis
- stromal vascular fraction osteoarthritis
- stromal vascular fraction osteonecrosis
- Pak (Author)
- stromal vascular fraction fracture
- amniotic fluid stem cells osteoarthritis
- amniotic fluid stem cells osteonecrosis
- amniotic fluid stem cells fracture
- synovial fluid stem cells osteoarthritis
- synovial fluid stem cells osteonecrosis
- synovial fluid stem cells fracture
- cord stem cells osteoarthritis
- cord stem cells osteonecrosis
- cord stem cells fracture
- embryonic stem cells osteoarthritis
- embryonic stem cells osteonecrosis
- embryonic stem cells fracture

FDA Trials Data or Review Articles:

- http://www.osirisx.com/grad_chondrogen.php
- http://www.ncbi.nlm.nih.gov/pmc/articles/PMC2964482/pdf/JSCI20510-4101570.pdf