Adipose stem cells

Simple liposuction technique
Adipose stem cells

Aspirate fat and wash fat x2

Aspirate fat and digest with collagenase for 30 - 60 minutes

SVF (cell pellet)

Surgery

Patient

Potential clinical applications

Fat

Bone

Muscle

Cartilage

Differentiable ASC

Culture SVF to obtain ASC

Potential clinical applications:
- Cartilage
- Bone
- Muscle
- Fat

Differentiable ASC
Adipose stem cells
Bone marrow stem cells
Autologous stem cells are only as good as the donor and are subject to the limitations of the individual’s health status and age.
After the age of 30 the stem cell content of any donor markedly decreases with age.

Autologous stem cells
Progressive Depletion of Stem Cell Population with Age
Stem Cells decline with age

MSC/Marrow Cells

Age

New Born   Teen       35 yrs   50 yrs   80 yrs
Autologous stem cells

These cells may be a good choice in the young, but not a good choice for patients of advancing age.
Yet many of stem cell clinics in the US STILL utilize autologous stem cells ONLY.
Stem Cells 101 Course Objectives are now half completed and are as follows:

1. You have now been made aware of the stem cell industry and how it works.
2. You are now educated and empowered with the ability to sort through the pitfalls of autologous stem cell therapy.
3. You are rapidly losing your VULNERABILITY.
4. Now let's move on to the second half of Stem Cells 101.
Heterologous stem cells

These are cells that come from one human being and are given to another.
Heterologous stem cells

These are cells derived from babies delivered by scheduled C-section in mothers that have been screened for health issues. They DO NOT come from aborted fetuses and there are no moral or ethical issues involving their use.
Heterologous stem cells

There are two sources of heterologous stem cells:

1. Amniotic stem cells
2. Umbilical cord stem cells
Heterologous stem cells
(Amnion or Umbilical Cord)

- They have the longest telomeres.
- The cells are immune privileged.
- They are the greatest concentration of stem cells available from any known human source.
- They can be harvested and cryopreserved for 20+ years.
Heterologous stem cells are vibrant, energetic, and juvenile.
Heterologous stem cells

- Have the longest telomeres.
- With each cell division telomeres shorten and as a result will eventually either:
  1. Stop Growing (senescence)
  2. Begin Programmed cell death (apoptosis)
Heterologous stem cells are IMMUNE PRIVILEGED

These stem cells do not provoke a tissue-rejection reaction as occurs with organ transplant patients.
Heterologous stem cells provide the greatest number of stem cells than any other human source.
Heterologous stem cells

• More important question is whether or not they are stored in any synthetic solution (i.e. DMSO).

• Heterologous stem cells can be harvested and cryopreserved for 20+ years.
Amniotic stem cells

- Derived from amniotic membrane and fluid.
- Donated by healthy mothers at the time of scheduled cesarean section.
- Prior to delivery, a detailed prenatal evaluation, risk assessment, and review of donor’s past medical and social history are completed.
- Includes screening for use of medications, chemical substances, and communicable diseases.
Amniotic stem cells

- Although there are a large number of stem cells that can be harvested very few are processed and available for medical use.
- The cells in amniotic fluid and the amniotic sac are exposed to major contaminants and cellular debris (dirty cells).
- Amniotic stem cells are a good source of stem cells but not the best source.
Umbilical cord stem cells

Also harvested from babies delivered by scheduled C-section from mothers who have been screened for health issues.
Umbilical cord stem cells are free from all contaminants and cellular debris and considered to be sterile.
Umbilical cord stem cells

- Umbilical cord stem cells are **immune privileged**. Umbilical cord blood is NOT.
- During processing, only **white blood** cells and **Wharton’s Jelly** are retained.
- The resultant mixture is then cryopreserved for storage.
Umbilical cord stem cells

The **key** to producing a superior stem cell product is how the umbilical cord stem cells are processed:

- **Remove the red blood cells.**
- Process the Wharton’s Jelly and the white blood cells.
Umbilical cord cells are the best known source of stem cells due to:

1. Vibrancy
2. Sheer number of cells
3. Contain highest content of mesenchymal stem cells (MSC)
4. This source is considered to be sterile
Mesenchymal stem cells

1. These cells can differentiate into all cell types.

2. They are considered the “work horse” of all stem cells.

3. The greater the MSC content the greater ability to regenerate and promote formation of healthy new tissue of all types.
A mesenchymal stem cell

Endothelium
Adipose
Muscle
Bone
Myocardium
Liver
Neuron
Pancreas
Cartilage
1. You can now distinguish the benefits between autologous and heterologous stem cells.
2. Based on your age alone, you can select the best stem cell source for you.
3. All stem cells are not alike.
4. You have completely lost your vulnerability in making a stem cell choice.
Your 7-Point Stem Cell Checklist
Are the stem cells **autologous** or **heterologous**?

- Over the age of 30, autologous stem cells are not the best source.
If they are heterologous, are they derived from the **amnion** or the **umbilical cord**?

- Umbilical cord cells are potentially the **best source** of stem cells.
If the stem cells are from the umbilical cord are they processed to remove all cord blood?

• To maintain their immune privilege, all red blood cells must be removed.
What is the **actual** number of stem cells contained in the product?

- Actual, **not** estimated
- The higher number of stem cells, the more superior the product.
- As a general rule, there should be greater than **10 million stem cells** in a one milliliter vial.
Have the stem cells been stored in any synthetic preservative?

- Stem cells are damaged and die off rapidly when stored in these synthetic solutions. (i.e. DMSO)
- This “die off” occurs within 15 minutes after thawing.
What is the total **mesenchymal cell content** of the product?

- Umbilical cord cells have the highest mesenchymal cell content.
- This can and should be higher than 30% of the total stem cell count. 9 ie = 10M Stem ct should have 3M mesenchymal)
What is the total number of live stem cells after thawing?

- There can be a considerable difference between the total number of live stem cells after the product has been thawed.
- Ask for the "stem cell viability" of the product.
- It must be in excess of 95%.
- If the answer is unknown, then the stem cell product is questionable.
The Final Point

• At this time there are very few companies that process umbilical cord stem cells.
• As we move forward, new products will be developed that will be better than those available in the market place today.
• The products may change, but the 7-Point Checklist that is used to select the product will NOT.
• To be an educated consumer and not a victim of an ‘aggressive sales presentation’, use the 7-Point Checklist.
The ultimate question:

How will the stem cells be delivered?

• To be most effective, the stem cells must be placed into the tissues that are intended to be rejuvenated.

• We call this “DIRECT DELIVERY.”

• Outside US groups may be doing or purporting I.V. systemic… This is NOT FDA Supported.