

What Makes **Chara** Products the **Best** Stem Cell Products in the U.S.

Compare to Autologous Stem Cell Sources

(using a person's own fat, bone marrow or blood, etc.)

- Chara products are:
 - **neonatal in origin**, obtained from a **healthy newborn baby**
 - cells are **more primitive, metabolically more active**, with **faster rate of self-renewal**, and **wider range of differentiation**
 - secrete **more growth factors**, have **longer telomeres**, **senesce** (get old) **slower**
 - **lack the accumulation of lifelong cellular damages** of adult stem cells
 - have **more anti-inflammatory** and **neuro-protective** effects.
 - Using Chara products **avoids invasive procedures** involved in autologous stem cell harvesting, thus avoiding the risks of **infection**, **scarring**, and **decline in a person's own stem cell pool**.
- Even someone who is **more advanced in age** or **more ill** can obtain high quality stem cells to help their body heal and regenerate.
- Allows for repeated dosing at precise concentrations in regular intervals to target various condition.
- Chara products are processed in a **FDA-registered and inspected** laboratory that adheres to **cGMP** guidelines, which means it provides much **more quality assurance** compared to the tissue-processing in a physician's office.

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Compare to Amniotic Products

Amniotic products contain important cytokines/growth factors, but:

- there is significant variation among products due the different points in gestation the amniotic fluid is obtained
- the younger and more potent amniotic fluid is collected during amniocentesis, which are usually performed when there is concern about **genetic abnormalities** or other diseases in the fetus.
- amniotic fluid contains about 200 various types of cytokines/growth factors, but it dwarfs in comparison to the **400+ cytokines/growth factors from umbilical cord tissue matrix** where Chara products are obtained.
- amniotic products contain very few live cells, so much so that the FDA prohibit these products to be called "stem cell products." Amniotic products thus **lack the many powerful benefits stem cells provide**, including the ability to home in to areas of injury/inflammation, and secrete appropriate cytokines/growth factors to target local repair.

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Compare to Umbilical Cord Blood Products

Cord blood-based products have a single FDA indication: reconstitution of the immune system after chemo-ablation of the bone marrow in leukemic patients.

it is the easiest birth tissue component to work with, as cells can be obtain via simple centrifuge cycles. However, they lack significant beneficial properties due to their **very low MSC content** (Mesenchymal Stem Cells).

Companies producing cord blood products emphasize the importance of MSC's, yet their products contain at most **1% MSC's**.

MSC's have been proposed to be renamed as **Medicinal Signaling Cells** by its discoverer Dr. Arnold Caplan. These cells are located throughout the body, hovering around blood vessels and communicating with local stem cells, serving as the orchestrators of regeneration.

MSC's:

- exert **paracrine** effects: induce changes in nearby cells by secreting cytokines/growth factors, to promote cellular proliferation, differentiation & angiogenesis (forming new blood vessels)
- have powerful **anti-inflammatory** effects
- have **immune-modulating** effects - able to modify and regulate the immune system, such as in autoimmune disorders
- have **anti-microbial** properties, helpful in fighting acute, chronic or systemic infections, and have been shown to be effective against protozoa (as in Lyme's disease)
- have **anti-apoptotic** properties - can rescue injured cells (due to trauma, hypoxia, chemical/mechanical damage, radiation, etc.) from programmed cell death

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Compare to Other Umbilical Cord Tissue Products

Very few laboratories in the U.S. have the knowledge and skill to produce stem cell products from umbilical cord tissue, due to the technical challenges of separating cells from the tissue matrix they are embedded in.

- Umbilical cord tissue are known for its highly rich MSC content, and Chara products contain **20-40% MSC's**, validated by 3rd party testing.
- Chara Biologics is the first in the industry to achieve a positive **CFU assay** result, demonstrating **MSC colony formation** -- a definitive test for MSC presence and their viability & health.
- Chara products are produced by a laboratory with a **perfect safety record**, even after 20,000 doses have been administered.
- All donors are U.S.-based, and selection criteria is the most stringent in the industry.
- Chara products provide the **highest cell concentration & viability** compared to other cord tissue-based products in the U.S.
- Chara products provide **more complete cell types, abundant cytokines/ growth factors**, due to its **delicate extraction process** which allows for more therapeutic agents to be preserved.

Our flagship product CharaCore is unique in the industry in that it is processed from the **cord tissue, cord blood and amniotic membrane**, harnessing the regenerative potential of all 3 birth tissue compartments.

And in CharaCore, serum from cord blood is carefully added back to the final product. Cord blood serum contains valuable proteins/growth factors, such as **TIMP-2 protein**, which has been shown to **promote memory and learning**. Many stem cell companies throw away the serum or put it in cosmetic products to sell at high prices.