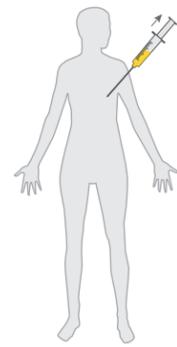
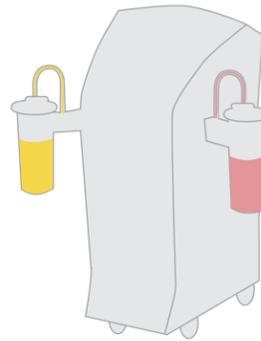


# ADULT . ADULT CELL SOURCE . Fat Stem Cells *in vitro*



## COLLECTION OF FAT STEM CELLS

Fat stem cells are collected by removing 12-100mls of subcutaneous tissue from the arm or via liposuction of the abdomen where the highest proportion of dormant fat stem cells reside. Being embedded in the extracellular matrix (ECM), the cells are in the G<sub>0</sub> non-dividing state. They are released from the ECM via mechanical and enzymatic (collagenase) digestion. The ability to use tissue and cells once considered waste has led to the emergence of companies, reagents, and procedures to harness this stem cell potential. A small sample removal using a microcannula costs ~\$2500.



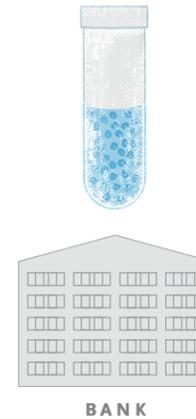
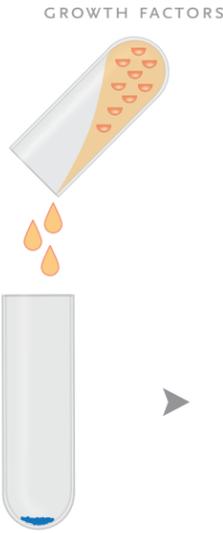
## STEM CELL ISOLATION

Samples can be spun in an automated centrifuge designed especially for ADSCs isolation to separate the many components in the tissue including the stromal vascular fraction (SVF), which harbors growth factors, mesenchymal stem cells, and other factors. The stem cells are isolated from this fraction and the cell pellet is eventually transferred to a fresh tube.



## STEM CELL ACTIVATION & DIFFERENTIATION

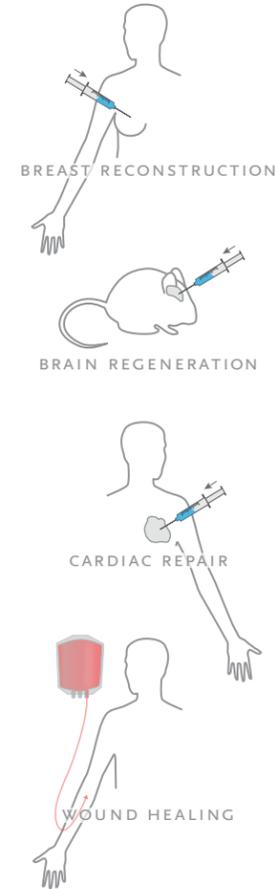
Dormant adipose-derived stem cells (ADSCs) embedded in the ECM do not differentiate easily in the body (*in vivo*) and require strong growth signals. After an ADSC stem cell pellet is isolated, growth factors are reintroduced in the lab environment (*in vitro*). In some cases the SVF is added back to the sample, as it is source of growth factors released by the ECM. These growth factors stimulate cell division and cell differentiation.



## STEM CELL BANKS

**Stem Cell Banking:** ADSCs may be stored cryogenically at -80°C. Commercialized private banking allows individuals to bank stem cells for family use, at \$1400-2500 plus annual storage fees of ~\$150. Accessing these cells for transplant therapy will cost at minimum \$2500.

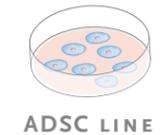
or



## TRANSPLANT

**Transplant Therapy:** Localized injections of ADSCs using a macrosyringe have induced tissue repair and growth in the heart, cartilage, and in breast tissue reconstruction with the latter case utilizing a unique "painting" technique to achieve natural tissue morphology. Additionally, ADSCs can be administered intravenously for systemic wound healing. As much of this work is experimental, some doctors and companies have been sued for false advertising regarding the therapeutic effects of ADSC transplants.

or



## RESEARCH

**Stem Cell Lines:** ADSCs are of mesodermal lineage but are multipotent in that they can differentiate into endodermal cell lineages and restore ectodermal lineage nerve cell dopamine production in a mouse model. Their abundance, their short doubling time of 2-4 days, and their ease of extraction make them a viable and exciting source of stem cells that avoid some of the ethical issues associated with embryonic stem cells.