Cryopreservation and Expansion of autologous mesenchymal stem cells from adipose tissue
LIPOSKILL is obtained from about 10 ml of fat harvested using surgical liposuction or in one outpatient session. Thanks to LIPOSKILL, also a normotype can preserve adipose-derived stem cells for repeated use over the years.

The exclusive processes applied by biologists at the Bioscience Institute cell factory, guarantee the isolation and expansion of a homogeneous population of mesenchymal stem cells, following two protocols:

- the cryopreservation and the graft.

Cryopreservation allows the patient to use the cells repeatedly if required. Under standard conditions it is possible to obtain about ten LIPOSKILL grafts with just one sample of fat.

The amount of cells contained in each LIPOSKILL graft is about 10-30 million, which is equivalent to the amount found in ten litres of liposuction material. Any other technique (e.g. mechanical digestion systems) would reduce the amount of fat extracted to a heterogeneous pool of cells, with a minimal amount of usable ADSCs.

Advantages of LIPOSKILL

- The extraction of 10 ml of adipose tissue is sufficient for about ten LIPOSKILL grafts
- The sample can be taken using a simple micro-liposuction procedure with no need for surgery
- LIPOSKILL does not require dedicated equipment and/or kits, simply a standard syringe
- The LIPOSKILL graft is of a homogeneous ADSC population whose quantity is one thousand times higher than in the original sample
- Cellular expansion is the only existing procedure that allows the production of a significant amount of ADSCs for therapeutic purposes
- Thanks to the LIPOSKILL protocols, cryopreserved cells can be used even after many years

<table>
<thead>
<tr>
<th>Minimum amount of fat extracted</th>
<th>Available grafts with one extraction</th>
<th>Number of ADSC available for each graft</th>
<th>Banking included</th>
<th>Type of cells</th>
<th>Characterisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>About 10 ml</td>
<td>10</td>
<td>15 - 30,000,000</td>
<td>Yes</td>
<td>Homogeneous mesenchymal stem cells</td>
<td>Yes</td>
</tr>
<tr>
<td>Lipofilling</td>
<td>Depending on the amount of fat to be grafted</td>
<td>1500 - 3000 for each ml of fat harvested</td>
<td>No</td>
<td>Heterogenous pool of cells including 0.005% ADSCs</td>
<td>No</td>
</tr>
<tr>
<td>Mechanical digestion systems</td>
<td>Minimum 50 - 150 ml</td>
<td>1500 - 3000 for each ml of fat harvested</td>
<td>No</td>
<td>Heterogenous pool of cells including 0.005% ADSCs</td>
<td>No</td>
</tr>
</tbody>
</table>

Adipose Derived Stem Cells

The adipose derived stem cells (ADSC) are multipotent adult stem cells with important biological properties:

- high proliferation capacity
- capacity to differentiate into different cellular lines: adipocytes, chondrocytes, myocytes and osteocytes
- capacity to retrieve and secrete angiogenic stimulating factors through endothelial cell retrieval and proliferation
- immunomodulating properties: reduction of T-mediated responses to mitogens and alloantigens

Cell Factory

Bioscience Institute is a cell factory dedicated to biological cryopreservation and cellular culture for clinical use and scientific research. The Bioscience Institute laboratories engage in the isolation, analysis, expansion and planned freezing of several types of cells: hematopoietic cord blood stem cells, adipose-derived stem cells, fibroblasts, keratinocytes and melanocytes. Bioscience Institute, in collaboration with prestigious Italian and foreign universities, conducts research work aimed at extending the possible clinical applications of stem cells to several areas of medicine: cardiology, surgery, dentistry, gynaecology and dermatology.

The Bioscience Institute laboratories include a 220 m² sterile environment (Clean Rooms) equipped with laser particle counters which constantly monitor the safety level in the room and under the laminar flow hoods. It is possible to monitor the sterility level of these rooms and the quality of the operational procedures adopted by the staff from the www.bioinst.com website which gives access to the environmental safety parameter control monitors and to the cameras inside the labs. Bioscience Institute has chosen the highest quality standard, thus bringing up to excellent levels the operational procedures and sterility level of the laboratories; all its work can be controlled by anyone through a simple internet connection thus guaranteeing the maximum transparency.
LIPOSKit is obtained from about 10 ml of fat harvested using surgical liposuction or in one outpatient session.

The sample is placed in an isothermal container which guarantees the best security, temperature and pressure conditions for the shipment of biological material.

The kit is collected by a specialised delivery service and delivered to the Bioscience Institute Cell Factory in a very short time, respecting the necessary procedures required by the material.

After the expansion, the cells undergo programmed freezing in order to interrupt any senescence process and to guarantee an optimal cellular viability in the future.

Cryopreserved ADSC will be available for defreezing and expansion at any time after 10 days notice in advance, and it will be possible to carry out about ten LIPOSKit treatments with a high concentration of autologous ADSC.

**ADSC clinical studies**

- A Randomized Clinical Trial of Adipose-Derived Stem Cells in Treatment of Non Revascularizable Ischemic Myocardium. Phase I clinical study.
- Safety and Efficacy of Autologous Cultured Adipocytes in Patient With Depressed Scar. Phase III clinical study.