By Dr **Mario Russo**

Bye-bye scalpel
The **stem cell** revolution in surgery

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You can obtain them from a quick and painless liposuction, achieving a double result: using it in the operating room and reducing undesired fat. And you can cryopreserve them too, as a biological insurance policy on your health. Let's discover how the surgeons can use stem cells to promote your wellbeing.

Every year, thousands of millions of surgeries are performed all over the world. Unfortunately, they do not come without risks.
Incision, excision, manipulation and pain are all sources of stress which has multiple effects on the whole body. Inflammation levels, coagulation and the immune response are all affected. Moreover, specific surgery can be associated with specific risks.

However, the scalpel is not always the only option. **Stem cells have already paved new ways to approach surgery in several fields,** heading towards regenerative treatments. «Adipose-Derived Stem Cells (ADSCs) are the basis of the most innovative aesthetic medicine and plastic surgery treatments», says **Dr. Mario Russo**, **an Italian Board Certified Plastic Surgeon, Medical Director at Maison Lutetia Dubai.** Dr. Russo is a specialist in Breast, Facial, and Body Surgery, having performed more than 9,000 surgeries, he settled his work on patient safety and on providing the best natural results, and found the ideal approach in stem cell-based treatments.
A case in point: breast volume increase and cancer risk

Among procedures that can take advantage of stem cells is a very common plastic surgery: breast volume increase. **Nowadays, breast implants are utilized for both reconstructive and augmentation surgery**. Surgeons and patients can choose among several types of implants; the most common in Europe, for example, are textured implants. Unfortunately, these same textured implants are associated **with a greater risk of BIA-ALCL** (Breast Implant-Associated Anaplastic Large Cell Lymphoma). BIA-ALCL can take more than 20 years to develop. The standard of care treatment is surgical resection; however, more advanced BIA-ALCL can require other treatments too, such as chemotherapy or radiation therapy.
Fortunately, cancer risk can be avoided by choosing solutions other than breast implants, such as stem cell-based breast augmentation. ADSCs are the best option. **They ensure the best results, together with the highest safety levels and the lowest risk of adverse effects.** As explained by Dr Russo, «ADSCs come with a double benefit: breast remodelling and excess fat reduction. They can be obtained from the patient's excess fat – for example, from fat that has accumulated on the abdomen or thighs. Nowadays, we can isolate stem cells from this fat and multiply them in the lab to obtain the number needed for breast augmentation. Once injected, the cells integrate into body tissues, allowing for results that are natural to both the eye and the touch.»
Dr Russo highlights the importance of choosing an ADSC-based treatment instead of the classical fat or Stromal Vascular Fraction (SVF) transplantation. «SVF is obtained by fat centrifugation; it is enriched in adipose stem cells, but it contains undesired components too, such as macrophages. These components are supposed to drive undesired effects, such as fat resorption after transplantation. That is why one should switch from fat or SVF

transplantation to ADSC-based treatments.» Clinicians using this approach reported that the injection of a suitable concentration of ADSCs is not associated with the adverse effects that are frequent with fat or SVF transplantation, in particular with the development of cysts and the death of the injected fat. «This last effect would come with a toll: the reduction of the volume achieved by the injection. In fact, **fat or SVF injection are associated with this risk. Instead, ADSCs produce molecules that can give stability to the volumes and that can regenerate the tissues, avoiding, at the same time, the formation of cysts**.»

Not only breast

The same approach is suitable for shaping other parts of the body. For example, ADSCs are a valuable option for buttock enhancement without artificial implants. «Both the theory and the practice are the same as for breast augmentation. No permanent implants are utilized, so the risk of associated complication is completely avoided. No surgery with general anaesthesia is required, eliminating medical and intra-operative risks. Results are long-lasting and could be doubled: buttocks are reshaped while the undesired fat on "critical points" is reduced.»

Again, **ADSCs are suitable for a completely natural facial lifting without scalpel, allowing for restoring a youthful face with long-lasting results.** «The stem cells of the adipose tissue confer to the skin a younger appearance by promoting the production of collagen and elastin. These are the molecules that mark the difference between a child's and an adult's skin. By producing it, stem cells not only increase, where necessary, the volume but also improve skin quality.» Other treatments, such as Botox and fillers, can reduce wrinkles, but cannot improve the quality of the epidermis; that is why the combination of these, more traditional, approaches and ADSC treatment can avoid wrinkle-free but otherwise old skin. «Skin texture is improved, the subcutaneous collagen layer is thicker, fine wrinkles and other signs of ageing disappear, and the skin looks overall healthier and fresher.»

Also, **stem cell-driven collagen and elastin production can be exploited to replace the fibrotic tissue** associated with scars and stretch marks with fresh and smooth skin. «Stem cells repair damaged skin through the reconstruction of the extracellular matrix. The fibrotic tissue that makes the scar unpleasant from both the aesthetic and the functional point of view is removed, leaving the skin looking healthier, smoother, and glowing, and reducing stretch marks.»

Finally, ADSCs can be utilised in penis enlargement and vaginal rejuvenation treatments, and in hair loss approaches suitable for people who do not need a hair transplantation because still young or in the initial phase of thinning.

A simple procedure

All of these treatments are based on a simple and painless procedure. «**Fat is collected during a quick outpatient liposuction**. No hospitalisation is needed, neither in this phase nor for the treatment, which is usually performed under sedation and/or local anaesthesia. Stem cells are extracted and expanded in a GMP-compliant lab, such as the ones of Bioscience Institute, a leading Regenerative Medicine Centre based in Europe (Italy, San Marino) and Middle-East (Dubai). The expansion takes about 2 weeks, after which the cells are added to the patient's fat from liposuction and injected into the treatment area.»

What is more, remaining ADSCs can be frozen and cryopreserved to warrant the availability of stem cells for other body shaping treatments, or other Regenerative Medicine treatments.

«**Stem cell cryopreservation is a biological insurance policy for our health. Autologous stem cell transplantation is devoid of rejection risk, and research is continuously unveiling new stem cell potential in medicine. That is why missing the opportunity of cryopreserving the cells you obtained by liposuction is missing the opportunity of exploiting their health-safeguarding potential.**»