NANOFAT 20: EXPERIMENTAL PHASES AND CLINICAL APPLICATIONS

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Introduction. Adipose-derived mesenchymal stem cells (ASCs) and their secretomes seem able to promote extracellular matrix production, new collagen deposition, and early revascularization [1-4]. These physiological characteristics make ASCs valuable candidates for regenerative and aesthetic medicine. Several techniques have been devised to obtain a fat graft as rich as possible of ASCs; for example, lipoaspirate enriched with stromal vascular fraction or with previously expanded ASCs have been tested [5-7]. Sequential filtering steps of lipoaspirate have been adopted to obtain "lipogems" [8] and "nanofat" grafting [9] for skin rejuvenation applications. We have developed a 2.0 version of nanofat.

Materials and Methods. The lipoaspirate obtained from healthy donors underwent three separate procedures to obtain: a) the microfat sample, which was not subjected to any further processing; b) the nanofat sample, which was obtained strictly following the nanofat protocol; c) the nanofat 2.0 sample, which was obtained by avoiding the final steps of filtration and squeezing of the lipid emulsion. Mesenchymal stem cell markers were identified using immunofluorescence and flow cytometry and cell viability was assessed in each sample using the MTT assay.

Results. Histological examination showed greater preservation of mature adipocytes in microfat sample, whereas the nanofat and, especially, the nanofat 2.0 sample showed a higher density of ASCs, featuring a higher proliferative rate, especially in the first few days following collection. Therefore, the nanofat 2.0 resulted the most suitable for transplantation and was successfully used in the treatment of postburn scars in the face and in Vulvar Lichen Sclerosus. Clinically, nanofat-based treatments resulted in significant improvement in tissue quality, with reduction of symptoms such as itching, burning, and dyspareunia, and progressive restoration of elasticity and function within the first months after treatment.

Conclusions. Nanofat 2.0 represent a fat graft substantially enriched with ASCs. Obtainable by minimal manipulation, it is easily injectable and may represent a useful tool for improving skin quality and wound healing, especially when conspicuous volume augmentation is not required.

References

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