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Mechanically isolated Stromal Vascular Fraction by Nanofat Emulsification techniques.

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Sir,

We read with great interest the manuscript titled “Mechanical Micronization of Lipoaspirates: Squeeze and Emulsification Techniques” by Mashiko *et al*¹. Foremost, we want to congratulate the authors for this beautiful work that adds significant details to our knowledge on mechanical extraction of stroma vascular fraction (SVF) of adipose tissue without enzymatic digestion. Indeed, the authors demonstrated the possible presence of adipose-derived stromal cells (ASCs) (CD45-/CD31-/CD34+ cells) in squeezed and emulsified fat. The emulsification technique developed by the author’s results in two distinct products: a solid fraction (called REF) and a fluid fraction (called FEF). The analysis of the cell composition is performed essentially to the solid portion which is different from the product called nanofat by Tonnard². Indeed, Tonnard et al analyzed the liquid phase eg: the SVF obtained after a similar technique without the two steps of centrifugation. The fluid portion is particularly interesting in clinical practice for indications of regenerative surgery (post radiotherapy, burns sequelae...), whereas the solid portion maybe useful for intermediate indications between fat grafting (volumetric correction of defect) and nanofat grafting (regenerative surgery). This new study characterizes a portion not studied until now.

We would like to discuss two points that has not been addressed by the authors.

First, in our opinion, it would be really interesting to determine if the ASCs (CD45-/CD31-/CD34+) isolated by these two free enzymatic extraction methods are “classical” adipose-derived stromal cells. Indeed, ASCs are characterized by different criteria³ such as: their ability to form colony-forming unit-fibroblasts cells (CFU-Fs), the ability to differentiate into various cell types derived from the mesodermal lineage (bone, cartilage and adipose tissue) and the presence of mesenchymal markers (CD105, CD73, CD90) which were not assayed by the authors

Moreover, we demonstrated that the SVF obtained after emulsification of the fat with the nanofat technique, described by Tonnard contains functional ASCs ⁴. Indeed, ASCs isolated with this technique present all the criteria described below and are functional with immunosuppressive properties characterized by the capability to decrease the proliferation of human T cells. Functional ASCs, through secretion of paracrine factors can modulate inflammation and can favorise angiogenesis, two factors that play an essential role in tissue regeneration ⁵.

In conclusion, all changes in the technique of mechanical extraction of SVF cells can modify cell composition and may alter cell properties. Therefore, SVF cells isolated with new mechanical techniques has to be tested *in vitro* to demonstrate the presence of ASCs cells. Moreover, presence of functional ASCs has to be determined to judge and to validate the use of this new technique in the operating room and to choose the best regenerative mechanical technique.

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