Yielding and Growing of Adipose Stem Cell Harvested from the Superficial and Deep Abdominal Subcutaneous Fat: A Case

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Abstract
A 60 year old woman was enrolled in our study. She was 151 cm tall, weighed 73 kg and had high body mass index (33.19 kg/m²). Adipose tissue specimens were taken from her abdomen by surgical excision. ASCs were isolated in primary culture and cell counts were performed by using an automated cell counter (LUNA™). And 5 × 10^4 ASCs were seeded into DMEM tissue culture flasks and were cultured for 16 days (n=3). Lastly, self-renewal capacity was demonstrated by colony-forming unit fibroblast (CFU-F) assays (n=3).

Keywords: Adipose stem cell; Subcutaneous fat

Case Report

Subcutaneous fat is a valuable source of adipose-derived stem cells (ASCs). There are two anatomically distinct compartments of subcutaneous fat tissue in human: superficial adipose tissue (SAT) and deep adipose tissue (DAT). Abdominal subcutaneous fat is also separated by scarpa’s fascia into two layers, which are SAT and DAT. The difference between SAT and DAT had been studied in anatomy [1,2], structure and function [3], insulin resistance [4], molecular and morphologic character [5] and metabolic markers [6]. Taranto et al. recently demonstrated that SAT contained a higher stromal tissue compound and features increased stem properties [7].

As far as we are aware, this is the first study of comparing growth rate of SAT and DAT. Our case study showed that DAT has better growth and self-renewal capacity than SAT. This result was different from Taranto et al. study [7]. Although our study has a limit as a case study, these results may provide a clue to further study about SAT and DAT.

Table 1: Yield of adipose derived stem cell; total cell count of ASCs derived from DAT was higher than SAT group but live cell count of ASCs derived from DAT was lower than SAT group.

<table>
<thead>
<tr>
<th>Type</th>
<th>Total fat weight (g)</th>
<th>Total cell yield (g)</th>
<th>Live cell yield (g)</th>
</tr>
</thead>
<tbody>
<tr>
<td>SAT</td>
<td>180.3</td>
<td>1.1 × 10^4 ± 1.9 × 10^3 cells</td>
<td>7.6 × 10^3 ± 1.4 × 10^2 cells</td>
</tr>
<tr>
<td>DAT</td>
<td>117.0</td>
<td>1.8 × 10^4 ± 9.8 × 10^3 cells</td>
<td>6.3 × 10^4 ± 8.8 × 10^3 cells</td>
</tr>
</tbody>
</table>

Yield of adipose stem cell; total cell count of ASCs derived from DAT was higher than SAT group but live cell count of ASCs derived from DAT was lower than DAT group.

Harvesting of DAT from SAT is not an easy procedure. A scarpa's fascia can be clearly demonstrated under CT and MRI but in clinical field it is almost impossible to harvest only deep abdominal fat using a suction cannula during liposuction. Even in the excised full layer of abdominal skin and subcutaneous fat the scarpa's fascia is unclear medially. Especially in lower BMI patients who have thin DAT layer, harvesting is even more difficult.

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