expansion media. In this study cells from the infrapatellar fat pad were not cultured; thus the cell preparation took only 3 to 4 hours. Isolation of MSCs by culture expansion needs at least several days. Thus the authors' method for cell preparation was completely different from the previous method of MSC preparation in the referenced articles.[4,5] This is a serious error in the description of the methods and citing of references.

Although we acknowledge that this article is a leading clinical study using "fat pad–derived cells" in arthritic patients, we believe that it is very important to understand that the results of this study are not the results of using MSCs. We would like to ask the authors to change the erroneous term "mesenchymal stem cells" used in their article to an appropriate term—"fat pad-derived cells" or "fat pad aspirate concentrate." We look forward to their response to our concerns.

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Note: The authors report that they have no conflicts of interest in the authorship and publication of this letter.

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Authors' Reply

We appreciate the interesting and perceptive comments by Ha and Park regarding our recent study. The review's primary concern is the terms "fat pad–derived mesenchymal stem cells (MSCs)" and "fat pad aspirate concentrate" or "fat pad–derived cells." To use the term MSCs, the cells should possess the following characteristics: self-renewal, the expression of specific cell surface markers, and the capacity for multilineage differentiation. In the "Methods" section of our article, we briefly described the sample collection method and MSC isolation technique. According to the article, after centrifugation, the resulting samples were definitely "fat pad aspirate concentrates" or the "stromal vascular fraction."[1] Although we actually performed, however, the entire process as described by Zuk et al.,[1] we did not include it in this article and abbreviated on purpose the above process of the methodology describing the identification of MSCs from the stromal vascular fraction (SVF). Therefore, to enhance the clarity for the readers, we have described herein the entire MSC identification process with the subsequent results.

Isolation of SVF and MSCs From Subcutaneous Adipose Tissue. In the operating room, the infrapatellar fat pad was collected (mean weight, 9.1 g; range, 6.4 to 13.1 g), suspended in phosphate-buffered saline solution (PBS), placed in a sterile box, and transported to a laboratory. Mature adipocytes and connective tissues were separated from the SVF by centrifugation, as reported by Zuk et al.[1] The parts of the SVF were subjected to laboratory analysis to examine the plastic-adherent cells that form colony-forming units—fibroblasts (CFU-F) and confirm the multilineage differentiation of adipose-derived stem cells.

Assessment of Plastic-Adherent Cells That Form CFU-F and Immunophenotyping of Adipose-Derived Stem Cells. To evaluate the frequency of mesenchymal-like progenitors in patients' SVF, cells were cultured in T25 flasks at a final concentration of 16 cells/cm^2. Colonies consisting of greater than 50-cell aggregates were scored under an optical microscope, and the immunophenotype of adipose-derived stem cells was analyzed by flow cytometry (FACS). MSC marker phenotyping was performed as previously described.[2]

Confirmation of Multilineage Differentiation of Adipose-Derived Stem Cells. Adipose-derived stem cells were plated at 2×10^3 cells/cm^2 in DMEM containing 10% FBS and allowed to adhere for 24 hours. The culture medium was then replaced with specific inductive media to determine the adipogenic, osteogenic, and chondrogenic differentiation potential, as previously reported.[2]

Cell Isolation and Characterization of Adipose-Derived Stem Cells. We evaluated the capacity of human subcutaneous adipose tissue to generate mesenchymal progenitors using the CFU-F. Thus, after isolation, adipose-derived stem cells represented a mean of 10.1% of SVF cells (range, 7.1% to 12.2% of SVF cells). After the SVF was isolated, a mean of 1.18×10^6 stem cells (10.1% of 1.19×10^7 SVF cells) were prepared. FACS characterization indicated positive expression of the surface markers CD90 (98.4%) and CD105 (94.5%) and negative expression of CD34 (8.1%) and CD14 (3.6%),

as shown previously in another article.[1] Adipose-derived stem cells treated with conditioned media showed characteristics of adipogenic, osteogenic, and chondrogenic differentiation after staining.

Accordingly, in this study, an average of 1.19×10^7 fat pad–derived cells, which contained an average of 1.18×10^6 stem cells, were injected into the patients. As mentioned earlier, the number "1.18×10^6," written in our article, is not of the fat pad–derived cell count but of the real stem cell count that was calculated by using our laboratory data. Therefore, we would like Ha and Park to take the above explanations into consideration, and we hereby insist that it is not acceptable to require us to change the appropriate term "mesenchymal stem cells" that is used in our article with the erroneous term "fat pad–derived cells" or "fat pad aspirate concentrate."

In addition, Ha and Park mentioned that we described that "MSCs were derived and counted with a hemocytometer, as described previously."[3,4] However, we cited not two articles[3,4] but, rather, three articles[3-5] in our report. The article that Ha and Park omitted to mention is a clinical paper reported by our institution.[5] In that article we used exactly the same method as in the present article for patient treatment. Moreover, the other two articles are not clinical papers using stem cells but are research papers about the character of infrapatellar fat pad–derived stem cells. Our article is a clinical paper; we therefore skipped the laboratory data. As mentioned earlier, however, our method of cell isolation and characterization of adipose-derived stem cells is similar to that in the two articles mentioned earlier. Therefore our citation does not matter at all.

In conclusion, we believe with certainty that our use of the term "MSCs" in our article is appropriate based on the review of the referenced articles and our laboratory study. We hope this letter clarifies all of the questions and refutations of Ha and Park.

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