Reviewer #1:

Scientific Quality: Grade B (Very good)

Language Quality: Grade B (Minor language polishing)

Conclusion: Major revision

Specific Comments to Authors: This is a well-written paper testing in vitro strategies to obtain a pericyte-like differentiation of human ASCs (hASCs). As a key cellular component of vascular structures, pericytes play a critical role in vascular development, maturation, and stabilization. Loss of pericytes is associated with microcirculation damage and inflammation processes. Study about this is important to provide a valuable therapeutic strategy for a variety of diseases. I have a few concerns:

AA: We wish to thank Reviewer #1 for appreciating our work. Here are the answers to his remarks:

1. How many healthy young donors undergo liposuction to provide adipose tissue? Whether there were certain inclusion and exclusion criteria? Where was the liposuction site? Whether all donors collected the same site adipose tissue？These should be provided in Material and Methods section.

AA: Adipose tissue was harvested from four healthy female donors (age: 32-38 years: not smokers; not taking estrogen replacement therapy) undergoing liposuction procedures. In all cases, lipoaspirate from the subcutaneous abdominal region was processed. This information has been added in the Material and Methods section, in the revised manuscript.

2. In the co-culture experiments, what were the numbers and proportions of the two cells in different groups？

AA: When missing, data about cell number and proportion of cell types in the co-culture experiments have now been added in the Material and Methods section.

3. In Figure 3, the amount of internal control loading was obviously inconsistent among different groups, especially in Figure 3B. It is recommended to replace the figure with a better one.

AA: We agree with the reviewer that the β-actin bands reported in Figure 3B are not the best possible example. However, we would like to keep this image because it is the best compromise for showing representative NG2 bands.

4. More details about similar studies should be provided. Amos et al. 2008, Mendel et al. 2013 and Natesan et al. 2011 involved ASCs, provided good evidence that ASCs can differentiate into pericytes. In the first two studies, early passages of ASCs could spontaneously differentiate into pericytes without any specific induction. What were the advantages of this research? Higher induction success rate?

AA: Results from similar studies were more widely described both in the Introduction and in the Discussion. We have included the studies mentioned above by the reviewer in the revised version. Although ASCs can

spontaneously differentiate into pericytes, an induction strategy is suitable to improve this differentiation ability and to avoid other lines of differentiation (for example endothelial cells).

As we report in the discussion, the advantage of this study is to provide a further protocol to obtain pericyte-like differentiated ASCs. In particular, since at early stages of differentiation they have a higher proliferative potential, we believe that they may be more suitable for *in vivo* administration (in rodent models of diabetic retinopathy), which is the next experimental step we intend to pursue as a development of this research line.

5. There was no mention of the limitations of the study, one of which can be false positive results. Please mention what measures were taken to avoid false positive results.

AA: One limitation of this study might be the lack of guarantee that these *in vitro* pericyte-like differentiated ASCs are actually able to replace those lost in a damaged retinal microcirculation *in vivo*. For this reason, a further line of *in vivo* experiments will be designed.

Particular attention has been paid to avoid (or minimize) false positive results. For this reason, the immunophenotype of differently treated ASCs was always compared to that of native pericytes. Moreover, the specificity of immunostaining was routinely checked by omitting the primary antibodies.

(1) *Science Editor*: 1 Scientific quality: The manuscript describes a basic study of the Pericyte-like differentiation of human adipose-derived mesenchymal stem cells. The topic is within the scope of the WJSC. (1) Classification: Grade B and Grade C; (2) Summary of the Peer-Review Report: This is a well-written paper testing in vitro strategies to obtain a pericyte-like differentiation of human ASCs, which is important to provide a valuable therapeutic strategy for a variety of diseases. However, some questions raised by the reviewers should be solved and answered; and (3) Format: There are 9 figures. A total of 36 references are cited, including 6 references published in the last 3 years. There are no self-citations.

2 Language evaluation: Classification: Grade B. The language was edited by a native English speaker.

AA: The manuscript has been revised and certified Grade A

3 Academic norms and rules: The authors provided the signed Conflict-of-Interest Disclosure Form and Copyright License Agreement, and the written informed consent. The manuscript lacks of the Biostatistics Review Certificate, the Institutional Review Board Approval Form, and The ARRIVE Guidelines.

AA:
The Biostatistics Review Certificate is now included.
The Institutional Review Board Approval document is included (parts of interest are highlighted).

The authors have read the ARRIVE guidelines. However, no animal experiments were carried out in the present work.

The authors did not provide the approved grant application form(s). Please upload the approved grant application form(s) or funding agency copy of any approval document(s);

AA: The Funding Approval Document from University of Catania is now included. Parts of interest are highlighted.

(2) The authors did not provide original pictures. Please provide the original figure documents. Please prepare and arrange the figures using PowerPoint to ensure that all graphs or arrows or text portions can be reprocessed by the editor;

AA: The original figure documents prepared using PowerPoint are now included.

(3) The "Article Highlights" section is missing. Please add the "Article Highlights" section at the end of the main text.

AA: The "Article Highlights" section has been added.