



”The stem cell fashion”: do we need only stem cells for tissue regeneration?

Imad About

► To cite this version:

Imad About. ”The stem cell fashion”: do we need only stem cells for tissue regeneration?. Clinical Oral Investigations, 2018, 22 (2), pp.553-554. 10.1007/s00784-017-2316-7 . hal-02087356

HAL Id: hal-02087356

<https://amu.hal.science/hal-02087356>

Submitted on 2 Apr 2019

HAL is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L’archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d’enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.



“The stem cell fashion”: do we need only stem cells for tissue regeneration?

Imad About¹

Received: 12 December 2017 / Accepted: 12 December 2017
© Springer-Verlag GmbH Germany, part of Springer Nature 2017

Dear Editor of Clinical Oral Investigations,

As reviewer, reader, and editor, I noticed a significant number of manuscripts published in several dental journals using mixed pulp cell populations but still referring to these as stem cells. The major part of these manuscripts is related to investigating the potential role of these mixed cells in tissue regeneration.

A quick look at the definition of stem cells clearly indicates that they are resting cells that can be activated by locally synthesized regeneration signals under pathological conditions and injury [1]. Recent data have shown that, when injured, pulp fibroblasts produce a significant number of biologically active molecules [2, 3] acting on neo-angiogenesis [4, 5], nerve growth [6], stem cell recruitment, and differentiation [7, 8].

After stem cell sorting with specific markers, studies performed in vitro showed that they are heterogeneous with regard to their differentiation potential and that culture conditions determine their differentiation fate [9]. However, transplantation experiments in vivo showed the significant contribution of the surrounding tissue on their differentiation and demonstrated that the local environment provides the required regeneration signals. This is well demonstrated by the fact that pulp stem cell transplantation into an ischemic site leads to endothelial cell differentiation and angiogenesis [9] while bone regeneration is obtained when they are transplanted into a bone defect [10].

Thus, while isolated and sorted stem cells should be used in studies such as cell fate determination, regeneration potential, and stem cell recruitment, there is “no shame” in using “mixed populations” of pulp cells for

pulp regeneration studies pending that the authors specify the type of cells used. Indeed, stem cells cannot be engaged in tissue regeneration without the required regeneration signals of the surrounding microenvironment.

Thus, I believe, it is the responsibility of the authors to be precise on which cell population they use in their investigations and it is also the reviewers’ and editors’ responsibility to check for the appropriate terms employed related to the cells used in the experimental procedures. This is important for the young investigators to better understand what we are doing in the tissue regeneration research field.

Funding information The original works related to this subject and performed in our laboratory was supported by institutional funding from Aix Marseille Université and Centre National de la Recherche Scientifique.

Compliance with ethical standards

Conflict of interest The author declares that he has no conflict of interest.

References

1. About I (2013) Dentin–pulp regeneration: the primordial role of the microenvironment and its modification by traumatic injuries and bioactive materials. *Endod Topics* 28(1):61–89. <https://doi.org/10.1111/etp.12038>
2. Jeanneau C, Lundy FT, El Karim IA, About I (2017) Potential therapeutic strategy of targeting pulp fibroblasts in dentin–pulp regeneration. *J Endod* 43(9S):S17–S24. <https://doi.org/10.1016/j.joen.2017.06.007>
3. Chmielewsky F, Jeanneau C, Laurent P, About I (2014) Pulp fibroblasts synthesize functional complement proteins involved in initiating dentin–pulp regeneration. *Am J Pathol* 184(7):1991–2000. <https://doi.org/10.1016/j.ajpath.2014.04.003>
4. Tran-Hung L, Laurent P, Camps J, About I (2008) Quantification of angiogenic growth factors released by human dental cells after injury. *Arch Oral Biol* 53(1):9–13. <https://doi.org/10.1016/j.archoralbio.2007.07.001>
5. Rombouts C, Giraud T, Jeanneau C, About I (2017) Pulp vascularization during tooth development, regeneration, and therapy. *J Dent Res* 96(2):137–144. <https://doi.org/10.1177/0022034516671688>

✉ Imad About
imad.about@univ-amu.fr

¹ Aix Marseille Univ, CNRS, ISM, Inst Movement Sci, Marseille, 27 BD Jean Moulin, 13385 cedex 5, France

6. Chmielewsky F, About I, Chung S-H (2016) Pulp fibroblasts control nerve regeneration through complement activation. *J Dent Res* 95(8):913–922. <https://doi.org/10.1177/0022034516643065>
7. Mathieu S, Jeanneau C, Sheibat-Othman N, Kalaji N, Fessi H, About I (2013) Usefulness of controlled release of growth factors in investigating the early events of dentin-pulp regeneration. *J Endod* 39(2):228–235. <https://doi.org/10.1016/j.joen.2012.11.007>
8. Chmielewsky F, Jeanneau C, Laurent P, Kirschfink M, About I (2013) Pulp progenitor cell recruitment is selectively guided by a C5a gradient. *J Dent Res* 92(6):532–539. <https://doi.org/10.1177/0022034513487377>
9. Iohara K, Zheng L, Wake H, Ito M, Nabekura J, Wakita H, Nakamura H, Into T, Matsushita K, Nakashima M (2008) A novel stem cell source for vasculogenesis in ischemia: subfraction of side population cells from dental pulp. *Stem Cells* 26(9):2408–2418. <https://doi.org/10.1634/stemcells.2008-0393>
10. Zheng Y, Liu Y, Zhang CM, Zhang HY, Li WH, Shi S, Le AD, Wang SL (2009) Stem cells from deciduous tooth repair mandibular defect in swine. *J Dent Res* 88(3):249–254. <https://doi.org/10.1177/0022034509333804>