

## Bone marrow-derived mesenchymal stromal cells and platelet rich plasma in skeletal muscle regeneration

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Adult skeletal muscle is able to undergo regeneration after damage, thanks to satellite cells. However, in case of severe damage, the efficiency of these cells cannot be sufficient to promote tissue repair [1]. Recent trends are attempting to identify strategies aimed to improve the endogenous muscle repair potential. The administration of bone marrow-derived mesenchymal stromal cells (BM-MSCs), thanks to their secretion of paracrine factors, displays promising clues in skeletal muscle healing [2]. However, some criticisms hamper their clinical application, namely scarce survival in the host tissue and the need to avoid animal serum contamination in manipulation. In this context, platelet rich plasma (PRP) offers several advantages. Indeed, as a source of multiple growth factors it could represent an optimal substitute for animal serum in vitro and could provide beneficial therapeutic effects in vivo in the tissue injury site. However, controversial clinical findings exist for its therapeutic application in skeletal muscle injuries [3]. Here we evaluated: i) the effect of PRP on both C2C12 myoblasts and BM-MSCs in term of viability, survival, proliferation and myogenic differentiation and ii) the effect of PRP in combination with BM-MSCs in sustaining and promoting myogenic differentiation. We found that PRP induced an increase of myoblast and BM-MSC survival, viability and proliferation as judged by MTS and EdU incorporation assays, Ki67 expression and Akt and Notch-1 signalling activation. PRP promoted also C2C12 myoblast differentiation as evaluated by the analysis of myoD, myogenin, and  $\alpha$ -sarcomeric actin expression. Finally, the co-culture C2C12/BM-MSCs in the presence of PRP showed an increase of all parameters of survival, proliferation and differentiation as compared to PRP treatment alone. In conclusion, our data suggest that the combined use of PRP and BM-MSC can be considered as a valuable tool in the field of skeletal muscle regenerative medicine.

### References

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### Keywords

Platelet rich plasma; skeletal myoblasts; mesenchymal stromal cells.