

Platelet rich plasma (PRP): new perspectives in skeletal muscle regeneration after damage

Larissa Vallone¹, Alessia Tani¹, Flaminia Chellini¹, Chiara Sassoli¹, Daniele Nosi¹, Carlo Mirabella², Federica D'Asta³, [Sandra Zecchi Orlandini](#)¹

¹ Dipartimento di Medicina Sperimentale e Clinica-Sezione Anatomia, Università degli Studi di Firenze, Firenze, Italy - ² Immunoematologia e Medicina Trasfusionale, Azienda Ospedaliera -Universitaria Careggi, Firenze, Italy -

³ Burn Center, Birmingham Children Hospital, Birmingham Children Hospital, Birmingham, UK

Adult skeletal muscle can undergo regeneration after damage, thanks to a resident population of stem cells, namely satellite cells, located underneath the basement membrane of the skeletal muscle fibers. However, these cells are scarce in number and, in case of severe and extended muscle damage, they cannot be efficient enough as to promote tissue repair. Recent trends in the field of regenerative medicine are attempting to identify novel strategies aimed to improve the endogenous tissue repair potential and contribute to the recreation of a less hostile microenvironment for muscle cell progenitors functionality. In such perspective, platelet rich plasma (PRP) appears to be provided with several desirable properties for regenerative purposes, representing a source of multiple growth factors, as well as an optimal substitute for animal serum [1-3]. On these bases, in this study we evaluated the effect of PRP on C2C12 myoblasts in terms of viability, proliferation and myogenic differentiative potential. It was found that PRP, used at different concentrations, was able to positively influence C2C12 cell viability and proliferation as observed by MTS assay, EdU incorporation and confocal immunofluorescence analysis of Ki67 expression. The differentiative potential of C2C12 myoblasts treated with PRP was investigated by confocal immunofluorescence analysis of the expression of specific markers. In conclusion, our preliminary data suggest that PRP may play a pivotal role in skeletal muscle regeneration and can be considered as a valuable tool in designing therapeutic protocols in the field of regenerative medicine.

References

- [1] Formigli L et al. MSCs seeded on bioengineered scaffolds improve skin wound healing in rats. *Wound Repair Regen.* 2015 23:115-23. doi: 10.1111/wrr.12251.
- [2] Formigli L et al. Dermal matrix scaffold engineered with adult mesenchymal stem cells and platelet-rich plasma as a potential tool for tissue repair and regeneration. *J Tissue Eng Regen Med* 2012;6:125-34.
- [3] Kelc R et al. Platelet-rich plasma, especially when combined with a TGF- β inhibitor promotes proliferation, viability and myogenic differentiation of myoblasts in vitro. *PLoS One.* 2015;10:e0117302.

Keywords

Cell proliferation and differentiation; platelet rich plasma; skeletal myoblasts.