

A REVIEW OF BASIC SCIENCE EVIDENCE SUGGESTING THE ROLE OF PLATELET-RICH PLASMA DERIVATIVES IN TREATING OSTEOARTHRITIS

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Introduction: Growing evidence suggests that platelet-rich plasma derivatives (PRPDs) such as platelet lysate or platelet-derived extracellular vesicles contain valuable functional molecules that are effective in treating osteoarthritis of the knee. This may be due to the presence of bioactive proteins and growth factors that actively participates in cartilage repair processes. This review provides an overview of the basic scientific evidence that investigate the role of PRPDs as an adjunct to chondrocyte regeneration and how these became part of regular use in the management of osteoarthritis.

Methodology: A PubMed/MEDLINE and ProQuest database search was performed using the following Medical Subject Headings (MeSH) terms: platelet-rich plasma derivatives OR platelet lysate OR platelet-derived extracellular vesicles AND cartilage OR chondrocyte OR chondrogenesis OR osteoarthritis. The searches covered the period up to December 2020.

Results: Seventeen eligible studies were included in the review (N=17). The positive role of PRPDs in the reviewed studies included a significant restoration of anabolic gene expression in chondrocyte, which mediated by the inhibition of NF-kB and c-Jun activities¹, enhancement of chondrocyte proliferation rate with higher population doubling and 4-folds increase of viable cell yield², along with the improvement of the extracellular matrix production, associated with increase mRNA levels of collagen type II, SOX9 and aggrecan. Interestingly, PRPDs are able to activate chondro-progenitor cells in terminally differentiated cartilage tissue³. Conversely, other studies concluded that the supplementation of PRPDs displayed negative effect on chondrogenic redifferentiation potential, resulting in the inhibition of collagen and glycosaminoglycan secretion⁴ as well as failing to maintain the chondrogenic markers⁵.

Conclusion: Current evidence suggests that the use of PRPD as an adjunct to chondrocyte regeneration is potentially beneficial. Nevertheless, it is worth noting on the report relating to the inhibitory effect on chondrogenesis. This suggests that caution is needed for the future development of related products when used to treat osteoarthritis.