Platelet-rich plasma and its derivates as promising bioactive materials for regenerative medicine : basic principles and concepts underlying recent advances

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Abstrak

Over the past decade, platelet-rich plasma (PRP), a platelet-concentrated plasma fraction, has been widely investigated and applied to regenerative medicine. The clinical utility of PRP is supported by evidence that PRP contains high concentrations of platelet-related growth factors and normal concentrations of plasma-derived fibrinogen, both of which contribute synergistically to the regenerative process. Additionally, its superior cost-efficacy versus conventional therapies is attractive to many clinicians. However, current disadvantages of PRP include a relatively complicated preparation procedure and variable operator-dependent efficacy. An additional disadvantage is the use of bovine thrombin, an animal-derived biological, as a coagulant. Many of these disadvantages are overcome by recent advances in preparation procedures and devices; for example, Joseph Choukroun simplified the platelet-rich fibrin preparation procedure and improved handling efficiency without the aid of animal-derived factors. With advancements in cell processing technology, there has been a general shift in cell therapy from autologous to allogeneic treatment; however, autologous PRP therapy will not easily be replaced by allogeneic treatment in the near future. Therefore, to provide more predictable regenerative therapy outcomes using autologous PRP, further investigations should address developing a standardized procedure for PRP preparation to augment its efficacy and potency, independent of donor variability. We would then propose that operators and clinicians prepare PRP according to the standardized protocol and to carefully evaluate the clinical scenario (i.e., recipient factors comprising skeletal defects) to determine which factor(s) should be added to PRP preparations. This careful approach will lead to improved clinical outcomes for patients.