

## EDITORIAL

## Platelet Rich Plasma, Platelet Lysate, Freeze-dried Platelets and Next

Platelet rich plasma (PRP), an autologous plasma fraction of peripheral blood, is the simplest regenerative medicine intervention that is rapidly extending to multiple medical fields mainly due to the easy use and biosafety that facilitates translation in humans.<sup>1</sup> In fact, regulatory requirements for any cell therapy involve multiple preclinical experiments to demonstrate their safety and nonteratogen effects in addition to GLP compliance in the preparation, and the use of adequate expensive installations.<sup>2</sup> In contrast, PRP therapies involve minimal manipulation and, in general, regulatory requirements are easy to comply thereby facilitating the widespread clinical use and commercial success of PRP kits and devices.

Actually in its very beginnings, PRPs have been used with a vague idea of the biological mechanisms they were influencing. Thereafter, most studies were directed at examining clinical outcomes rather than identifying the precise biochemical mechanisms underlying PRP effects, which remain to be elucidated in the most part. In fact, PRP widespread use was not driven by the principles of the scientific methods instead patient demand has been boosted by sports news and propaganda reporting that outstanding elite athletes had been successfully treated with PRP. The need is clear, to investigate and describe main PRP targets and mechanism of action underlying their clinical effects. In fact, translational medicine addresses both the biological and the clinical aspects of the novel biotechnologies.<sup>1</sup> The role of PRP in pain medicine had gained variable acceptance in last few years including condition like osteoarthritis, tendinitis and so on.

Lots of studies had been done on osteoarthritis and had been proved to be more effective in early osteoarthritis in younger age groups.<sup>3</sup> Lots of studies were done regarding technical part of PRP preparation which includes bias on methods like plateletpheresis, buffy coat and test tube method, patient platelet concentration, platelet function and so on. It had been shown that most of the action of PRP is because of alpha granules which contain multiple growth factors, including PDGF, TGF, IGF and many other inflammatory mediators. In initial days, PRP injection was done without activation and now it had been advised to activate platelet to release growth factors before injection which was found to be better

effective. Thrombin and calcium chloride had been used to activate platelet but, because of expected coagulopathy associated with thrombin, it had lost its favor. Then alternate methods were analyzed and double-freeze thawing method was shown to be superior in activation without need of thrombin.<sup>4</sup>

Platelet rich plasma injection for any pain condition may need 2 to 3 injections for which we have to repeat venous puncture and platelet processing which cause more morbidity, laborious and more chance of infection. Platelet had been tried in trauma in freeze-dried form to control bleeding and had been proved that it retains growth factors even up to 6 months.<sup>5</sup> In pain conditions also, it can be an option to try freeze-dried platelet prepared in first sitting and can be used later just by reconstituting it. Studies regarding freeze-dried platelets in pain condition is lagging at present and can be scope of undertaking studies for those who are interested in PRP in pain condition.

It had been shown that more platelets and growth factor have opposite role.<sup>6</sup> Now puzzle for medical fraternity is to find out the optimal level of growth factors or platelets for particular disease condition. If we get answer for this question then freeze-dried platelet can reduce our burden more in preparing PRP as amount of platelets and growth factors had been already quantified and available in ready form. Our further studies should focus on quantification of platelets and growth factor requirement for particular disease condition so that we can move forward in PRP as regenerative medicine in pain conditions.

### REFERENCES

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