

Annual Meeting SVG0 / SBMS

Thursday May 3th, 2018

Influence of polymeric adjuvants on the properties of Platelet Rich Plasma gel.

Arabpour Z^{1,2}, Keller J¹, Serra T¹, Alini M¹, Eglin D¹, Verrier S¹.

¹AO Research Institut Davos, Davos Switzerland, ²Dpt of Tissue Engineering, School of Advanced Technologies in Medicine, Tehran University of Medical Sciences, Iran.

Introduction: Naturally rich in growth factors and cytokines (e.g. PDGF, VEGF), platelets play a pivotal role in wound healing. Platelet Rich Plasma (PRP) gel can be prepared from patient's own blood, has shown beneficial outcome in human and veterinary medicine [1] and can be used for cells and growth factors delivery [2-3]. As biomaterial, PRP has poor mechanical properties and high degradation rate, reducing its stability and long-term effect. Here we investigate the mechanical properties and stability of PRP enriched with bioresorbable polymeric adjuvants.

Methods: PRP was prepared as previously described [4]. Briefly, Platelets concentrates from 3 donors (blood bank, Kantonspital Graubünden, Chur, CH) were centrifuged to obtain different concentrations of PRP: 10X, 15X and 50X higher than in the whole blood. Four polymeric adjuvants: Hyaluronic acid(HA), carboxymethyl cellulose(CMC), gelatin and polyvinyl alcohol(PVA) were added respectively to different PRP concentrations; and the jellification of PRP induced by addition of 2.5, 5 or 10U thrombin. Rheological (MCR, Anton Paar) and mechanical testing were performed, and the viscosity, elastic, viscous and Young moduli evaluated.

Results: An addition of 5U thrombin independently of the PRP concentrations leads to more stable gels in the absence and the presence of adjuvants. Addition of polymeric adjuvants increases the elastic and viscous moduli of PRP 15X and 50X, although with higher increase with PVA and gelatin in comparison to HA and CMC.

Conclusion: Here we show that the mechanical properties of PRP can be modulated by FDA approved polymeric adjuvants. Further experiments will assess their influence on the growth factors and cytokines release.

[1]Marques, L. et al, Platelets, 2015, [2]Jalowiec, J. et al, TE Part C, 2016, [3]Zahn, J. et al, Mediators Inflamm, Epub 2017, [4]Duttenhoefer, F. et al. eCM, 2013