Platelet Rich Plasma, PRP, is a source of autologous Growth factors obtained by different methods. Currently, various techniques and applications are being used with different elements and/or substances being injected. Which means different results after the application. There are studies suggesting that leukocyte in PRP contribute to inflammatory cytokine production. As well as its minimization is more important than platelet maximization to decrease inflammation and enhance matrix gene synthesis.

The comprehension of platelet biology is fundamental to understand PRP-therapies. The platelets are very important in haemostasis, inflammation and proliferation for remodelling and healing the injured tissue, and have an angiogenic power to deliver proteins into the damaged areas.

The platelets are capable to liberate active metabolites throughout its membrane and can be activated which will catalyse the thrombin release as well as generate procoagulant particles.

The platelets play roles in diverse physiological processes such as the well-known homeostasis, angiogenesis, immunity and regeneration. The morphology of the platelet allows the capture of molecules for subsequent release.

After the activation, the platelet undergoes intracellular alterations that result in the exocytosis of its biological content. During the activation, the expression of adhesive molecules in the cell surface promote the platelet aggregation to finally form a clot with homeostatic properties. At the same time cytokines, chemokines and cell surface cells are released which maintain homeostasis and promote circulating cells recruitment.

The exocytotic capacity of the platelets, given by its alpha and dense granules and lysosomes, are the main reason to be considered essential in regenerative, immune and adaptive response.

The success in repairing and regenerating the tissue is based on biological events controlled by the signalling molecules to enhance the proper environment.

When a tissue injury occurs multiple biological pathways immediately become activated and are synchronized to respond. The healing comprises haemostasis, inflammation, repair, and remodelling. These phases depend on the molecules released in the surrounding injured area.

The molecules that are secreted in order to stimulate the tissue regeneration are adhesion molecules, cytokines and growth factors.

Growth Factors are capable of modulate the cellular response, and its main function is to stimulate cell growth and differentiation. They are involved in biological functions, such as cellular proliferation, cellular survival, migration and even apoptosis. They carry out their
function at very low concentration (pico or nanograms). They bind to a cellular receptor which is specific for a second tyrosine-kinase messenger. When active, the signalling cascade starts ending in the nucleus where the transcription factors activate one or more genes. The most important Growth Factors acting in healing are Platelet-Derived Growth Factor, Transforming Growth Factor Beta, Insulin Growth Factor, Fibroblast Growth Factor, Epidermal Growth Factor and Vascular Endothelial Growth Factor, also Nerve Growth Factor and Hepatocyte Growth Factor in a smaller proportion.

CONCLUSIONS

- The variety of systems for obtaining substances that contain growth factors and other elements. The products obtained have different chemical and cellular compositions. This explains why the results are not always similar.
- PRP has an anti-inflammatory and anabolic effect.
- In clinical practice Growth Factors shorten Tissue Regeneration/Repair Time in Conservative Treatment.