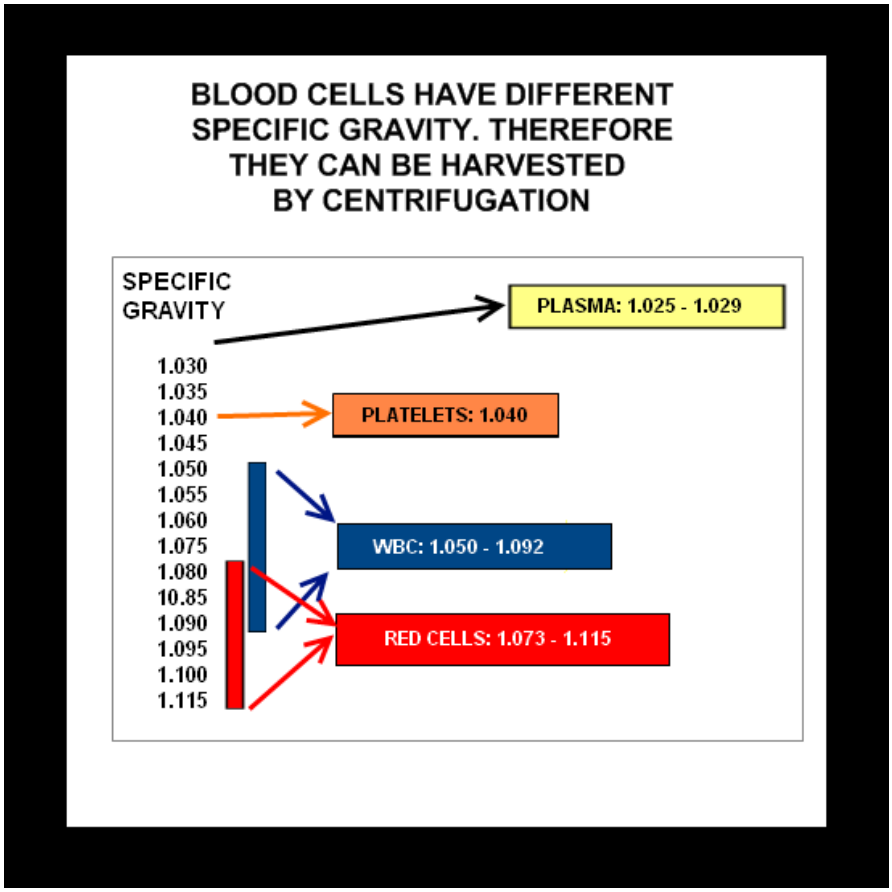
WHAT IS THE AUTOLOGOUS PLATELET-RICH PLASMA?

Namely, the **P**latelet-**R**ich-**P**lasma (**PRP**) is a blood component. Since some decades, it is produced by the Blood Banks such as a platelet concentrate to be transfused in thrombocytopenic patients (patients who eventually have very low platelet count in their own blood).
The tissue regenerating capacity of platelets was clinically recognized in the late seventies. Then a few specialists in selected medical areas began to challenge the PRP such as a local non-infusion therapy. This new therapeutic tool was mostly used with reasonable success to enhance the healing rate of difficult-to-heal chronic ulcers, and to speed the bone regeneration after dental-oral surgery (e.g. implants).
The PRP is obtained by minimal manipulation of the patient's blood. This, through a simple venipunture, is collected in tube containing an anticoagulant.

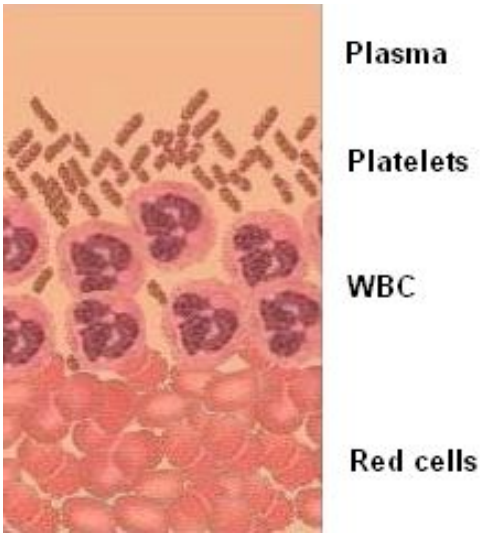
A simple venipunture

This anticoagulant is necessary, since platelet strongly adhere (and take active part) to the clot. If anticoagulants are not used when collecting the patient's blood, then the patient's platelets are totally wasted.
One must consider that cells has different specific gravity, and that any blood cells has a specific gravity higher than that of plasma (the water moiety of whole blood). In particular, red cells are heavier than leukocytes (**w**hite **b**lood **c**ells, WBCs). In turn, WBCs are heavier than platelets. Thus platelets are the lightest cells in circulating blood.



In order to recover platelets without contamination of other blood cells (WBCs and red cells), the tubes with the patient's blood are centrifuged slowly. This procedure accelerates the sedimentation of the heavier cells such as WBCs and red cells, while platelets (which sediment to a lower rate) remain floating within the plasma fraction at the top side of the tubes. This fraction is than collected as platelet-rich plasma (PRP).

An example of cell sedimentation after centrifugation of whole blood



In this PRP fraction, the platelet concentration is three-four folds that of the original whole blood. However, since the tissue-regenerating capacity of platelets is strictly related to their concentration, it is likely that a three-four folds that of the original blood may be insufficient to drive fast improvement of severe tissue lesions. Hence a higher concentration of platelets may be required for successful clinical outcome to be achieved. Again, this further enrichment of platelet is obtained through centrifugation. Since PRP is essentially a mixture of plasma and platelets, the PRP-containing tubes must be centrifuged at high gravitational force. This is achieved through simple bench centrifuges. After centrifugation, platelets are recovered as a pellet at the bottom of the tubes which are resuspended in small amount of supernatant plasma to achieve a clinical valuable product.

A bench centrifuge

The PRP