

New research developments and advances in the application of autologous cellular regeneration (ACR) and platelet-rich plasma (PRP) in South Africa

Prof Don du Toit

In Cape Town, Professor Donald du Toit, research fellow working independently and affiliated to the Diabetes Discovery Research Unit, Medical Research Council, and Stellenbosch University, has demonstrated both at cell tissue culture level and in clinical case studies, that PRP is a very valuable treatment adjunct for the clinician, surgeon and dentist regarding regenerative, anti-aging and wound healing properties. The pioneer regarding the application of PRP is Professor Marx of Miami, who defines PRP as a "normal autogenous blood clot that contains a highly concentrated number of platelets." In clinical practice, the use of PRP for enhancement of wound healing has great advantages over allogeneic fibrin products, such as the absence of hypersensitivity reactions and avoidance of the transfer of transmissible disease. PRP platelet gels have been in use for about 10 years, with strong application in dental surgery to augment sinus lifting grafting, ridge augmentation grafting, molar socket surgery, free gingival grafts and mandibular reconstruction. The application of PRP to surgical wounds promotes healing by release of growth factors such as PDGF, TGF, IGF, and EGF from activated platelets. Professor Marx has demonstrated the enhancement of bone regeneration and osteo-integration with the use of PRP in maxillofacial surgery.

From a clinical perspective, PRP is used as follows. The physician, surgeon, or aesthetic physician defines the area he wishes to regenerate or rejuvenate, with directed wound healing and biological factors. REGENLAB™ of Mollens, Switzerland, provide four user-friendly PRP kits, equipped with syringes, blood collection tubes, complying with safety

and sterility standards, to address all the divisions of regenerative medicine, surgery, dentistry, and aesthetic medicine. These kits are sufficient to address all the application needs of PRP, but careful selection is needed. The REGENKIT™, authorised for human use and CE coded, allow for blood harvesting, processing, and enrichment of PRP. These kits provide higher biological and haematological activity of GF, as assessed by cell proliferative studies and culture *ex vivo*, compared to other products available. PRP is generated as follows. Sixteen millilitres of venous blood, by venesection, is collected in two specially designated tubes containing an anticoagulant and blood separator. The quality of PRP and growth factor release may be reduced if uncontrolled or inferior quality blood collection tubes or apparatus are used. The blood is centrifuged at low revolutions (g-force) for a short period in a side room or in theatre, separating plasma from red blood cells.

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The PRP is separated, aseptically, by drawing up the plasma into a syringe. The PRP is activated by addition of calcium chloride, provided in the kit, and then used for regeneration (biological wound healing) or as a sealant to reduce oozing from raw surfaces. A double, spray-on, syringe applicator is available. Two components are available, ATS (autologous thrombin serum) and PRP. PRP processing takes 30 minutes to prepare, and has the great advantage of being autologous in nature. REGENLAB™ ACR-PRP has unique features, not portrayed by other PRP preparations, and has shown superior cell proliferation effects on fibroblasts, chondrocytes and keratinocytes in *ex vivo* quantification tests. Prof. du Toit runs practitioner and specialist surgeon education courses regarding the clinical application of ACR-PRP and the utilization/selection of specialised kits for the