



ATHENA<sup>LAB</sup>

**fresh**bio

Platelet Rich Plasma

**Platelet Rich Plasma Therapy**

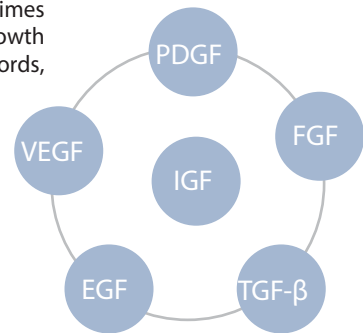
**PRP SYSTEM**

# What is fresh bio PRP?

Optimal System for PRP Separation

## ■ Clinical Definition of Platelet Rich Plasma

The clinical definition of PRP is a volume of autologous plasma that has more than 1 million/ $\mu\text{l}$  of platelet counts and concentrated 4-5 times greater above baseline. When activated, platelets release bioactive growth factors such as PDGF, TGF- $\beta$ , FGF, VEGF, EGF, IGF and etc; in other words, it can also be defined as 'Concentrated Growth Factors (CGF)'.

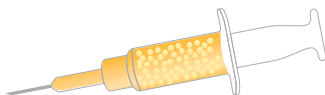


## ■ Fresh bio PRP ?

Fresh bio-PRP\* is the innovative system for PRP containing super high concentrated sources of growth factors, differentiated from general PRP or Plasma-based PRP\*\*.

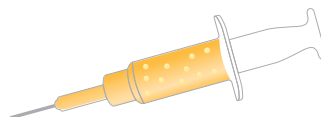
### \* Freshbio-PRP?

PRP containing more than 1 millions/ $\mu\text{l}$  of platelet counts which is concentrated 7~9 times greater than baseline.



### \*\* Plasma-based PRP?

PRP containing less than 1 millions/ $\mu\text{l}$  of platelet counts which is hardly concentrated compared to baseline and mostly consists of plasma.



## ■ Fresh bio PRP Concentration Technology

Creative and scientific functions of Fresh bio system allow users to obtain the most optimal sources of concentrated growth factors.



# Fresh bio Advantages

High Enrichment Technology

## 01 Harvesting the Whole Blood into Fresh bio PRP Tube

The whole blood is harvested into Fresh bio PRP tube from the patient's arm using phlebotomy set of Fresh bio PRP Kit. Each Fresh bio PRP Tube is 10ml volume including 1ml of anticoagulant. Tubes provide easily harvesting of the whole blood as they are vacuumed tubes. After harvesting the whole blood, gently shake both tubes to permeate the anticoagulant into whole blood in the tubes.



## 02 Centrifugation

Each centrifuging unit can be used to perform this process. Tubes shall be put accordingly in order to achieve the centrifuging balance. No special centrifuging device is provided or recommended. The most important subject for centrifuging is to perform 2500rpm for 8 minutes according to instructions for use. Swing rotor centrifugation devices are recommended for more convenient results. Centrifuging devices generally express the RPM (Repeat Per Minute)



## 03 Harvesting the PRP

This section is the crucial part to obtain the platelet rich plasma. Please do not shake or move the tubes upside down after centrifugation process. After centrifugation you shall see 3 layers in the tube. It means centrifugation process is done properly.

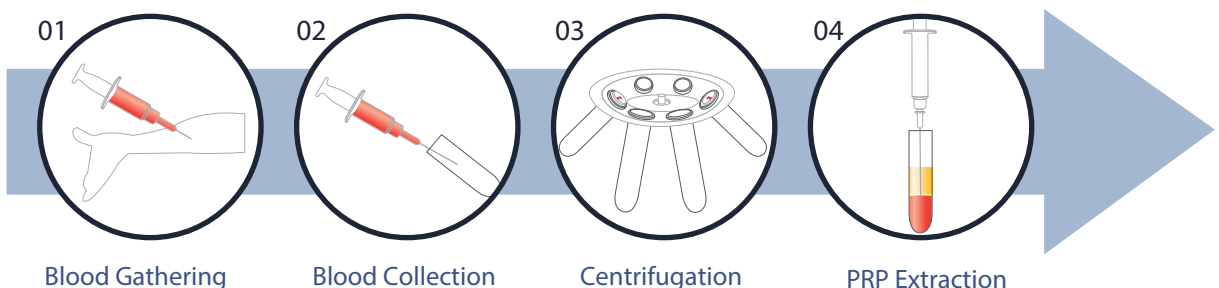
## Easy Process

User-friendly System

### Compatible with ALL CENTRIFUGES

Fresh bio Tube is suitable for both swing and angle type centrifuges.

### ■ Fresh bio PRP Extraction Process



# Freshbio Enrichment Test

Fresh bio Performance

## ■ Clinical Definition of PRP

- PRP is Platelet 'Rich' Plasma.
- 'Rich' means to contain more than 1million/  $\times$  platelet counts in plasma.
- Platelet counts multiply 4-5 times greater than the baseline.

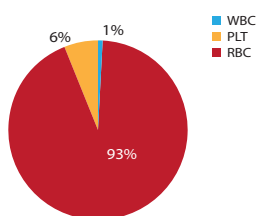
The definition of Platelet Rich Plasma, literally, is 'Plasma enriched with numerous of platelets. PRP, in general, has a higher concentration of platelets compared with baseline blood. Clinically valuable PRP, however, typically contains 1 million platelets or more per microliter<sup>1)</sup>

Normal Platelet counts in blood are average about 200,000/  $\times$ .....The scientific proof of bone and soft tissue healing enhancement has been shown using PRP with 1,000,000/  $\times$  is the working definition of PRP today.....Lesser concentrations cannot be relied upon to enhance wound healing.<sup>1)</sup>

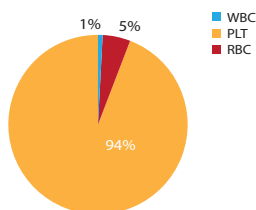
A sufficient cellular response to platelet concentrations first began when a 4-to 5-fold increase over baseline platelet numbers was achieved. <sup>2)</sup>

## ■ Comparison between Whole Blood and PRP

Blood Composition

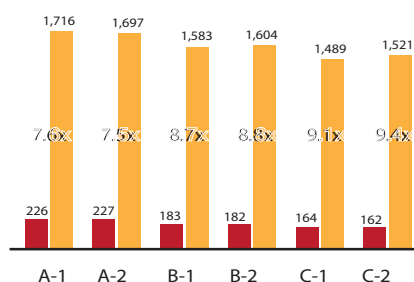


Cell Ratios in a normal blood clot



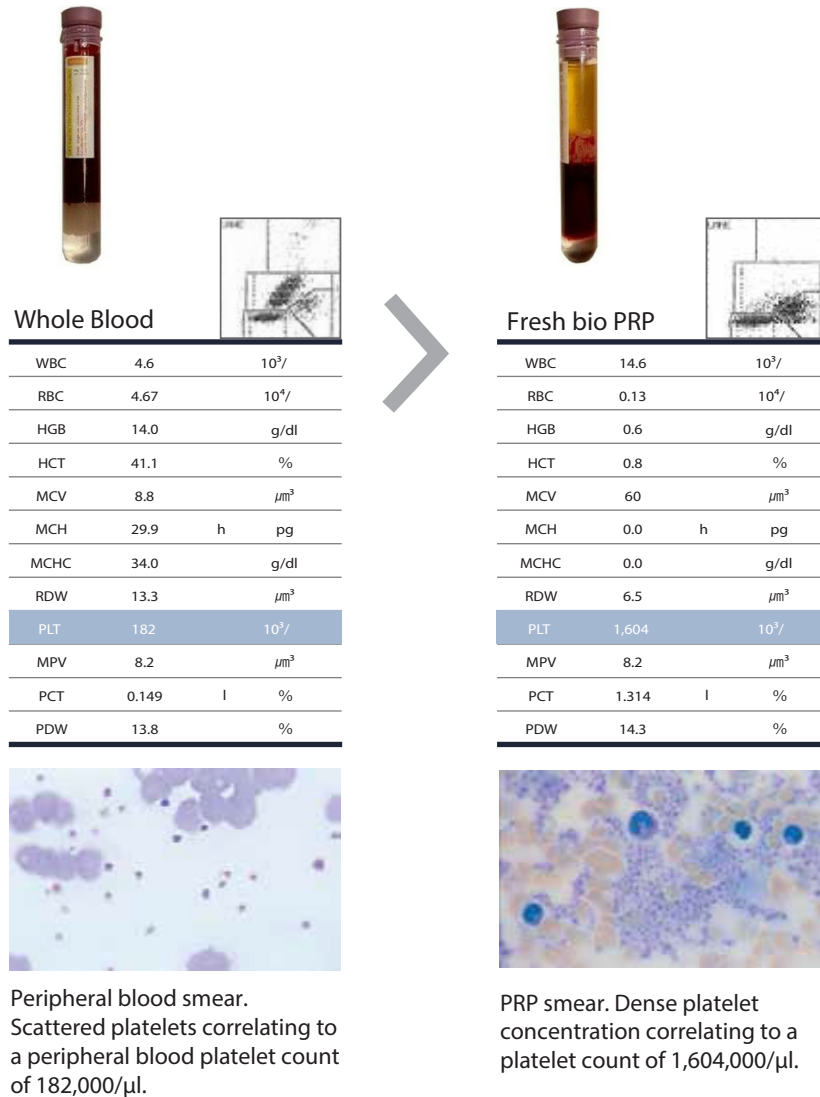
Cell Ratios in platelet rich plasma

Platelet Counts



Patients		PLT Count / $\mu$ l		PLT Enrichment
		in whole blood	in PRP	
Patient A	1st	226	1,716	7.6x
	2nd	227	1,657	7.5x
Patient B	1st	183	1,583	8.7x
	2nd	182	1,604	8.8x
Patient C	1st	164	1,489	9.1x
	2nd	162	1,521	9.4x

## ■ Fresh bio PRP Enrichment Test



## Reference

- 1) Marx RE. Platelet rich plasma (PRP): What is PRP and what is not PRP? Implant Dent 2001;10:225-8.
- 2) Marx RE. Platelet-Rich Plasma: Evidence to Support Its Use. J Oral Maxillofac Surg 62:489-496, 2004.

# PRP for Treatment

## Aesthetics

- Skin Rejuvenation
- Face Lift
- Age Spots
- Volume Correction



## PRP Combination Therapy

PRP combined therapy is actually more effective than a single modality therapy. This great co-application represents many advantages with a simple, cost-effective, safe method and better effect.

### Laser + PRP

PRP combined with laser therapy produces objective improvement of skin elasticity, a lower erythema index, and an increase in collagen density as well.

### MTS + PRP

This combination quantify the stimulation of new collagen synthesis and cell formation exactly where it is needed, right at the dermal layer.

### Fat Grafts + PRP

PRP addition to fat grafts is a solution to boost stem cell survival, multiplication and differentiation to finally enhance the survival of grafted fat.

### HA + PRP

HA can provide rejuvenation for age-related changes to soft facial tissue, but not the underlying bone. On the other hand combination using platelet rich plasma can target all aspects of facial ageing.

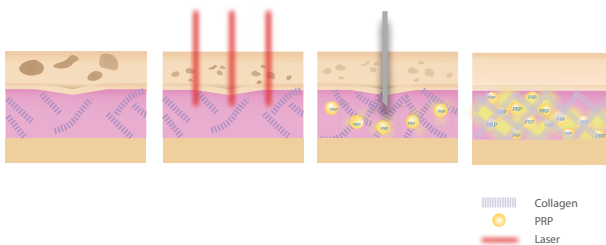
### Collagen + PRP

Collagen is a great platelet activator which can make the average growth factor release higher. When this combination injected into the skin, it acts as a matrix that promotes PRP activation and collagen to grow, and regenerates tissue.

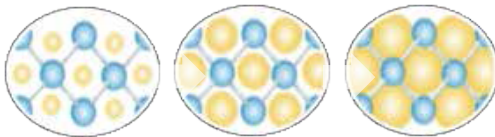
## PRP + Laser

The first step involves doing therapy with laser resurfacing, which works effectively by burning microscopic holes in the skin, unevenly textured or sun-damaged skin is able to shed to reveal newer, smoother skin underneath.

The second step apply a portion of the nutrient rich platelets to the wounds created by the laser. This injected PRP gives big boosts in collagen remodeling and it actually reduces recovery time so speeds up healing. Eventually this combination treatment provides skin with its fullness, suppleness and elasticity.



## PRP + Hyaluronic Acid



PRP increases the duration of Hyaluronic Acid when it is injected with HA together and slows down the decomposition of HA particles. Thus this combination yields a great result with a long lasting effect. The Hyaluronic Acid alone will be temporary, and last only anywhere from 6 months to 10 months.

## PRP + Fat Grafts



The addition of PRP to fat grafts offers several advantages:

- 1 Better fat grafting survival,
- 2 Less bruising and inflammation,
- 3 Easier application of fat grafts due to liquefaction effect of PRP.

## Clinical Photos

1 injection of F-PRP



► Steffen Giesse, Ludwigshafen.(2015,May). Behandlung von akneiformer Dermatitis und Aknenarben mit Platelet-Rich-Plasma-Therapie. Haut



► Löwenstein-Frey (2015,January). PRP in der Ästhetischen Medizin –Grundlagen und Trends. Face

**PRP** for  
Treatment

## *Alopecia*

- Hair Growth
- Hair Implant



## Non-Chemical Hair Restoration Using Natural Sources from Your Blood

A Bioactive Cellular Treatment for Alopecia  
with Platelet-derived Growth Factors.

**freshbio**  
Platelet-rich Plasma



## PRP Stimulates Growth and Regeneration of Follicles

PRP is known to contain more than 20 different growth factors, which are important in promoting cell proliferation and differentiation.<sup>1)</sup> These properties are thought to lead to its beneficial effects on acne scarring<sup>2)</sup> and wound healing.<sup>3)</sup>

## High Enriched PRP is One of the Major Concerns in Hair Growth

The optimal platelet concentration for the induction of angiogenesis in human endothelial cells was 1,500,000 platelets/ $\mu$ L, whereas excessively high concentrations of platelets were suggested to decrease the angiogenic potential.<sup>4)</sup> In this study, a mean 1,484,555.6 platelets/ $\mu$ L in the PRP preparation could effectively stimulate follicular and perifollicular angiogenesis, which is suggested to be one of the major factors in active hair growth.<sup>5,6)</sup> Our data suggest that the injection of AA-PRP preparations has a positive therapeutic effect on male and pattern hair loss without major side effects.

## PRP Injection Shows Significant Effect in AA Lesions

PRP administration leads to major improvements in AA lesions, with 60% of patients achieving complete remission at study termination. It should be noted that spontaneous remissions have been reported to occur in 34~50% of patients at 1 year.<sup>7)</sup>

## PRP Enhances the Hair Graft Survival

Storing hair grafts in PRP can enhance graft survival, improve hair density and stimulate the growth of transplanted follicular units.<sup>7)</sup>

## Reference

- 1) Takikawa M, Nakamura S, Nakamura S et al. Enhanced effect of platelet-rich plasma containing a new carrier on hair growth. *Dermatol Surg* 2011; 37:1721–9.
- 2) Lee JW, Kim BJ, Kim MN, Mun SK. The efficacy of autologous platelet rich plasma combined with ablative carbon dioxide fractional resurfacing for acne scars: a simultaneous split-face trial. *Dermatol Surg* 2011; 37:931–8.
- 3) Chen TM, Tsai JC, Burnouf T. A novel technique combining platelet gel, skin graft, and fibrin glue for healing recalcitrant lower extremity ulcers. *Dermatol Surg* 2010; 36:453–60.
- 4) I. Giusti, A. Rugghetti, S. D'Ascenzo, "Identification of an optimal concentration of platelet gel for promoting angiogenesis in human endothelial cells," *Transfusion*, vol.49, no.4, pp.771-778, 2009.
- 5) L. Mecklenburg, D. J. Tobin, S. Müller-Röver, "Active hair growth (anagen) is associated with angiogenesis," *Journal of Investigative Dermatology*, vol.114, no.5, pp.909-916, 2000.
- 6) M. Semalty, A. Semalty, G. P. Joshi, M. S. M. Rawat, "Hair growth and rejuvenation: an overview," *Journal of Dermatological Treatment*, vol.22, no.3, pp.123-132, 2011.
- 7) A Trink, E, et al. A randomized, double-blind, placebo- and active-controlled, half-head study to evaluate the effects of platelet-rich plasma on alopecia areata. *British Journal of Dermatology* 169, 2013; 690–694.

## Clinical Photos



Photography before and after PRP Injection conducted with Ycellbio PRP.



Clinical photographs of combination of a 1,550 nm erbium:glass fractional laser and PRP for the treatment. It shows baseline and 6 months after two treatment sessions of non-ablative fractional laser followed by PRP injection on the affected area at 1-month intervals.



# PRP for Treatment

## Orthopedics

- Acute Tendon Injuries
- Ligament & Muscle Injuries
- Surgery
- Knee Arthritis
- Fractures



**freshbio**  
Platelet Rich Plasma



## Non-Surgical Regenerative Therapy Using Autologous Blood

A Bioactive Cellular Treatment for Orthopedics  
with Platelet-derived Growth Factors.

## Anterior Cruciate Ligament Grafts With and Without PRP

ACL reconstruction with the use of PRPG achieves complete homogeneous grafts assessed by MRI, in 179 days compared with 369 days for ACL reconstruction without PRPG. This represents a time shortening of 48% with respect to ACL reconstruction without PRPG.<sup>1)</sup>



## PRP Improves Chronic Tendinosis

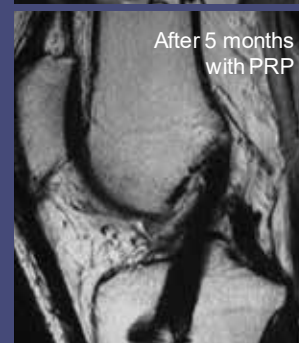
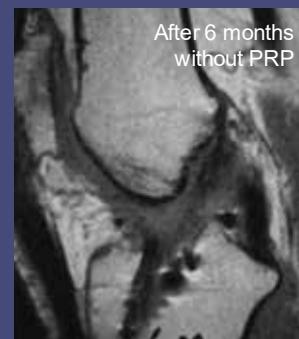
PRP may improve tendon injuries as well as other chronic tendinosis. Specifically, it could be possible to treat an acute Achilles tendon tear non-operatively using a PRP injection<sup>2)</sup>

Non-surgical, ultrasound guided injection of PRP into the Achilles tendon within one month of injury, significantly improved a 90% Achilles tendon rupture in 6 weeks, leaving only a small focal tear. At 24 weeks, the tear was completely resolved.<sup>3)</sup>

### Reference

- 1) Radice F, et al, Comparison of Magnetic Resonance Imaging Findings in Anterior Cruciate Ligament Grafts with and without Autologous Platelet-derived Growth Factors, The Journal of Arthroscopic and Related Surgery 26, issue 1, 2010;50-57.
- 2) Mishra, et al, Treatment of Tendon and Muscle Using Platelet-Rich Plasma, Clin Sports Med 28, 2009;113-125.
- 3) Steven Sampson, et al, Platelet-rich Plasma Therapy as a first-line Treatment for severe Achilles Tendon Tear: a case report, International Journal of Therapy and Rehabilitation 18, 2011;101-106.
- 4) Wellington K, et al, Platelet-rich Plasma in Orthopaedic Applications: Evidence-based Recommendations for Treatment, J am Acad Orthop Surg 21, 2013;739-748.

### Anterior Cruciate Ligament Grafts With and Without PRP



A more homogeneous signal was demonstrated in grafts with PRP, which suggests a quicker maturation rate.<sup>4)</sup>

### Achilles MRI before and after PRP treatment



Achilles MRI before and after PRP treatment. (A) MRI before PRP injection, partial Achilles tendon tear. (B) MRI 4 month after PRP, healing of partial tear!<sup>4)</sup>

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Platelet Rich Plasma

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