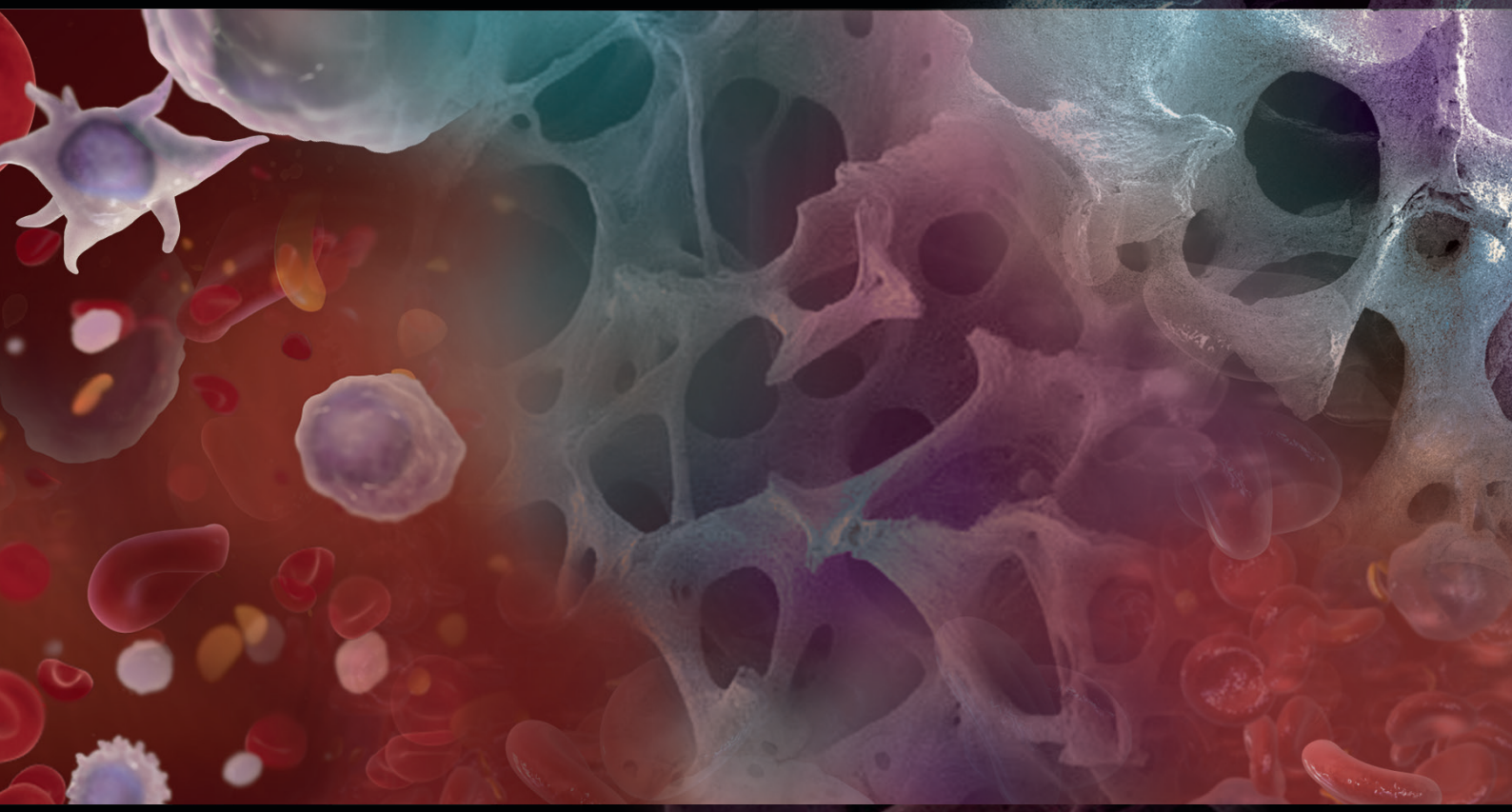
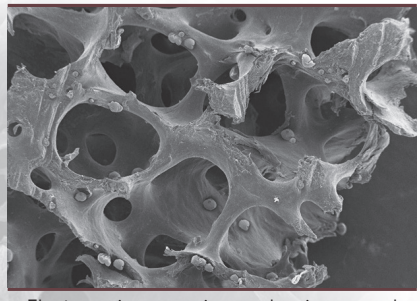
BioSurge™ Cell and Bone Graft Processing System

Cell. Signal. Scaffold.



Arthrex®

BioSurge
Cell & Bone Graft Processing System



Electron microscopy image showing several healthy cells attached to the AlloSync™ bone graft scaffold after hydration

BioSurge™ – the Biosurgical System

The Arthrex BioSurge system combines the superior matrices of the AlloSync™ bone grafting solutions line with the Angel® system's proprietary technology to prepare customized platelet-rich plasma concentrate (cPRP) from bone marrow aspirate (BMA). Hydrated AlloSync bone grafts provide the optimal scaffold for cPRP from BMA, which is a rich source of platelets and nucleated and progenitor cells.

Arthrex Angel® cPRP and Bone Marrow Processing System

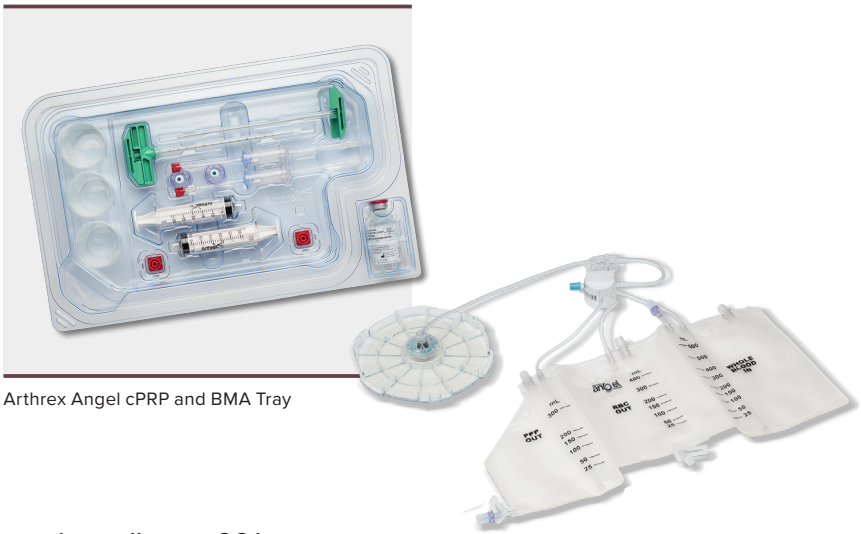
Technology is what sets the Angel system apart from the competition. The Arthrex Angel cPRP and Bone Marrow Processing System utilizes a proprietary platelet sensor and 1-button automation to prepare customized cPRP from BMA.

Bone marrow is a rich source of platelets, nucleated cells, and progenitor cells. The Angel device is the only one to provide cPRP from BMA with adjustable cellular levels.

- Proprietary platelet sensor system
- Adjustable platelet concentrations
- Adjustable white blood cell (WBC) concentration
- Flexible processing volume of 40 mL to 180 mL
- Each processing kit can process 3 cycles up to 180 mL, on the same patient
- Programmable – can store up to 30 custom processing protocols
- Closed system, delivers PRP, platelet-poor plasma (PPP), and red blood cells (RBCs) into separate, sterile compartments

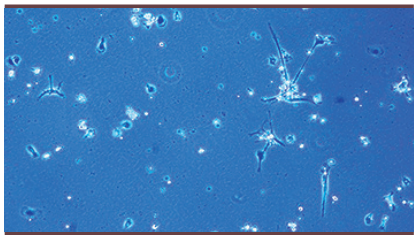
Arthrex Angel cPRP and Powered BMA Kit

Arrow® OnControl® System Sterile Procedure Tray*

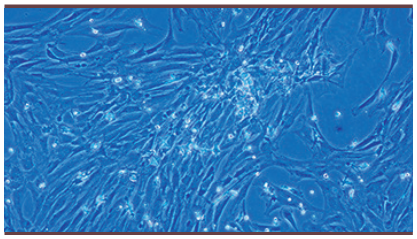


Arthrex Angel cPRP and BMA Tray

In vitro culture expansion of progenitor cells over 96 hours



48 hours



96 hours

*Arrow and OnControl are registered trademarks of Teleflex, Inc.

Precision Separation

Advantages of 3-Sensor Technology (3ST):

- No syringe switching
- No manual steps to prepare PRP
- Delivers PRP, PPP, and RBCs into separate, sterile compartments
- Ability to modulate platelet, leukocyte, and RBC content
- Consistent PRP output

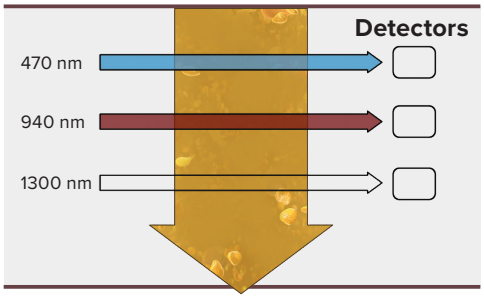
High-specificity 3ST light sensor technology and automated valve actuation are the foundation of the Arthrex Angel® cPRP System. The results of these features are the production of a high yield of PRP and PPP from whole blood.

High-specificity 3ST light sensor technology

3-Sensor Technology

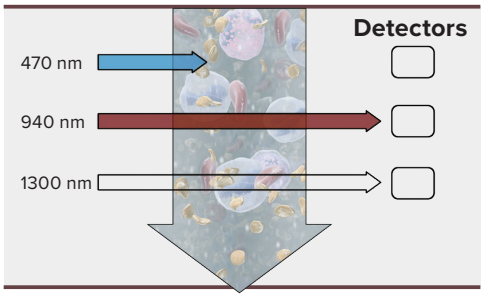
The Angel system incorporates 3 sensors to accurately separate blood components using cell-specific wavelengths of light to increase cellular yields. Absorption of 470 nm light detects platelets and leukocytes, 940 nm detects erythrocytes, and the 1300 nm wavelength corrects for ambient light and the presence of air bubbles.

Plasma



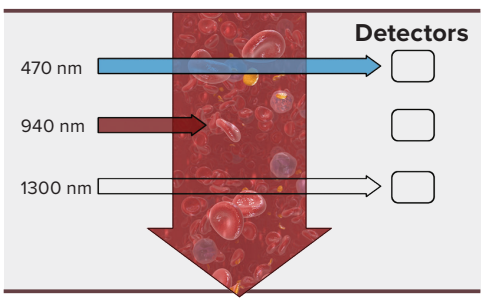
When plasma is present, all 3 light beams pass through and contact the detector. The Angel device recognizes the presence of plasma and turns the valve to collect PPP. The PPP is deposited in the PPP collection reservoir.

Platelets and Nucleated Cells



When platelets and nucleated cells are present, the 470 nm wavelength of light is absorbed. The absence of the 470 nm beam on the detector alerts the Angel system to stop collecting PPP. The Angel system will then actuate the valve to collect PRP. The PRP is directed into the collection syringe on top of the unit.

RBCs



The 940 nm wavelength is absorbed by RBCs. When the detector no longer detects the 940 nm beam, the Angel system will allow a percentage of RBCs to pass through into the PRP collection syringe. The percentage of RBCs collected in the PRP syringe is determined by the hematocrit (HCT) setting selected by the operator.

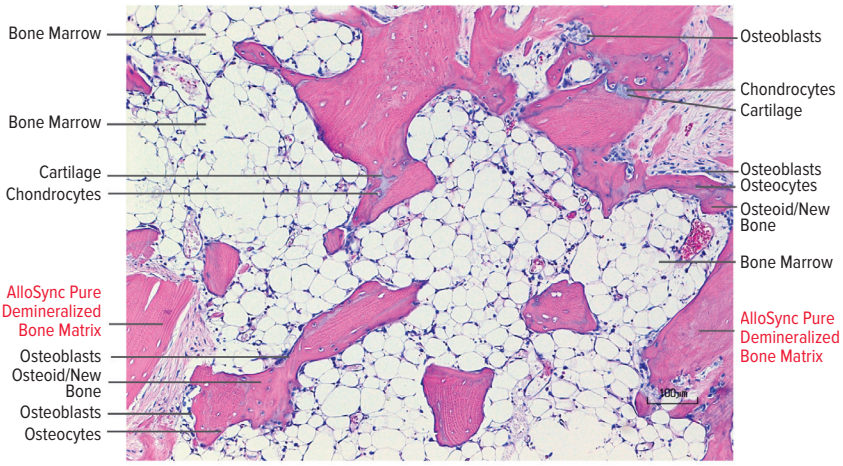
AlloSync™ Bone Grafting Solutions

The AlloSync bone grafting solutions line is a comprehensive offering of osteoinductive bone matrices. The AlloSync demineralization process preserves native bone morphogenic proteins (BMPs) and growth factors, and provides an ideal scaffold for cellular attachment and proliferation.

AlloSync Pure™

AlloSync Pure is a dehydrated osteoinductive demineralized bone matrix derived from 100% human allograft bone. When prepared with a biologic fluid, such as cPRP from BMA, AlloSync Pure bone matrix resists irrigation and can be used in a fluid environment.

AlloSync Pure has been histologically proven to contain all 5 elements of bone formation including new bone, bone marrow, osteocytes, chondrocytes, and cartilage post-implantation.



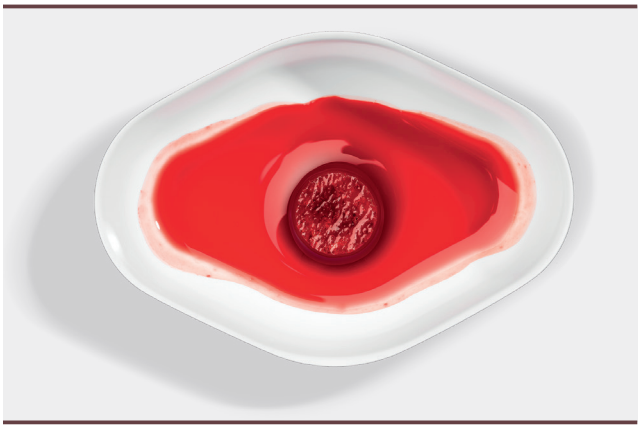
AlloSync Pure demineralized bone matrix histology

AlloSync Pure demineralized bone matrix can be utilized in an arthroscopic environment

AlloSync Cortical Fibers and Cancellous Strips

The AlloSync demineralized cancellous strips and cortical fibers maintain the natural bone architecture with interconnected porosity and contain exposed natural growth factors with verified osteoinductivity. These strips and fibers naturally absorb and retain bioactive fluids such as cPRP from BMA. After rehydration, the graft is compressible like a sponge, allowing for flexibility to fit in and around different types of bone defects.

AlloSync™ Button



The AlloSync button is a 12 mm round by 3 mm thick demineralized cancellous bone disc. This disc maintains the same superior handling characteristics as the AlloSync demineralized cancellous sponges. Because it is compressible, it can delivered to the repair site through an arthroscopic portal. Studies suggest that this demineralized bone disc, when used as an interpositional graft for rotator cuff repair, may help to induce more natural tendon-to-bone healing.[1]

Reference

1. Smith MJ, Pfeiffer FM, Cook CR, Kuroki K, Cook JL. Rotator cuff healing using demineralized cancellous bone matrix sponge interposition compared to standard repair in preclinical canine model. *J Orthop Res*. 2018;36(3):906-912. doi: 10.1002/jor.23680.

BioSurge™ Cell and Bone Graft Processing System

Product Description	Item Number
BioSurge I, 2.5 cc AlloSync Pure with Arthrex Angel cPRP and BMA tray	ABS-**2016-01**
BioSurge II, 5.0 cc AlloSync Pure with Arthrex Angel cPRP and BMA tray	ABS-**2016-02**
BioSurge III, 15 mm × 40 mm × 3 mm AlloSync DBM Cancellous Strip with Arthrex Angel cPRP and BMA tray	ABS-**2016-03**
BioSurge IV, 5.0 cc AlloSync DBM cortical fibers and Arthrex Powered Angel System	ABS-**2016-04**
BioSurge V, 12 mm × 3 mm AlloSync button disc with Arthrex Angel cPRP and BMA tray	ABS-**2016-05**

View U.S. Patent information at
www.arthrex.com/corporate/virtual-patent-marking

This description of technique is provided as an educational tool and clinical aid to assist properly licensed medical professionals in the usage of specific Arthrex products. As part of this professional usage, the medical professional must use their professional judgment in making any final determinations in product usage and technique. In doing so, the medical professional should rely on their own training and experience and should conduct a thorough review of pertinent medical literature and the product's directions for use. Postoperative management is patient-specific and dependent on the treating professional's assessment. Individual results will vary and not all patients will experience the same postoperative activity level or outcomes.

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