

HNM FIBRin™

BioMatrix Technology

- Flowable BioMatrix™
- Suturable BioScaffolds™
- Gel BioMatrix™



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HNMTOTAL RECON



HNM FIBRin

BioMatrix Technology™

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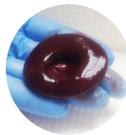
Suturable BioScaffolds™



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Indications for use

HNM
TOTAL RECON

HNM Total Recon is committed in providing surgeons and health care professionals with advanced surgical solutions for effective and time-saving treatment of their patients. Our most important task is meeting surgeons' needs. We accomplish this by creating key partnerships and driving innovative product development.





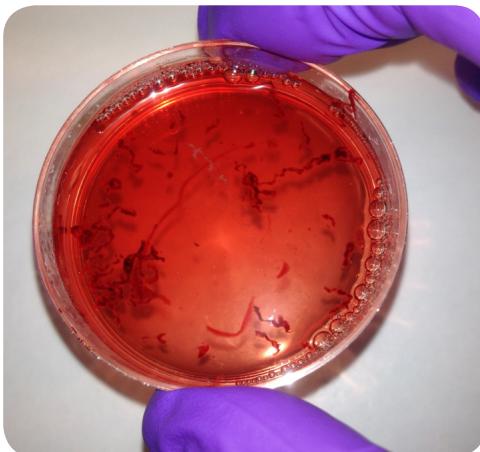
FLOWABLE BIOMATRIX

HNM FIBRin Applications



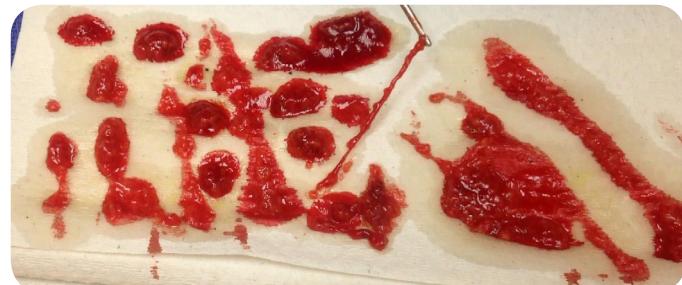
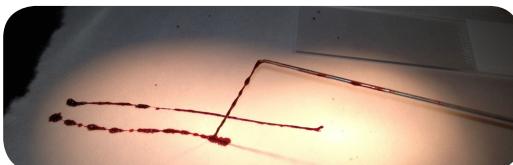
- Joint Pain
- Osteo-Arthritis
- Orthopedic Tendinopathies & Inflammation
- Soft And Hard Tissue
- Tendonitis
- Medial Collateral Ligament

10 minute prep time. No centrifuge or chemicals required. Creates a liquid fibrin matrix with the full compliment of cells and growth factors. Fibrin solids bind to the application site and offer slow release of factors as nature intended. Can be used as a carrier for other agents or materials as deemed appropriate by the physician.



Lab test showing activated whole blood fibril solids after washing in saline.

Viscous high volume fibrin matrix with plasma, passes through 22G needle or larger leaving fibrin solids that offer matrix and bind growth factors for natural delivery over time.

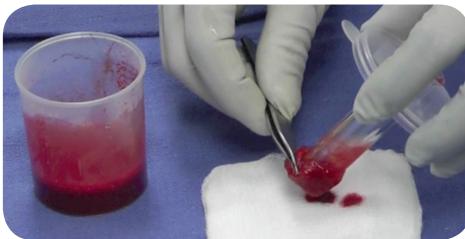


Flowable Biomatrix can formed with whole blood or marrow aspirate (above) or with blood and lipo aspirate (right).



FLOWABLE BIOMATRIX

HNM FIBRin Biomatrix vs. PRP



Immuno-histochemical staining of these types of fibrin networks has demonstrated “nests” of platelets that become trapped within the fibrin scaffold^[1]. Furthermore, cytokines bind to fibrin such that the fibrin scaffold becomes a growth factor reservoir that may allow growth factor release slowly over many days to weeks^[2].

Biologic Adv	Technical Advantages	Cost Advantages
Rich in platelets		Inexpensive
Structural integrity of fibrin matrix	Quick	
Rich in growth factors	Easy Procedure	
(TGF-B1,PDGF-BB,VEGF, FGF2)	Consistent Results	
Possible to use as scaffold for TE	Requires no extra OR staff	
Completely autologous (No exogenous activation required)	Can suture to repair site	
	Versatility (Different types of clot)	

Results of immunohistochemical staining (below) indicate that TGF-b1, PDGF-bb, VEGF, and FGF2, are present in human blood clots produced by the Hula Cup. This demonstrates that ClotMaster™ clots deliver the same healing growth factors found in PRP, and therefore have the potential to enhance healing^[4]

A study by Proctor, determined that the fibrin clot platelet capture rate to be 92% (below L).^[3] This capture rate compares favorably to prior studies that have demonstrated platelet capture rates of traditional PRP ranging from 17-80%^[4].

As an alternative method to standard PRP*, Clot Master provides the full compliment of plasma, leukocytes, cytokines and growth factors in an activated fibrin matrix providing structure and sustained release of Growth Factors in an exogenous fibrin blood clot scaffold.

This exogenous fibrin blood clot can act as a stable mechanism for long-term direct delivery of growth factors and as a three dimensional native scaffold for cell adhesion and proliferation.

REFERENCES

- 1.Visser, L et al., Veterinary Surgery. 2010; 39: 811-817.
2. Macri, L et al., Advanced Drug Delivery Reviews. 2007;59: 1366-1381.
3. Proctor, C Determination of the Platelet Capture Rate of Human Fibrin Blood Clot Alta Orthopaedics, Santa Barbara, CA 2014
4. Doodesack, A The Characterization and Quantification of Bioactive Components In Human Blood Clots for Tissue Healing and Engineering Spring, 2014, Brown University Biology



PROCEDURE MATERIALS

REQUIRED FOR 60ML BLOOD DRAW

- 1 - ClotMaster Hula Cup
- 1 - Phlebotomy kit
- 1 - 60ml syringe
- 6 - 10ml syringes
- 1 - female to female luerlock connector
- 1 - injection needles of choice (not recommended for needles smaller than 21G) 3 - 2x2 or 4x4 gauze sponges

BLOOD SAMPLE PREPARATION

Peel open the sterile pouch and transfer Hula Cup to work surface. Snap lid shut.

STEP 1

Draw 15-60ml of blood (or desired amount) immediately dispense into the Hula Cup via the Luer port so blood runs down the inner surface to avoid bubbling. Remove syringe from luer port.

STEP 2

Swirl gently for 60 seconds to initiate the clotting cascade. Allow sample to rest for 10-15 min to form gel matrix. Typically, gel is adhered to the bottom of the Hula Cup, the gel can be loosened with the handle of glass tube.

STEP 3

Keeping Hula Cup closed, push the glass handle away from the port on lid and connect syringe.

STEP 4

When all syringes are filled, connect the female-female luer lock to each syringe and pass the gel back and forth at least 10 times to liquefy the BioMatrix for easy application.

STEP 5





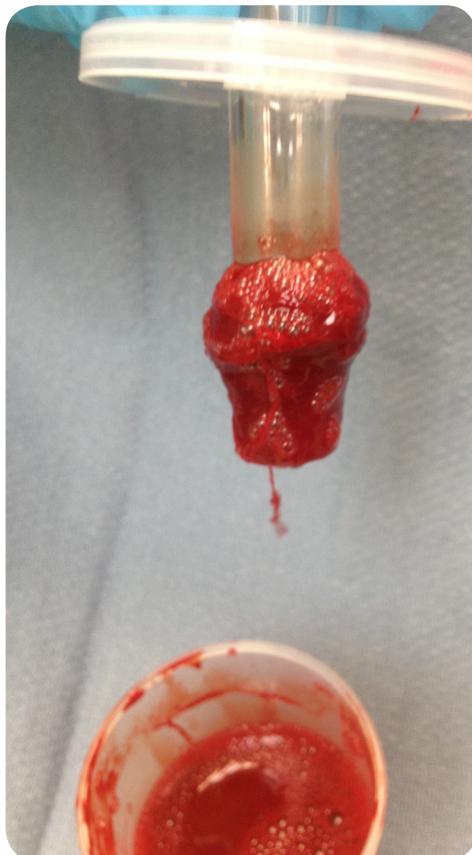
Suturable BioScaffolds™

Applications



Suturable, Elastic

- -Rotator Cuff
- - AC
- -Meniscus Tears
- Tendon Repair



Indications for use

Ten time prep time, No centrifuge or adhesives required, Stays in sterile field, Scaffolds have natural open structure Microenvironment, controlled formation, makes 3 different scaffold types.

Suturable FIBRin clot peripheral blood or bone marrow stays in place & has advantages over platelet-rich plasma, containing platelets as well as other bioactive components in a fibrous architecture.

- Parallel oriented FIBRin matrix can be stretched, flattened, Twisted, or rolled, prior to suturing.
- Bone marrow can be used to form cell laden constructs.
- Over 90% platelet capture rates have been reported .



GEL BioMatrix™

Applications

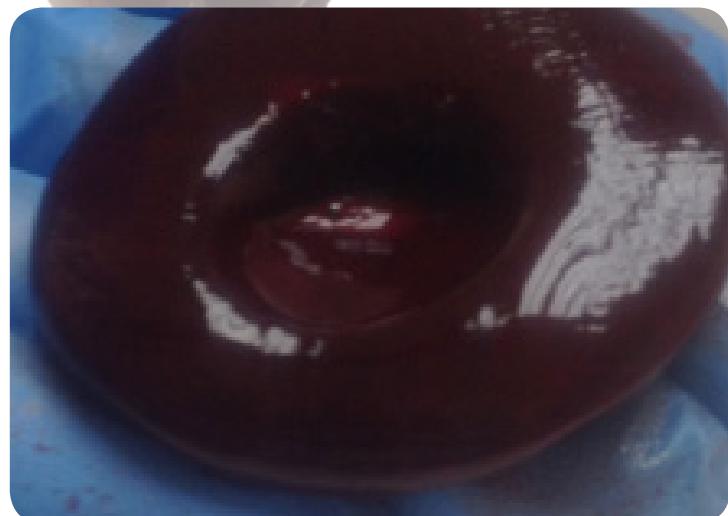
- Bone Grafting
- Carry Cells
- Bone Grafting



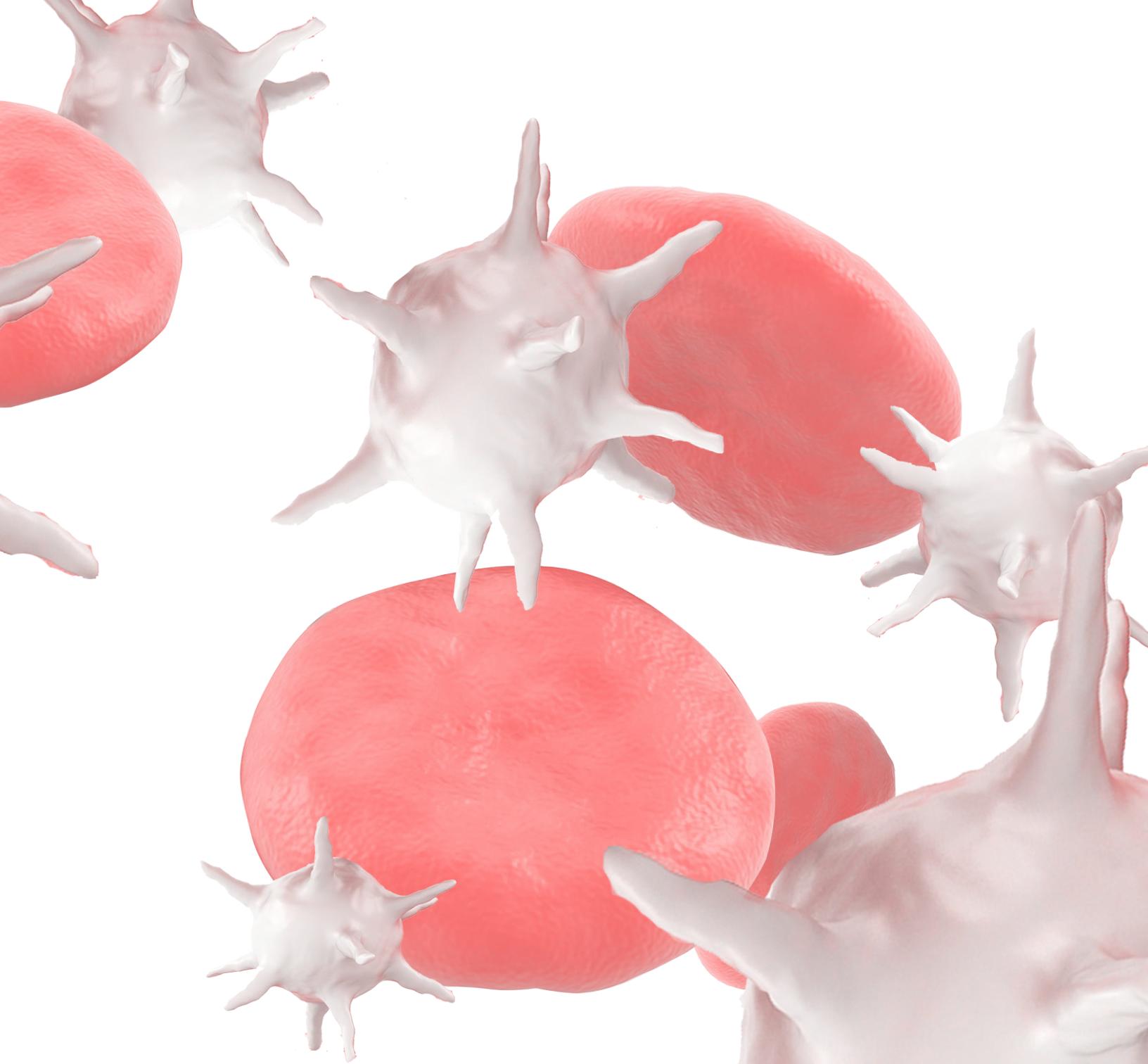
Cohesive high volume fibrin gel, easy to handle, can be cut into strips, packed into spaces, wrapped around structures

Gel Biomatrix made with whole blood L

Gel-adipose composite R



Gel Biomatrix made with whole blood L



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