Next Generation.
Regenerative Medicine.

Advancing regenerative medicine platforms to improve patient outcomes.

AZIYO® BIOLOGICS

The Science of Extracellular Matrix.

Remodel into Healthy Tissue

Extracellular matrix (ECM) is a naturally occurring bioscaffold that surrounds cells in all tissues. ECM restores, repairs, and remodels into healthy, organized tissue[1].

Controlled Healing

ECM acts as a scaffold into which the patient's own cells migrate and integrate[2] - stimulating natural wound healing mechanisms.[3]

Extracellular Matrix Functions to Regulate:

- Cell Adhesion[2]
- Cell Differentiation[2]
- Cell Division[2]
- Cell Migration[2]
- Healthy tissue formation[1]

Aziyo products are constructed of ECM derived from porcine small intestine submucosa (SIS), which is rich in growth factors, matricellular proteins, adhesion glycoproteins, and structural proteins such as collagen and elastin.[2,4]

Natural Regeneration and Healing Response

A biologic matrix promotes a regenerative healing response after tissue injury or disruption.[1] The innate immune response, especially the macrophage response, is a critical determinant of downstream tissue remodeling outcomes.[5] The biologic response has two potential tissue healing pathways based on macrophage phenotype polarization: M1 vs. M2. The M1 macrophage response stimulates tissue fibrosis and scar tissue formation.[5]

However the ECM guided M2 macrophage response results in:

- Healthy tissue formation[1]
- Neo-vascularization[1]
- Anti-inflammatory response[1]

Aziyo is harnessing the regenerative properties of ECM in our product portfolio to provide a natural biologic healing response into healthy, vascularized, native tissue.[6,7,8,9,10]

Product catalog can be found at the end of this brochure.
For more information go to www.Aziyo.com.

Natural Regeneration.

A biologic collagen matrix promotes a regenerative immune response.[1]

Video: Dr. Stephen Badylak Discusses M1 & M2 Macrophages

Choose a Healthy Healing Response

NON-BIOLOGIC MATERIALS → M1 → **FOREIGN BODY RESPONSE**

- **Pro-inflammatory Macrophage**
  Stimulates fibrosis and chronic inflammation[5]

BIOLOGIC EXTRACELLULAR MATRIX → M2 → **REGENERATIVE RESPONSE**

- **Regenerative Macrophage**
  Stimulates healthy tissue formation and minimizes inflammation[1]

Example of Regenerative Healing Response with ECM

Use of a non-biologic material can result in a fibrotic capsule.	Use of a biologic material can result in healthy, vascularized tissue formation.
	

Macrophage healing illustration. Scan QR code at top right to better understand how ECM regulates tissue healing and the immune response.

1. Piterina A, et al. *Int J Mol Sci.* 2009 Nov 20;10(10):4375-417.
2. Sundermann S, et al. *Thorac Cardiovasc Surg.* 2014 Feb;62(1):76-9.
3. Londono R, et al. *Ann Biomed Eng.* 2015 Mar;43(3):577-92.
4. Scholl F, et al. *World J Pediatr Congenit Heart Surg.* 2010 Apr;1(1):132-6.
5. Dziki J, et al. *J Biomed Mater Res A.* 2017 Jan;105(1):138-147.
6. Rego A, et al. *J Cardiothorac Surg.* 2019 Mar 15;14(1):61.
7. Ferng A, et al. *Ann Thorac Surg.* 2017 Sep;104(3):e239-e241.
8. Allen K, et al. *Front Cardiovasc Med.* 2021 Feb 11;8:631750.
9. Goel R. *Cureus.* 2021 Jan 25;13(1):e12902.
10. Bibevski S, et al. *Front Cardiovasc Med.* 2020 Oct 30;7:562136.

CanGaroo® Envelope

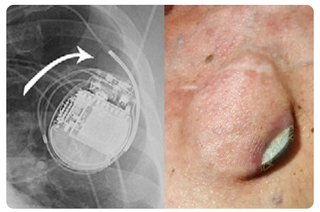
For Implantable Devices

CIED-Related Complications

CIED-related complications are associated with increased risk.[1]

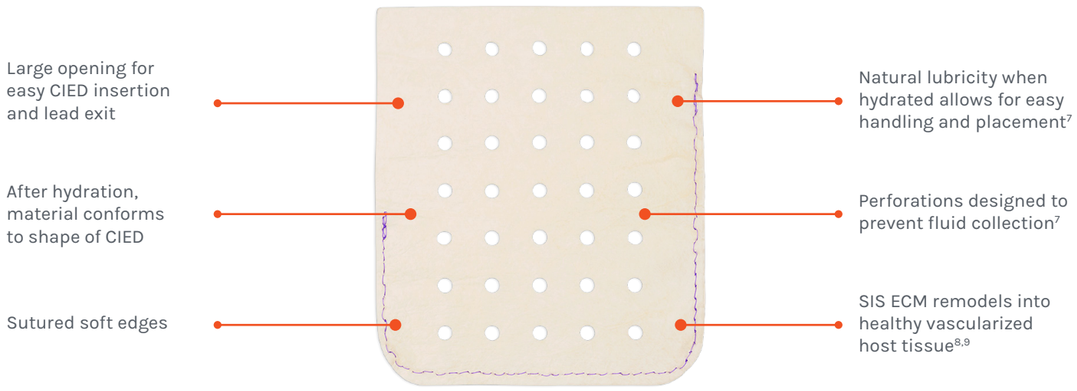
Risks may include:

- Infection and inflammation associated with severe pocket scarring[2,3]
- Difficult lead extractions or pocket revisions due to scarring[3]
- Calcified fibrotic capsules[4]
- Device migration and erosion[4]
- Thin skin[4]

Calcified Fibrotic Capsule[3]	Migration[5]/Erosion	Thin Skin[6]
		

The First. The Only.

CanGaroo Envelope is comprised of acellular biologic material. Porcine small intestine submucosa extracellular matrix (SIS ECM): designed to create a healthy pocket.[7]

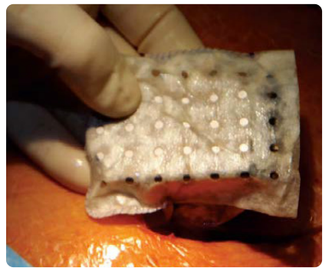
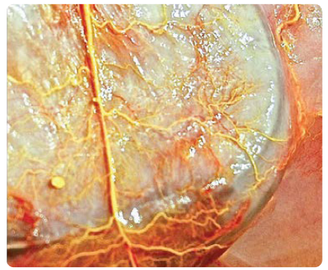
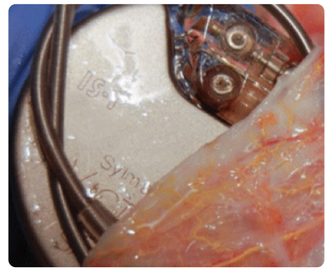


Product catalog can be found at the end of this brochure.
For more information go to www.Aziyo.com.

Remodels into a healthy, vascularized pocket.[4]

- ECM promotes the development of vascularized tissue[8]
- CanGaroo provides additional anchoring points — reduces the risk of device migration and erosion[4]
- CanGaroo provides a soft, pliable layer which conforms to the device for easy handling and implantation[7]

Watch the Healthy Healing Process of CanGaroo

Biologic Extracellular Matrix[10]	Systemically Vascularized Tissue[4]	Healthy Native Tissue[4]
		

CanGaroo Envelope is the First and Only Envelope Approved for S-ICDs.

- Secures the S-ICD upon implant and remodels into a vascularized, healthy native tissue pocket[4]
- Envelope provides additional anchoring points at time of implant[11]
- Helps protect both the sensing and shocking vector[11]

S-ICD Shown in Sub-Q CanGaroo Envelope

1. Palmisano P, et al. *JACC Clin Electrophysiol.* 2020 Apr;6(4):382-392.
2. Wilkoff B. *Tex Heart Inst J.* 2011;38(4):353 -354.
3. Maytin M, et al. *Journal of Innovations in Cardiac Rhythm Management.* 2015;6(11):2173-2177.
4. Pre-clinical data on file at Aziyo Biologics, Inc. using CIEDs.
5. Close M, et. al. *J Emerg Med.* 2012 Jul;43(1):e55-6.
6. Knepp E, et al. *Eplasty.* 2012;12:e8.
7. Data on file at Aziyo Biologics, Inc.
8. Piterina A, et al. *Int J Mol Sci.* 2009 Nov 20;10(10):4375-417.
9. Goel R. *Cureus.* 2021 Jan 25;13(1):e12902.
10. Image on file at Aziyo Biologics, Inc.
11. Xiang K, et al. *HeartRhythm Case Rep.* 2019;5(8):430-432.

CanGaroo® Envelope

For Neurostimulators

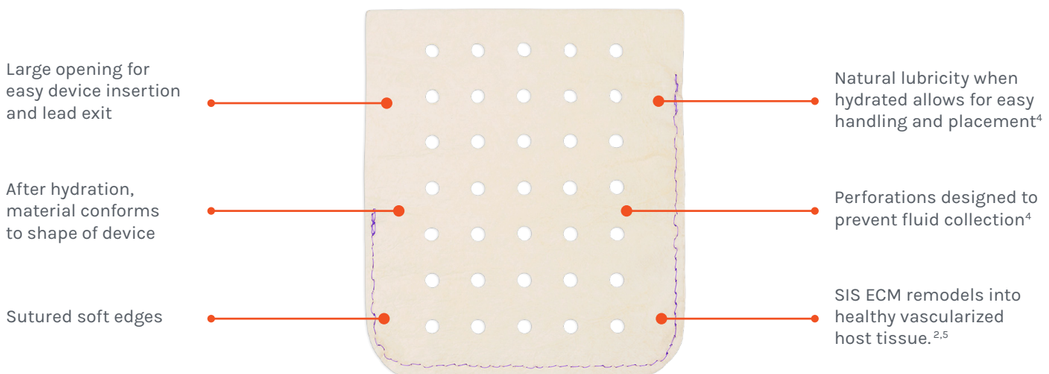
Stabilize Neurostimulators with Healthy, Vascularized Tissue.[1]

CanGaroo Benefits.

Extracellular matrix (ECM) regulates the biologic healing response to decrease inflammation and stimulate formation of healthy tissue.[2] CanGaroo is an extracellular matrix that creates a hospitable environment for host cells to migrate into and initiate tissue remodeling.[1,3] The new healthy tissue secures and protects the implanted electronic device.[1]

The First. The Only.

CanGaroo Envelope is the first and only natural biologic envelope designed for implantable electronic devices.



Product catalog can be found at the end of this brochure.
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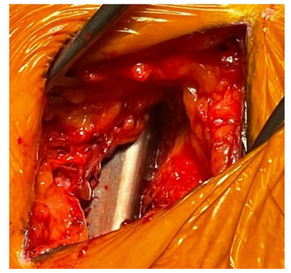
Create a Healthy Pocket.



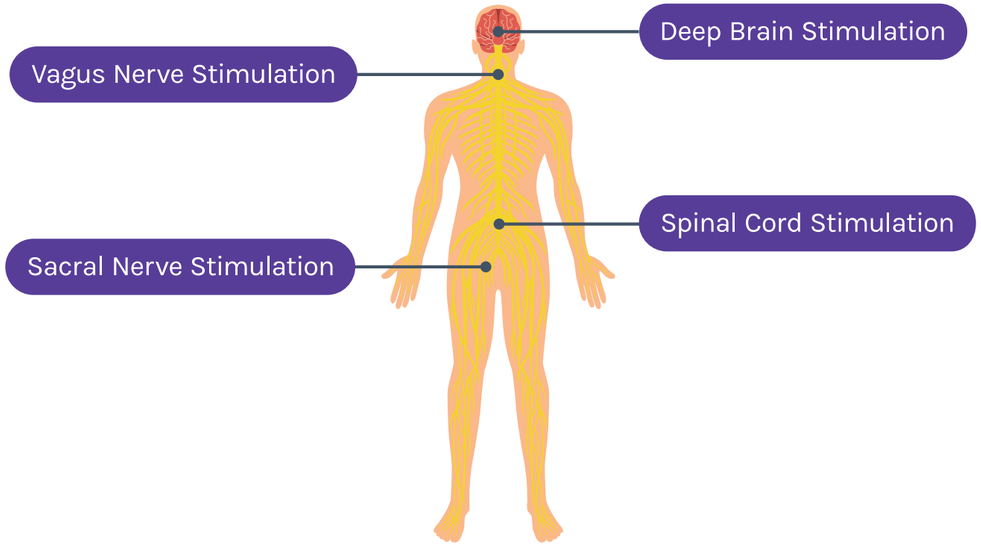
Dr. Judson Cook, St. David's Hospital, Austin, TX

Scan Here for More Information

CanGaroo® Envelope

Promote Pocket Health

Using CanGaroo at time of implant can stabilize the device and promote pocket health.[1] CanGaroo may be used in the following procedures:



CanGaroo provides a soft layer around the device which helps anchor the implantable electronic device, naturally mitigating risk of migration and/or erosion.[1] The CanGaroo may facilitate device implant by providing additional anchoring points.[6]

1. Pre-clinical data on file at Aziyo Biologics, Inc. using CIEDs.
2. Piterina AV, et al. *Int J Mol Sci.* 2009 Nov 20;10(10):4375-417.
3. Badylak S. *Semin Cell Dev Biol.* 2002 Oct;13(5):377-83.
4. Data on file at Aziyo Biologics, Inc.
5. Goel R. *Cureus.* 2021 Jan 25;13(1):e12902.
6. Xiang K, et al. *HeartRhythm Case Rep.* 2019;5(8):430-432.

ProxiCor®

For Pericardial Closure

The Natural Choice for Pericardial Reconstruction.

The pericardium is a complex, specialized membrane that serves a wide range of normal physiological functions.[1]

Function of the Pericardium:[1]

- Maintains normal ventricular compliance
- Maintains ventricular function curves
- Limits effect of increased LV end-diastolic pressure
- Provides atrial support
- Enhances RV function
- Maintains functionally optimal cardiac shape
- Limits hypertrophy associated with chronic exercise
- Prevents abrupt changes in intracavitary volumes
- Reduces external friction due to heart movements
- Production of pericardial fluid and phospholipid surfactants
- Provides a barrier to inflammation
- Preserves retrosternal distance

Fewer Post-Op Complications.

Pericardial reconstruction with ProxiCor makes recovery less eventful with fewer post-operative complications.[2] An extracellular matrix (ECM) derived from porcine small intestine submucosa (SIS) encourages healthy healing and tissue regeneration.[3]

SIS ECM is more resistant to infection than synthetic material[4]

SIS ECM remodels into healthy site-specific tissue[2,3]

SIS ECM modulates the biologic healing response and reduces inflammation[3]

4-Ply material is strong and pliable once hydrated[5]

Natural material, non-crosslinked bioscaffold[5]

SIS ECM supports the angiogenic process[6]

Also available in 7x10cm

Extracellular matrix materials have been used in more than one million patients. SIS ECM has demonstrated antimicrobial activity during remodeling and reduces an inflammatory response.[3]

Product catalog can be found at the end of this brochure.
For more information go to www.Aziyo.com.

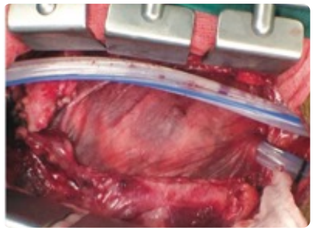
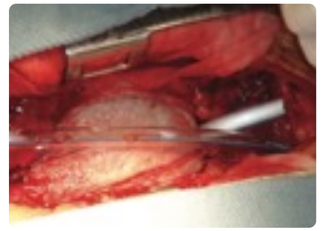
Reconstruction of the pericardium using ProxiCor for Pericardial Closure enables surgeons to re-establish this normal anatomic structure.[7,8]

Potential Benefits of Pericardial Reconstruction:[2,9]

- Restores normal anatomy and physiology
- Maintains the retrosternal distance
- Reduces post-op complications:
  - Pleural and pericardial effusion
  - 30-day readmission rates
  - Atrial fibrillation
  - Bleeding complications
- Preserves the retrosternal distance
- Enables accurate identification of post-op bleeding[9]
- Shortens operative times and aids in re-entry for re-operations[12]

Watch an Example of Pericardial Reconstruction Using ProxiCor PC

Absence of the pericardial barrier after cardiac surgery often leads to scarring and the formation of adhesions between the heart and sternum, which can impair normal heart function, as well as disruption of normal intra-cardiac pressures.[2,8]

Reconstructed Pericardium with ProxiCor PC	Redo Procedure 3-Months Post-Op	Vascularized Remodeled Tissue
		
Chest tubes shown inside and outside of the reconstructed pericardium.	**Sternal re-entry greatly facilitated.**	**3-months post pericardial reconstruction.**
Image: Dr. Alfredo Rego, Doral, FL		*Image: Dr. Frank Scholl, Hollywood, FL*

Reconstruct the Pericardium with Proxicor PC:

- Consists of natural material, non-crosslinked bioscaffold[5]
- Modulates the biologic healing response and reduces inflammation[3]
- More resistant to infection than synthetic material[4]
- Resists calcification[11]
- Remodels into vascularized, site-specific tissue[2,3]
- Fewer post-op complications[2]
- Bioscaffold patch enables hemostasis and minimizes bleeding at suture lines[7]
- Offers customization of material to be shaped to fit anatomy[12]

1. Boyd W, et al. *Expert Rev Cardiovasc Ther.* 2012 Sep;10(9):1109-18.
2. Rego A, et al. *J Cardiothorac Surg.* 2019 Mar 15;14(1):61.
3. Piterina A, et al. *Int J Mol Sci.* 2009 Nov 20;10(10):4375-417.
4. Brennan E, et al. *Tissue Eng.* 2006;12(10):2949-55.
5. Data on file at Aziyo Biologics, Inc.
6. Grimes M, et al. *Biomed Mater Eng.* 2005;15(1-2):65-71.
7. Sundermann S, et al. *Interact Cardiovasc Thorac Surg.* 2015 Jan;20(1):10-4.
8. Stelly M, et al. *Ann Thorac Surg.* 2013 Nov;96(5):e127-9.
9. Rego A, et al. *Heart Surg Forum.* 2022 Jan 13;25(1):E008-E019.
10. Rao V, et al. *Ann Thorac Surg.* 1999 Feb;67(2):484-8.
11. Haney L, et al. *Ann Thorac Surg.* 2021 Aug 8:S0003-4975(21)01384-9.
12. Aziyo Biologics, Inc., ProxiCor for Pericardial Closure Instructions for Use.

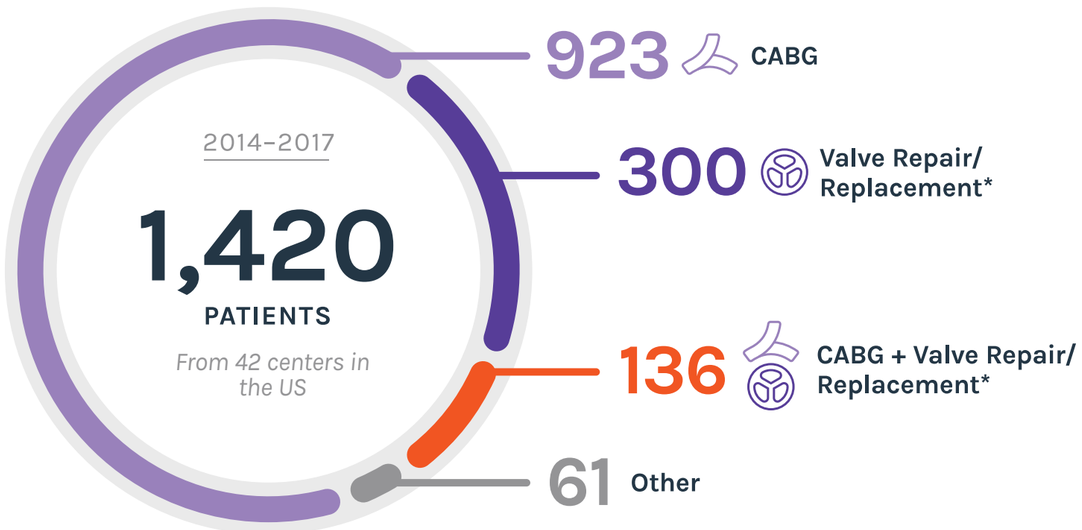
Fewer Post-Op Complications. Naturally.

The RECON Study has demonstrated that using ECM for pericardial closure can impact the incidence rate of post-operative complications for cardiac surgery patients.[1]

A prospective, multicenter study designed to assess readmission rates and perioperative complications of patients undergoing CABG (Coronary Artery Bypass Graft) or valve repair and replacement after pericardial closure using ECM and compare the outcomes with a similar national patient cohort dataset.[1]

Data from the RECON study demonstrated that pericardial closure with ECM following cardiac surgery in 1,420 patients was associated with substantial reductions in pleural effusion, pericardial effusion, and 30-day hospital readmission rates.[1]

The RECON Study.[1]



*ProxiCor is not indicated for the construction or replacement of total valves or conduits.

Product catalog can be found at the end of this brochure.
For more information go to www.Aziyo.com.

The Outcome.[1]

Reductions in Rates of Pleural Effusion**

67% Reduction◊ for CABG patients

85% Reduction for valve repair/ replacement patients

Closing the pericardium with ECM reduced the incidence of pleural effusion in patients undergoing valve surgery to **only 3%**

This reduction in pleural effusion by pericardial closure is remarkable and never before reported previously.[1]

Reductions in Rates of Pericardial Effusion†

86% Reduction◊ for CABG patients

68% Reduction◊ for valve repair/replacement patients

Reductions in Rates of 30-Day Hospital Readmission

58% Reduction◊ for CABG patients

66% Reduction◊ for valve repair/replacement patients

Lower Rates of Atrial Fibrillation

Compared to the Literature

LITERATURE RATES[3]

20-30% for CABG patients

30-50% for valve repair/ replacement patients

RECON STUDY RATES[1]

14% for CABG patients

27% for valve repair/ replacement patients

Reductions in Rates of Bleeding Complications‡

56% Reduction◊ for CABG patients

31% Reduction for valve repair/replacement patients

**Pleural effusion was documented as patients that required a thoracentesis or had imaging performed to confirm pleural effusion.
†Pericardial effusion was documented as patients that experienced clinical tamponade or required pericardiocentesis.
‡Bleeding was measured as any patient that experienced bleeding that required intervention (i.e. return to the emergency room or tamponade).
◊Statistically Significant Data*

1. Rego A, et al. *J Cardiothorac Surg.* 2019 Mar 15;14(1):61.

Scan QR Code to Access the Full Infographic

ProxiCor® PC &CTR

ProxiCor®

For Cardiac Tissue Repair

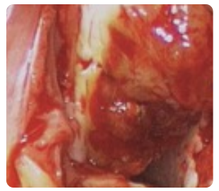
The Natural Choice for Intracardiac Repair.

In cases such as atrial or ventricular septal defect repair, ProxiCor CTR can effectively repair a defect and generate new, healthy tissue in lieu of using synthetic patches or performing interventional procedures with devices such as nitinol plugs.[1,2] An extracellular matrix derived from porcine small intestine submucosa (SIS ECM), ProxiCor CTR encourages healthy healing by reducing inflammation and promoting tissue regeneration.[3] Unlike synthetic alternatives, SIS ECM has demonstrated a reduced foreign body reaction and post-op inflammation.[3]

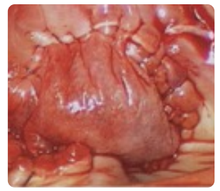
Repair Intracardiac Defects with ProxiCor CTR:

- Consists of natural material, non-crosslinked bioscaffold[4]
- Modulates the biologic healing response and reduces inflammation[3]
- Resists calcification[5]
- More resistant to infection than synthetic material[6]
- Repairs defects and restores natural cardiac tissue[1,2]
- Remodels into vascularized, site-specific tissue[1,3]
- Bioscaffold patch enables hemostasis and minimizes bleeding at suture lines[7]
- Takes only 1-2 minutes of preparation in sterile saline[8]
- Offers customization of material to be shaped to fit anatomy[8]

Atrial Septal Myxoma



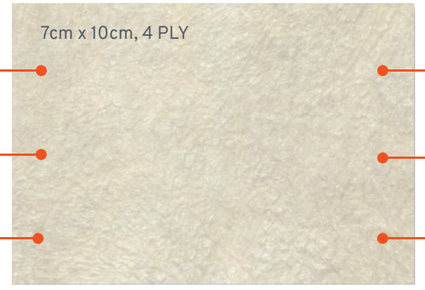
Prior to Resection



Repair Completed Using ProxiCor

Reconstruct. Remodel. Restore.

ProxiCor CTR can repair a defect by regulating the biologic healing response and reducing inflammation, resulting in the formation of healthy, vascularized tissue.[1,3]



SIS ECM is more resistant to infection than synthetic material[6]

SIS ECM remodels into healthy site-specific tissue[1,3]

SIS ECM modulates the biologic healing response and reduces inflammation[3]

4-Ply material is strong and pliable once hydrated[9]

Natural material, non-crosslinked bioscaffold[9]

SIS ECM supports the angiogenic process[10]

Also available in 4x7 cm

Extracellular matrix materials have been used in more than one million patients. SIS ECM has demonstrated antimicrobial activity during remodeling and reduces an inflammatory response.[3]

Product catalog can be found at the end of this brochure.
For more information go to www.Aziyo.com.

Myocardium Repair.

Case Report

Surgeon: Frank Slachman, MD
Institution: Mercy Medical Group, Sacramento, California

Challenge:

In August 2011, an 89 year-old male with remote history of dyspnea, impaired physical function, severe calcific and/or occlusive coronary artery disease, LVEF 30% and a large anteroapical anuerysm with dyskinesis. A bioresorbable, acellular, non-crosslinked extracellular matrix (ECM) material was used to repair an anteroapical aneurysm, and the patient was followed for three years by serial cardiac magnetic resonance imaging (CMR).

Approach:

The patient underwent coronary artery bypass grafting, followed by a Dor procedure (endoventricular circular patch plasty; EVCPP) repair of the aneurysmal myocardium using an approximately 3 cm circular patch of ProxiCor for Cardiac Tissue Repair (CTR) (formerly CorMatrix ECM). Cardiac function was evaluated immediately before discharge and at 8, 13, and 29 months using multiplanar, ECG-gated breath-hold (FIESTA) CMR with double-inversion recovery and a linear myocardial tagging sequence.

Patient Outcome:

The patient recovered to baseline function. Pre-discharge CMR showed normal left ventricular size with end diastolic diameter 44 x 44 mm, end diastolic volume 121.8 ml, and calculated LVEF 53%. There was moderate edema surrounding the patch, as well as evidence of a heterogeneous, loculated effusion between the patch and the pericardium, presumed to be clotted blood. There was no intra-cavitary thrombus or mass. Serial CMR at 8, 13, and 29 months suggested progressive improvement in LV function with calculated LVEF of 50%, 55%, and 56.4% respectively. LV wall thickness, function, and contractility were also improved. There was evidence of reduced edema surrounding the ventriculotomy and complete resolution of all post-operative pericardial effusion. CMR with gadolinium contrast at 29 months showed significant near-transmural enhancement of the apex and in the region of the patch, and no evidence of hypertrophic or infiltrative cardiomyopathies. As of this report, the patient remains alive and enjoys a high functional performance status.

Figure 1: Dor Procedure. Following CABG, a ventriculotomy was created between the terminal diagonal and left anterior descending arteries around the apex of the heart (A-B). 3-0 Prolene retraction sutures were placed and a 40 ml Foley balloon catheter was inserted into the cavity. The area of demarcation between the thinned-out and healthier myocardium was cinched down to approximately 3 cm in diameter (C). A 3 cm circular patch of CorMatrix ECM was sewn over the defect with running 4-0 Prolene, and then the patched area was cinched down to approximately 2.5 cm diameter with a bolster of 5-0 polypropylene suture (D-E). No leaks were detected when the ventricle was pressurized with antegrade cardioplegia. The ventriculotomy was closed with a double layer of 4-0 polypropylene suture and then reinforced with strips of CorMatrix ECM strips over 5-0 polypropylene suture (F).

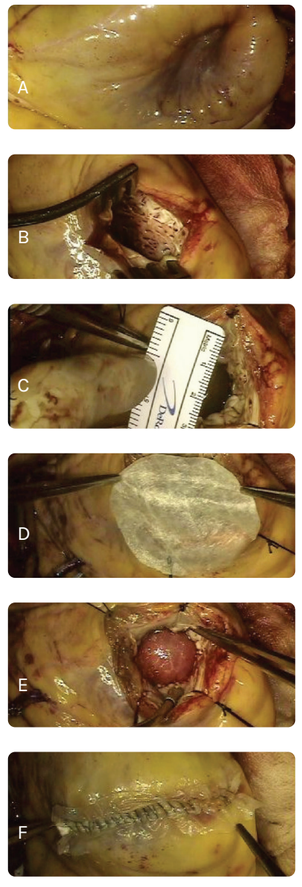
Results from case studies are not predictive of results in other cases. Results in other cases may vary.

Slachman F. Evidence of Myocardial Regeneration After Endoventricular Cirular Patch Plasty with CorMatrix ECM. Poster presented at ANZSCTS Annual Scientific Meeting. November 10, 2014.

1. Ferng A, et al. *Ann Thorac Surg.* 2017 Sep;104(3):e239-e241.
2. Scholl F, et al. *World J Pediatr Congenit Heart Surg.* 2010 Apr;1(1):132-6.
3. Piterina A, et al. *Int J Mol Sci.* 2009 Nov 20;10(10):4375-417.
4. Data on file at Aziyo Biologics, Inc.
5. Haney L, et al. *Ann Thorac Surg.* 2021 Aug 8:S0003-4975(21)01384-9.
6. Brennan E, et al. *Tissue Eng.* 2006;12(10):2945-55.
7. Sundermann S, et al. *Interact Cardiovasc Thorac Surg.* 2015 Jan;20(1):10-4.
8. Aziyo Biologics, Inc., ProxiCor for Cardiac Tissue Repair Instructions for Use.
9. Data on file at Aziyo Biologics, Inc.
10. Grimes M, et al. *Biomed Mater Eng.* 2005;15(1-2):65-71.

Video: Using ECM to Create Healthy, Vascularized Tissue

Figure 1:



Tyke®

For Cardiovascular Repair

A Better Surgical Experience, Designed for Small Vessel Repairs in Neonates.

The natural choice in neonatal and infant cardiovascular repair, Tyke was designed to be a thinner, more pliable, 2-ply patch for intracardiac and branch pulmonary artery use.[1] An extracellular matrix derived from porcine small intestine submucosa (SIS ECM), Tyke encourages healthy healing by reducing inflammation and promoting tissue regeneration.[2]

Tyke is Indicated for:[3]

- Intracardiac defects, septal defect and annulus repair, suture-line buttressing, and cardiac repair
- Epicardial covering for damaged or repaired cardiac structures

Tyke should be used to reconstruct curved structures less than or equal to 12mm in diameter or to reconstruct structures where the post-operative pressure is not expected to exceed 50 mmHg.[3]

For applications outside of these parameters, consider the use of ProxiCor for Cardiac Tissue Repair.

Improved Patient Outcomes.

Tyke is a 2-ply extracellular matrix specifically created for neonate and infant repairs.

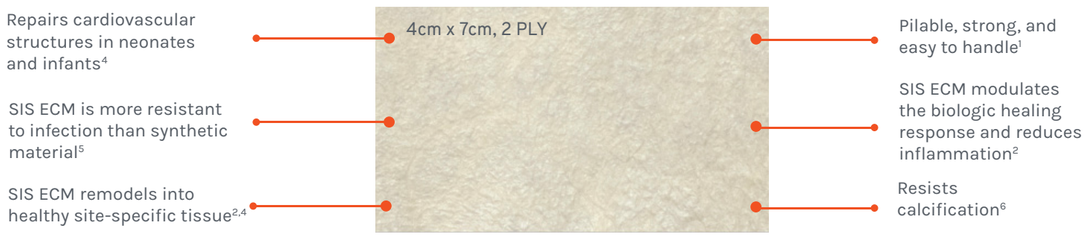


Image true to size

Tyke has shown lower re-intervention rates when compared to bovine and synthetic patches, thus lowering the overall cost of care and may provide better patient and family experience.[6]

Product catalog can be found at the end of this brochure.
For more information go to www.Aziyo.com.

Retrospective Analysis of Over 400 Uses in a Congenital Heart Program[6]

A retrospective chart review was performed at a single-center, cohort study of surgeries in a congenital heart program which resulted in 408 SIS ECM patches (Tyke [2-ply] and ProxiCor CTR [4-ply]) in 309 patients from 2012-2019.

The Usage Consisted of:

- 314 (77%) arterioplasties
- 22 (5.4%) venoplasties
- 63 (15.4%) intracardiac repairs
- 9 (2.2%) valve repairs

- Pulmonary artery repair was the most common usage (n=181; 44.4%)
- Median follow up time was 3.9 years (range 3 days – 7.4 years)
- Surgical re-intervention was required in 10 (2.5%) patches, and percutaneous re-intervention was required in 27 (6.6%)
- No statistical difference in the rate of re-intervention between the 2-ply (n=32) and 4-ply (n=376) patches was found

It was concluded that SIS ECM is a viable patch option that can be used in various cardiac and vascular reconstructive surgeries with low risk of failure and calcification.

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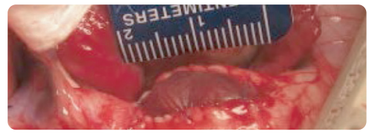
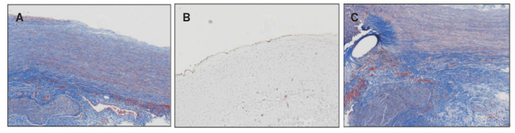
In Vivo Data:



Pulmonary artery branch implant prior to closure.[7]

Pulmonary artery implant harvested at 90 days.[7]

Histology of Remodeled Tyke Patch in Pulmonary Artery ~12 Months Post Implant[4]



(A) Masson's trichrome stain shows the remodeled ECM scaffold material. The neo-tissue is characterized by a highly aligned and organized accumulation of spindle cells and collagen fibers oriented along the length of the pulmonary artery. The luminal surface (top) is lined by endothelial cells and there is a vascular adventitia on the abluminal surface. Sections of a nerve fiber can also be seen at the lower left corner of the image. **(B)** Image showing positive immunolabeling for CD31+ endothelial cells along the luminal surface of the remodeled graft material. **(C)** Masson's trichrome stain shows the anastomotic site between the native pulmonary artery and the graft material. The oval unstained space at the left represents the site of suture placement. The graft material (to the right of the suture) is characterized by an organized, aligned accumulation of collagen fibers and spindle-shaped cells. The bottom portion of the picture shows the vascular adventitia with a section of nerve fiber.

Repair Intracardiac Defects with Tyke:

- Consists of natural material, non-crosslinked bioscaffold[1]
- Modulates the biologic healing response and reduces inflammation[2]
- Resists calcification[6]
- More resistant to infection than synthetic material[5]
- Effectively repairs defects and restores natural cardiac tissue[4]
- Designed for long-term repair[4]
- Remodels into functional, site-specific tissue[2,4]
- Bioscaffold patch enables hemostasis and minimizes bleeding at suture lines[8]
- Offers customization of material to be shaped to fit anatomy[3]
- Suitable for repairing neonatal and infant structures[4]

1. Data on file at Aziyo Biologics, Inc.
2. Piterina A, et al. *Int J Mol Sci.* 2009 Nov 20;10(10):4375-417.
3. Aziyo Biologics, Inc., Tyke Instructions for Use.
4. Bibevski S, et al. *Front Cardiovasc Med.* 2020 Oct 30;7:562136.
5. Brennan E, et al. *Tissue Eng.* 2006 Oct;12(10):2949-55.
6. Haney L, et al. *Ann Thorac Surg.* 2021 Aug 8:S0003-4975(21)01384-9.
7. CC54S Animal Study Final Report
8. Sundermann S, et al. *Interact Cardiovasc Thorac Surg.* 2015 Jan;20(1):10-4.

VasCure®

For Vascular Repair

The Natural Choice for Vascular Repair.

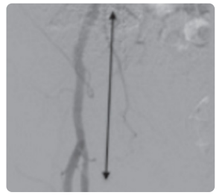
VasCure is ideal for carotid and iliofemoral endarterectomies and AV fistula repairs.[1]

An extracellular matrix derived from porcine small intestine submucosa (SIS ECM), VasCure encourages healthy healing by reducing inflammation and promoting tissue regeneration. VasCure is used for repair or reconstruction of peripheral vasculature including the carotid, renal, iliac, femoral, and tibial blood vessels. VasCure may be used for closure of vessels, as a pledget, or for suture line buttressing when repairing vessels.[1]

Repair Peripheral Vasculature with VasCure:

- Consists of natural material, non-crosslinked bioscaffold[2]
- Modulates the biologic healing response and reduces inflammation[3]
- Remodels into functional, site-specific tissue[3,4]
- More resistant to infection than synthetic material[5]
- Demonstrates similar compliance to native arteries compared to autologous grafts or synthetic material[3,4]
- Bioscaffold patch enables hemostasis and minimizes bleeding at suture lines[6]
- Offers customization of material to be shaped to fit anatomy[1]

VasCure Patch closure after iliofemoral thromboendarterectomy and profundaplasty as part of a hybrid open-endovascular revascularization.



Arteriogram eight weeks post operative during endovascular procedure on contralateral extremity – arrow indicates the length of patch repair.

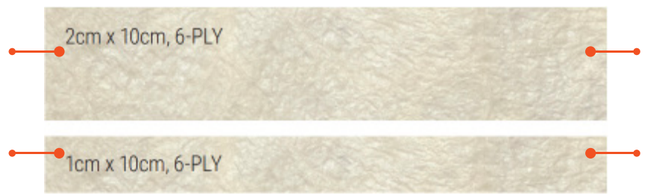
Photos Courtesy of Richard Neville, MD, George Washington University, Washington, DC

Healthy Site-Specific Tissue.

VasCure allows the body to regenerate healthy, site-specific tissue by employing the body's inherent ability to heal itself.[3,4]

SIS ECM is more resistant to infection than synthetic material[5]

SIS ECM material minimizes bleeding at suture lines[6]



6-Ply material offers high suture retention strength, probe burst strength, and tensile strength.[2]

SIS ECM remodels into healthy site-specific tissue[3,4]

Product catalog can be found at the end of this brochure.
For more information go to www.Aziyo.com.

Histology Confirms Integration of SIS ECM at Femoral Artery Endarterectomy Site[4]

A 55-year-old male underwent right common femoral artery (CFA) endarterectomy with patch angioplasty using a SIS ECM patch (VasCure for Vascular Repair) (Figure 1) with no subsequent adverse events. Due to disease progression, an additional operation was performed at a distal adjacent site 16 months later.

The previously placed SIS ECM patch in the right CFA was found to be grossly indistinguishable from the surrounding endarterectomy site arterial tissue.

The previously implanted patch could only be identified by the presence of the sutures used for the initial repair, demonstrating the regenerative potential of SIS ECM when used in patch angioplasty (Figure 2). An additional endarterectomy and vascular reconstruction were performed with another SIS ECM patch, extending the previous patch. Non-invasive follow-up testing confirmed the patient did well. The patient again developed disabling symptoms and presented with further progression of distal disease nineteen months after the initial procedure. A month later, a right femoral-to-above-knee popliteal artery bypass was performed using a prosthetic conduit.

At the time of this surgery, both previously placed SIS ECM patches were indistinguishable from the surrounding vascular tissue and could only be identified by the perimeter polypropylene sutures used to implant the patches (Figure 3).

The second patch used was also visually indistinguishable from the rest of the vessel walls. A tissue specimen including the anastomosis between the first patch and the previous endarterectomized vessel was removed and sent for evaluation by an independent laboratory. **Analysis of the specimen showed the area of the patch to be histologically identical to the adjacent endarterectomized vascular tissue, with no evidence of inflammation or degeneration in any areas of the patch.** Post-operatively, the patient had normal non-invasive testing and complete resolution of their lower extremity discomfort.

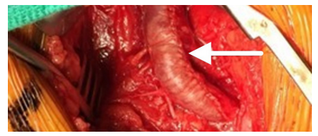
> **"Synthetic materials, such as polyethylene terephthalate (Dacron®) or polytetrafluoroethylene (PTFE), are ready to use and have a long shelf-life, have high biomechanical strength, but do not mimic the native vasculature, and stimulate a foreign body response on implantation which can lead to post-operative complications due to chronic inflammation, lack of remodeling, limited compliance, and poor resistance to infection."**
>
> —Allen K, et al. *Front Cardiovasc Med.* 2021 Feb 11;8:631750.

Results from case studies are not predictive of results in other cases. Results in other cases may vary.

1. Aziyo Biologics, Inc., VasCure for Vascular Repair Instructions for Use.
2. Data on file at Aziyo Biologics, Inc.
3. Piterina A, et al. *Int J Mol Sci.* 2009 Nov 20;10(10):4375-417.
4. Allen K, et al. *Front Cardiovasc Med.* 2021 Feb 11;8:631750.
5. Brennan E, et al. *Tissue Eng.* 2006 Oct;12(10):2949-55.
6. Sundermann S, et al. *Interact Cardiovasc Thorac Surg.* 2015 Jan;20(1):10-4.

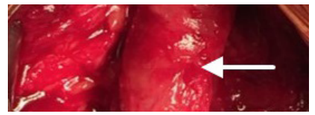
Article: Extracellular Matrix Patches for Endarterectomy Repair

Figure 1:



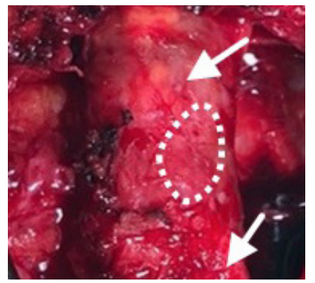
Initial patch angioplasty of the right CFA artery using an SIS ECM patch (arrow) following endarterectomy.

Figure 2:



After 16 months, the SIS ECM patch previously placed in the right CFA (arrow) was found to be completely incorporated into native vasular tissue.

Figure 3:



Following progression of distal disease 20 months after the index procedure, a third operation was performed with creation of a right femoral to above-knee popliteal artery bypass. At this time, the two previous SIS ECM patches in the common femoral artery appeared to be completely incorporated into the native femoral system (arrows). A specimen, including the anastomosis between the patch and the endarterectomized artery, was removed for histologic evaluation (dashed line).

VasCure® VR

Product Catalog.

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CMCV-009-XLG	CanGaroo® Envelope, XL	Single
CMCV-009-XXL	CanGaroo® Envelope, XXL (Sub-Q)	Single
CMCV-010-SML	CanGaroo® Envelope, S	5-Pack
CMCV-010-MED	CanGaroo® Envelope, M	5-Pack
CMCV-010-LRG	CanGaroo® Envelope, L	5-Pack
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CMCV-004-404	4x7cm	5-Pack

Tyke for Cardiovascular Repair: Ordering Information

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CMCV-099-204	4x7cm	5-Pack

VasCure for Vascular Repair: Ordering Information

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