

Human iPS cells on laminin-511 E8
stained for ZO-1, Beta-Actin and DAPI
(for more details see P.5)

⦿ STEM CELLS

iMATRIX RECOMBINANT HUMAN LAMININ E8 FRAGMENTS

E8 FRAGMENTS |
CELL CULTURE SUBSTRATE |
FEEDER FREE CELL CULTURE

INTRODUCTION

THE RECOMBINANT LAMININ iMATRIX SERIES

Enhance the efficiency of your stem cell workflows with iMatrix, a range of recombinant laminin E8 fragments that provide defined, xeno-free substrates tailored to support specific cell types and lineage outcomes.

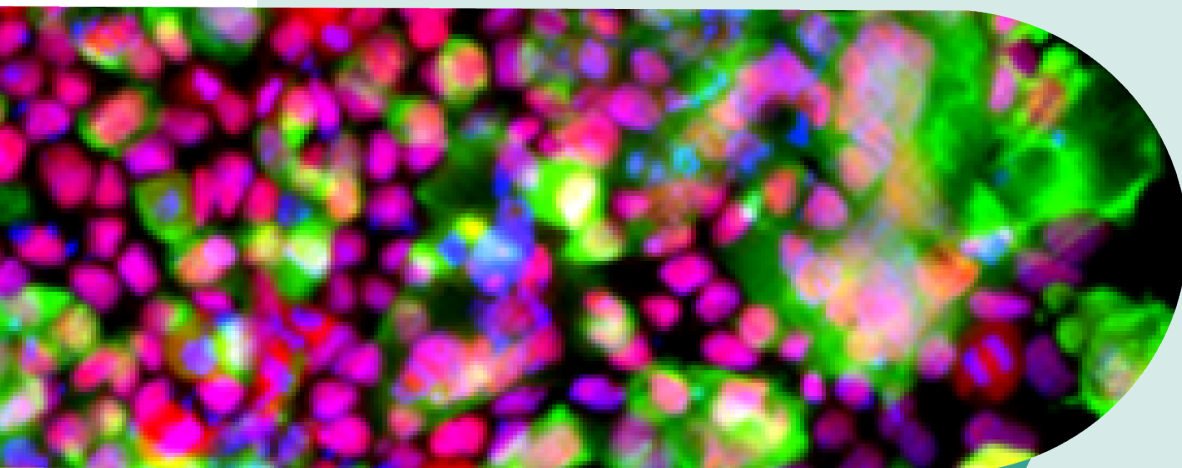
Each iMatrix isoform offers consistent, biologically relevant control over key cellular behaviors, including adhesion, proliferation, and differentiation by mimicking the extracellular matrix signals that cells experience in vivo.

iMatrix substrates remove the variability of many traditional ECMs, such as Matrigel™, and enable reliable performance across a wide range of applications, from supporting pluripotent stem cell culture maintenance to endothelial, epithelial, and muscle cell growth and differentiation.

Amsbio's iMatrix series includes highly purified, recombinant E8 fragments of laminin-511, -111, -221, -332, and -411.

All iMatrix products:

- are supplied in 175 µg vials
- have a long shelf life
- are supplied ready to use
- do not require freezing
- are stable at 2–10 °C
- are optimized for PSCs, neural models, endothelial cultures, and more
- offer consistent coating efficiency
- are fully defined & quality controlled
- are xeno-free



COVID-19 infection model: iPS cells grown on iMatrix-511 in StemFit® medium, after cryopreservation in STEM CELLBANKER®. Green: viral protein, Red: OCT3/4. Image courtesy of Kazuo Takayama (CiRA, Kyoto University, Japan)

TABLE OF CONTENTS

EXPANSION AND MAINTENANCE

1. iMATRIX-511 FAMILY

1.1 iMATRIX-511:

For maintenance and expansion of pluripotent stem cells

1.2 iMATRIX-511 Silk:

Expressed in silkworm for sustainability

1.3 iMATRIX-511 MG:

For clinical applications

EXPANSION, MAINTENANCE AND DIFFERENTIATION ALL-IN-ONE

2. iMATRIX-PALETTE :

All five laminin isoforms in one box

DIFFERENTIATION

3. iMATRIX-111:

Versatile isoform - published for hepatocyte differentiation

4. iMATRIX-221:

For differentiation and maintenance of cardiomyocytes

5. iMATRIX-332:

For differentiation into corneal and epithelial cells

6. iMATRIX-411:

For differentiation into vascular endothelial cells

7. STEM CELL SYNERGY

Integrated products for all phases of your research and manufacture

HOW IT WORKS

Laminin is an extracellular matrix protein which functions as an adhesion substrate for various cell types.

The laminin molecule consists of three chains (α , β , and γ) and interacts with cell membrane

receptor integrins via the E8 region, which is the

smallest integrin binding component.

Each chain can be found in different forms, which combine to make up the various isoforms of laminin.

The α chain mainly determines the function of the laminin - particularly its effects on cell

behaviour and cell fate. The type of laminin present changes during the differentiation process of cells. It is therefore possible to efficiently induce differentiation of pluripotent stem cells, by utilising different

combinations of laminin and cells for in vitro cell culture.

1. iMATRIX-511 FAMILY

DEFINED, XENO-FREE MATRICES FOR HPSC MAINTENANCE & TRANSLATION

The iMatrix-511 series is our flagship platform for robust, feeder-free culture of human pluripotent stem cells. Built around the recombinant E8 fragment of laminin-511, it offers full integrin-binding activity in a defined, xeno-free format. From basic research to clinical development, there's an iMatrix-511 solution for every stage.

iMATRIX-511
Research-grade E8 fragment for routine maintenance, single-cell passaging, and long-term expansion of hESCs and hiPSCs.

iMATRIX-511 Silk
Sustainable E8 fragment from silkworm cocoons for scalable, cost-effective production without performance loss

iMATRIX-511 MG
GMP-compatible E8 fragment, produced under strict PMDA-compliant quality controls, for clinical and regulatory use.

PRODUCT	iMATRIX-511	iMATRIX-511 Silk	iMATRIX-511 MG
Product Grade	Research Use Only	Research Use Only	Clinical Applications
MTA Required	No	No	Yes
Material Eligibility for Products for Regenerative Medicine	-	-	Acquired*
Production Method	CHO-S Cells	Silkworm Cocoon	CHO-S Cells
MCB/WCB/CAL Virus-Free Confirmation	Performed	-	Performed
Virus-Free Testing for Unrefined Bulk for Each Lot	-	-	Performed
Virus Removal Filtering in Manufacturing Process	-	-	Yes
Manufacturing Process Virus Clearance Test	-	-	Performed

** iMatrix-511MG is a GMP compatible and GMP adaptable resource, and meets the Standards of Biological Ingredients set by the Pharmaceutical and Medical Devices Agency (PMDA); the Japanese equivalent of the FDA. Their regulation is one of the strictest in the world and iMatrix-511MG not only fulfils their regulatory requirements, but it has since been used for a number of high-profile clinical applications in Japan.*

1.1 iMATRIX-511

MAINTENANCE AND EXPANSION OF PLURIPOTENT STEM CELLS



iMatrix-511 contains the highly purified, recombinant E8 fragment of human laminin-511, a laminin isoform involved in early embryonic development and widely used to support pluripotent stem cell (PSC) culture. The E8 fragment retains full integrin-binding capacity, enabling more efficient attachment and signaling than the full-length protein, while also being easier to produce and standardize.

Laminin-511 ($\alpha5\beta1\gamma1$) interacts with integrins such as $\alpha3\beta1$, $\alpha6\beta1$, and $\alpha6\beta4$, promoting robust adhesion, survival, and maintenance of human embryonic and induced pluripotent stem cells in feeder-free systems.

KEY BENEFITS:

- Enables feeder-free culture of hPSCs
- Superior adhesion compared to full-length laminin, vitronectin, or Matrigel®
- Supports single-cell passaging while preserving karyotype and stem cell marker expression, even after 10 passages
- No need for plate coating steps
- Ideal for achieving long-term extended cultures of hPSCs

This makes iMatrix-511 an ideal platform for stable PSC maintenance, scale-up, and downstream differentiation workflows.

PRODUCT TABLE		
RECOMBINANT LAMININ iMATRIX-511	350 ug (2 x 175 ug tubes) 1050 ug (6 x 175 ug tubes)	AMS.892-011 AMS.892-012

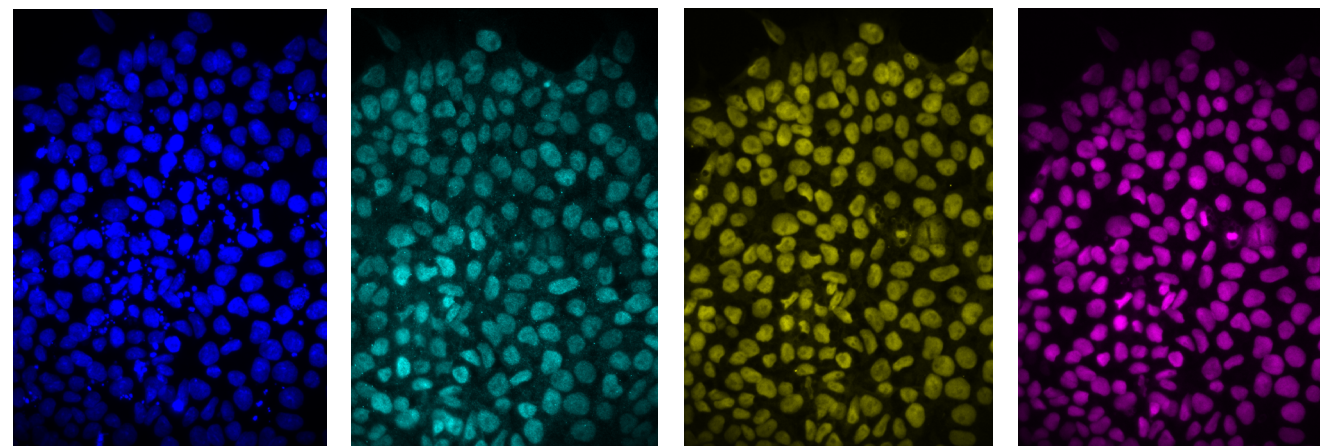
1.2 iMATRIX-511 Silk

FOR SUSTAINABILITY



iMatrix-511 Silk is a high-performance, recombinant E8 fragment of laminin-511 ($\alpha5\beta1\gamma1$), specifically engineered for the maintenance and expansion of human pluripotent stem cells. Like the original iMatrix-511, it supports robust adhesion, single-cell passaging, and long-term culture, preserving stem cell identity over multiple passages.

What sets iMatrix-511 Silk apart is its unique production using transgenic silkworm cocoons, providing a cost-effective, sustainable alternative to CHO-based methods, without losing biological activity or integrin-binding affinity. It matches iMatrix-511 in supporting feeder-free hPSC growth, stemness, and karyotypic stability, with a scalable, eco-friendly production ideal for routine and advanced cell culture.



Pig embryonic disc stem cells grown on iMatrix-511 Silk and stained for DAPI and pluripotency markers. Courtesy of Ramiro Alberio, University of Nottingham, UK.

PRODUCT TABLE

RECOMBINANT LAMININ iMATRIX-511 Silk	1050 ug (6 x 175 ug tubes)	AMS.892-021
--------------------------------------	----------------------------	-------------

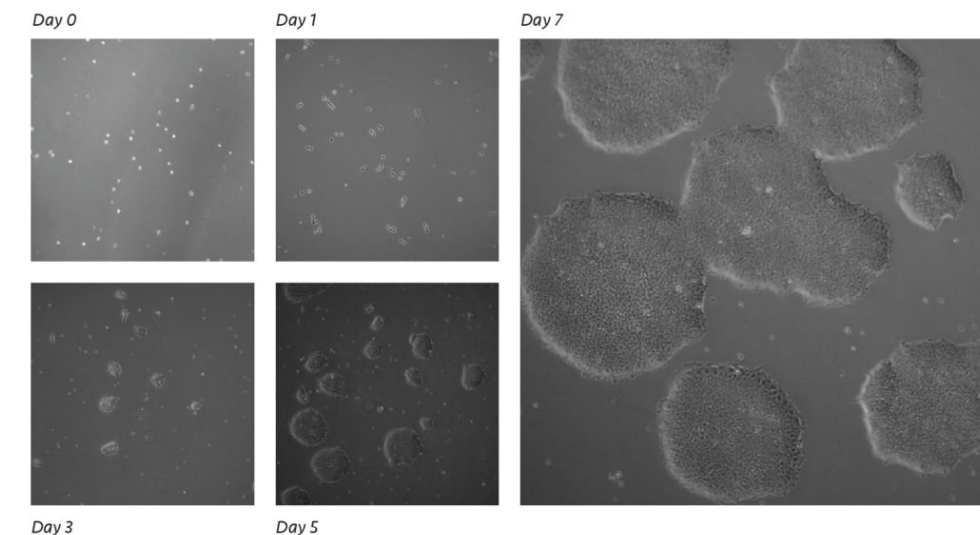
1.3 iMATRIX-511 MG

FOR CLINICAL APPLICATIONS



iMatrix-511 MG is a GMP-compatible recombinant E8 fragment of human laminin-511, specifically developed for the expansion and maintenance of hPSCs in workflows that require compliance with clinical and regulatory standards. It is produced using the same CHO-S expression system as research-grade iMatrix-511, ensuring consistent performance with elevated quality controls.

Highly purified and manufactured under rigorous conditions, iMatrix-511 MG complies with the stringent standards of Japan's Pharmaceuticals and Medical Devices Agency (PMDA), one of the most exacting global regulatory bodies. Its proven track record in clinical-stage research and regenerative medicine trials makes it ideal for researchers aiming to transition from bench to bedside.



Colony Morphology of human iPS cells 201B7 over 7 days culture on iMatrix-511 MG

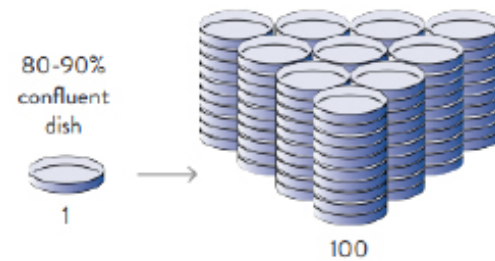
PRODUCT TABLE

RECOMBINANT LAMININ iMATRIX-511 MG	1050 ug (6 x 175 ug tubes)	AMS.892-005
------------------------------------	----------------------------	-------------

1.3 iMATRIX-511 PROVEN PERFORMANCE

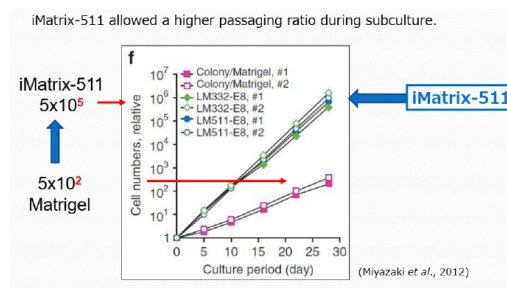
1. MAXIMISE PRODUCTIVITY IN FEEDER-FREE CULTURE

Human pluripotent stem cells (hESCs and hiPSCs) were successfully expanded under feeder-free conditions using iMatrix-511. Doubling times and fold changes per passage confirmed consistent proliferation across multiple passages. For tips on single-cell cloning with iMatrix-511, see our StemFit Technical Tips 1 online.



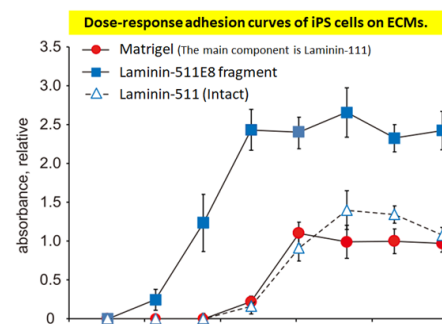
2. SUPERIOR EXPANSION EFFICIENCY

hESCs and hiPSCs cultured long-term on iMatrix-511 demonstrated over 200-fold expansion within 30 days, outperforming conventional colony-based methods. Initial cell counts were normalized to 1; cumulative counts are shown per passage. Graph shows total expansion over time.



3. STRONGER ADHESION = BETTER OUTCOMES

hiPSCs exhibited significantly stronger adhesion to the Laminin-511 E8 fragment than to full-length Laminin-511. Cell attachment (OD570) was measured and normalized to Matrigel® (set at 1), showing E8 as the highest-performing substrate. Graph compares relative cell adhesion to various substrates.



2. iMATRIX-PALETTE

EXPLORE INTEGRIN-SPECIFIC CELL BEHAVIOR WITH 5 LAMININ ISOFORMS



You can find detailed information and ordering options for each iMatrix isoform on the following pages.

The iMatrix-Palette is a versatile research kit that includes six highly purified recombinant human laminin E8 fragments:

- **iMatrix-511:** for maintenance and expansion of pluripotent stem cells
- **iMatrix-511 Silk:** for maintenance and expansion of pluripotent stem cells, made from transgenic silkworms instead of CHO-S cells
- **iMatrix-111:** versatile application, validated for differentiation into hepatocyte cells
- **iMatrix-221:** for differentiation and maintenance of cardiomyocytes
- **iMatrix-332:** for differentiation into corneal and epithelial cells
- **iMatrix-411:** for differentiation into vascular endothelial cells

iMatrix-Palette E8 fragments replicate the integrin-binding profiles of full-length laminins, enabling cell-specific studies in a defined, xeno-free format. Ideal for stem cell biology, tissue engineering, and regenerative medicine, it offers a modular approach to ECM-based culture design.

USE iMATRIX-PALETTE TO:

- Investigate the effect of different laminin isoforms on stem cell adhesion, expansion, and differentiation
- Identify the optimal substrate for lineage-specific differentiation or maintenance
- Find cell-matrix preferences across pluripotent, epithelial, neural, endothelial, corneal and muscle cell types and more!

PRODUCT TABLE

iMATRIX-PALETTE

6 vials x 175 µg

AMS.892-091

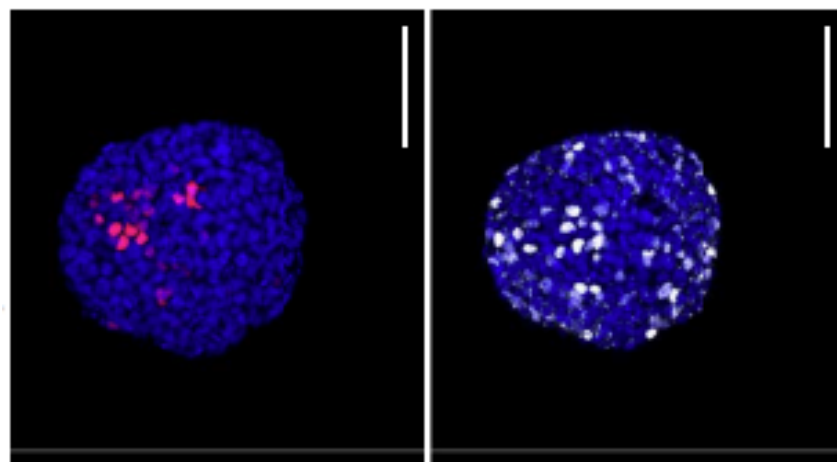
3. iMATRIX-111

**VERSATILE ISOFORM;
PUBLISHED FOR
HEPATIC
DIFFERENTIATION**



iMatrix-111 is a recombinant, highly purified E8 fragment of human laminin-111, the same isoform that forms a major structural component of widely used ECM substrates like Matrigel® and Cultrex® BME. Unlike these animal-derived products, iMatrix-111 offers a defined, xeno-free alternative that ensures greater consistency and control in stem cell culture and differentiation workflows.

Laminin-111 ($\alpha 1\beta 1\gamma 1$) plays a vital role in embryonic development by regulating cell adhesion and maintaining pluripotency through interactions with integrins such as $\alpha 1\beta 1$, $\alpha 3\beta 1$, and $\alpha 6\beta 1$. It also contributes to nerve axon growth and liver development, particularly through integrin $\alpha 7X2\beta 1$. Its involvement in maintaining liver tissue structure and function makes it especially relevant for hepatocyte-focused applications.



Immunostaining of Embryoid Bodies grown on iMatrix-111. Brachyury (red), Otx2 (white), DAPI (blue). Source: Makhlof et al., *Sci. Adv.* 10, eadk2252 (2024) under Creative Commons CC BY 4.0.

PRODUCT TABLE

RECOMBINANT LAMININ iMATRIX-111	350 ug (2 x 175 ug tubes) 1050 ug (6 x 175 ug tubes)	AMS.892-071 AMS.892-072
---------------------------------	---	----------------------------

4. iMATRIX-221

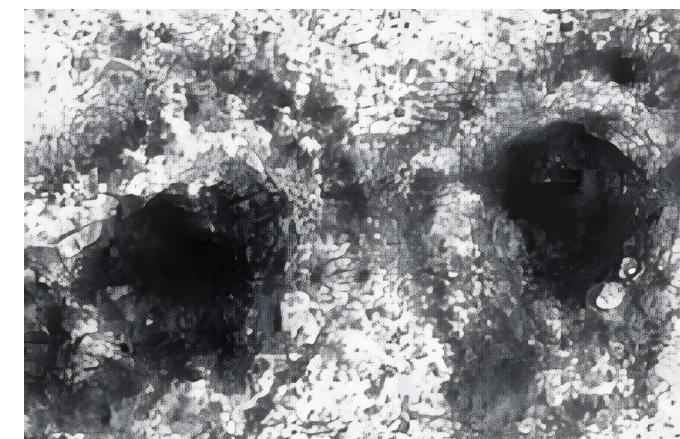
**SUPPORT
DIFFERENTIATION
AND MAINTENANCE
OF CARDIOMYOCYTES**



iMatrix-221 is a recombinant E8 fragment of human laminin-221, a laminin isoform abundantly expressed in the basement membrane of cardiac and skeletal muscle tissues. By providing a defined, xeno-free substrate with high adhesion activity, iMatrix-221 offers an ideal microenvironment for the culture of muscle-derived cells.

Laminin-221 ($\alpha 2\beta 2\gamma 1$) interacts specifically with integrin $\alpha 7X2\beta 1$, a protein predominantly expressed in muscle tissue, and plays a key role in the differentiation and long-term functional maintenance of cardiomyocytes and skeletal muscle cells.

iMatrix-221 creates a supportive in vitro environment that, with directed differentiation, promotes selective adhesion and differentiation of hPSC-derived cardiomyocytes, enabling controlled generation of functional muscle cultures.



Differentiated cardiomyocytes cultured on iMatrix-221.

PRODUCT TABLE

RECOMBINANT LAMININ iMATRIX-221	350 ug (2 x 175 ug tubes) 1050 ug (6 x 175 ug tubes)	AMS.892-061 AMS.892-062
---------------------------------	---	----------------------------

Figure: Human iPS cells on laminin-511 E8 (coated laminin concentration 0.4 mg/(micrograms)/cm²): ZO-1, Beta-Actin and Objective lens: X40

5. iMATRIX-332

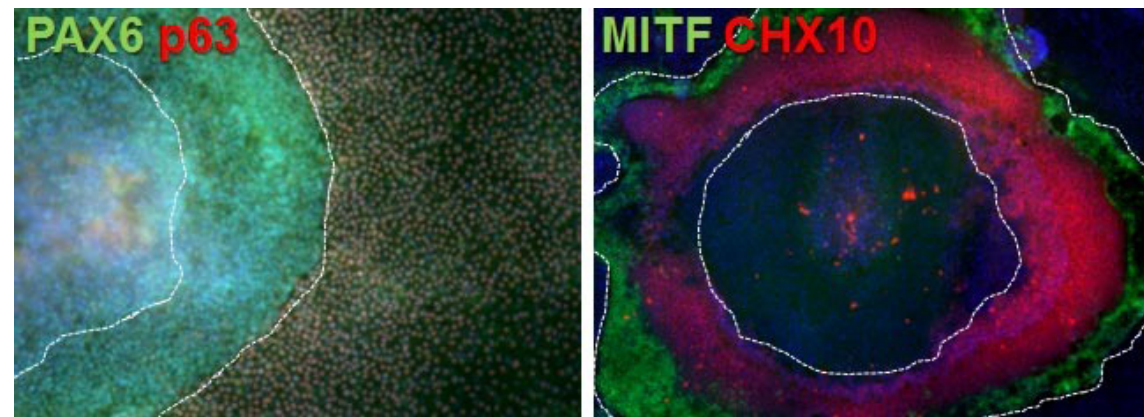
FOR DIFFERENTIATION INTO CORNEAL AND EPITHELIAL CELLS



iMatrix-332 is a recombinant E8 fragment of human laminin-332, a key isoform involved in epithelial cell adhesion, tissue integrity, wound healing, and development. As a defined, xeno-free substrate, it offers a consistent and biologically relevant surface for differentiating hPSCs into epithelial lineages, with specific validation in corneal epithelial cells.

Laminin-332 ($\alpha3\beta3\gamma2$) is naturally expressed in keratinocytes and the corneal epithelium, where it binds integrins $\alpha3\beta1$ and $\alpha6\beta4$ to anchor epithelial cells to the basement membrane. This interaction is essential for maintaining tissue structure, barrier function, and cellular stability.

In vitro, iMatrix-332 supports hPSC differentiation into epithelial lineages by mimicking native ECM cues from the eye, skin, hair follicles, oral cavity, lungs, glands, and gastrointestinal and urinary tracts.



Generation of self-formed ectodermal autonomous multi-zone (SEAM) of ocular cells from human induced pluripotent stem cells. The concentric SEAM mimics whole-eye development because cell location within different zones is indicative of lineage, spanning the ocular surface ectoderm, lens, neuro-retina, and retinal pigment epithelium. (Image courtesy of Prof. Ryuhei Hayashi, Osaka University, Japan.)

PRODUCT TABLE

RECOMBINANT LAMININ iMATRIX-332	350 ug (2 x 175 ug tubes) 1050 ug (6 x 175 ug tubes)	AMS.892-031 AMS.892-032
---------------------------------	---	----------------------------

6. iMATRIX-411

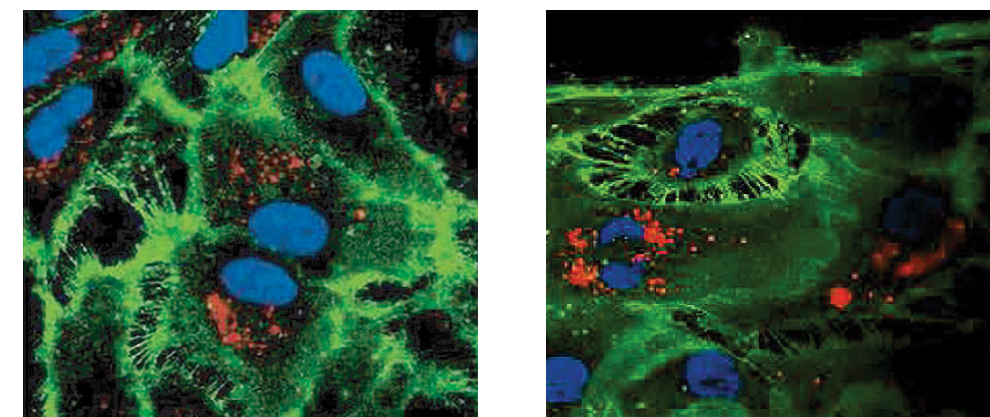
GUIDE EFFICIENT DIFFERENTIATION INTO VASCULAR ENDOTHELIAL CELLS



iMatrix-411 is a recombinant E8 fragment of human laminin-411, a key laminin isoform that lines the basement membranes of blood vessels. It plays a role in vascular biology by interacting with integrin $\alpha6\beta1$ on the surface of endothelial cells, supporting both vascular homeostasis and development of new blood vessel structures. In addition, it is also known to adhere to leukocytes and platelets, important for the immune system.

Laminin-411 ($\alpha4\beta1\gamma1$) has been shown to promote differentiation of hPSCs into vascular endothelial cells. The iMatrix-411 E8 fragment retains full integrin-binding activity while excluding regions responsible for binding other extracellular matrix components, resulting in enhanced specificity.

Produced in CHO-S cells and highly purified, iMatrix-411 is a defined, xeno-free substrate that supports feeder-free, consistent culture of endothelial progenitors and vascular or biliary differentiation from pluripotent stem cells.



Left - endothelial cells derived from human ES cell line KhES-1; Right - endothelial cells from human iPSC cell line 253G4. The presence of endothelial cells is marked by acetyl-LDL uptake (red), CD31 (green) expression, and nuclear staining (blue). Images courtesy of Ohta R et al., Scientific reports 6(35680), 1-12, 2016.

PRODUCT TABLE

RECOMBINANT LAMININ iMATRIX-411	350 ug (2 x 175 ug tubes) 1050 ug (6 x 175 ug tubes)	AMS.892-041 AMS.892-042
---------------------------------	---	----------------------------

7. STEM CELL SYNERGY

Amsbio's Stem Cell Synergy offers an integrated suite of sourcing, culture, storage, differentiation, and GMP manufacturing tools, enabling seamless bench-to-bedside workflows and ensuring reliable, high-quality results at every phase of your stem cell research.



SOURCE

Access fresh tissues, cell lines, and custom iPSC generation from our ethically sourced biorepository. Our reprogramming kits and collagenase-based isolation reagents ensure high-quality, batch-consistent material for every project.



GROW AND STORE

Our feeder-free, animal-free, chemically-defined media (e.g., StemFit®) deliver superior expansion rates while maintaining genetic stability. For long-term preservation, STEM-CELLBANKER® offers high-viability, GMP-grade cryopreservation optimized for clinical use.



DIFFERENTIATE

Our curated differentiation portfolio, comprising essential growth factors, extracellular matrices (e.g., iMatrix®), and streamlined kits, works together to produce consistent lineage-specific outcomes, letting you focus on downstream analyses.



MANUFACTURE

Transition to GMP manufacturing with our complete suite of regulatory-compliant reagents, covering sourcing, culture, differentiation, and storage, alongside a dedicated GMP guide to support ATMP production every step of the way.

FOUNDATIONAL CITATIONS

- Miyazaki, T., et al (2012). Nature communications, 3(1), 1236.
- Nakagawa, M., Yamanaka, S., et al (2014). Scientific Reports, 4(1), 3594.
- Miyazaki, T., et al (2017) Scientific reports, 7(1), 41165 for coating-free adhesion
- Tanosaki, S., Akiyama, T., Tohyama, S. et al (2022). STAR Protocols, 3(2), 101360. Cites iMatrix-511, iMatrix-221 and StemFit® Basic03 culture medium
- Hwang, Y. S., Suzuki, S., Sasaki, K. et al (2020). Nature Communications, 11(1), 1-17. Cites iMatrix-511 Silk with StemFit® Basic04 medium, with cell collection in CELLOTION® and cryopreservation in CELLBANKER® I
- Aoki, H., Yamashita, M., Matsunaga, T. et al (2020). Fluids And Barriers Of The CNS, 17(1). Cites iMatrix-221, iMatrix-411 and iMatrix-511
- Ohta, R., Niwa, A., Saiko, M et al (2016). Scientific Reports, 6(1). Cites iMatrix-511 and iMatrix-411

iMATRIX-511

- Neumayer, G. et al (2024). Nature Communications,15(1). Cites: iMatrix-511 with StemFit® Basic03
- Sanaki-Matsumiya, M., Trivedi, V., Ebisuya, M., et al (2022)Tanosaki, S., Akiyama, T., Kanaami et al (2022). STAR Protocols, 3(2), 101360. Cites iMatrix-511, iMatrix-221 and StemFit® Basic03 culture medium
- Hwang, Y. S., Suzuki, S., Seita, Y. et al (2020). Nature Communications, 11(1), 1-17. Cites iMatrix-511 Silk with StemFit® Basic04 medium, with cell collection in CELLOTION and cryopreservation in CELLBANKER I
- Kawase, E., Takada, K., & Suemori, H. (2020). Stem Cell Research, 49, 102020. Citing iMatrix-511 MG (Matrixome/Nippi, Japan), StemFit Basic03 and AMS.FGF-100
- Hiram, Yasuhiko, et al. "Safety and stable survival of stem-cell-derived retinal organoid for 2 years in patients with retinitis pigmentosa." Cell Stem Cell 30.12 (2023): 1585-1596. Citing iMatrix-511 MG (Matrixome/Nippi, Japan), StemFit Basic03 and AMS. FGF-100 (as AK03N, Ajinomoto, Japan)

iMATRIX-111

- Takayama K, Sekiguchi K, Mizuguchi H. et al (2017). Hepatol Commun. 12;1(10):1058-1069. Cites iMatrix-111.
- Makhlof, A., Rosa, V. S., & Shahbazi, M. N. et al (2024). Science Advances, 10(36), eadk2252. Cites iMatrix-111.

iMATRIX-221

- Tanosaki, S., Fukuda, K., & Tohyama, S. et al (2022). STAR Protocols, 3(2), 101360. Cites iMatrix-511, iMatrix-221 and StemFit® Basic03 culture medium
- Kihara, Y., Nagata, S., & Yamato, M. et al (2022). Regenerative Therapy, 20, 147-156. Cites iMatrix-221
- Aoki, H., Iwao, T., & Matsunaga, T. et al (2020). Fluids And Barriers Of The CNS, 17(1). Cites iMatrix-221, iMatrix-411 and iMatrix-511

iMATRIX-322

- Shibata S, Sekiguchi K, Nishida K. et al (2020). Stem Cell Reports 14;14(4):663-676. Cites iMatrix-221, 332, 411, 511.

iMATRIX-411

- Takayama K et al., Laminin 411 and 511 promote the cholangiocyte differentiation of human induced pluripotent stem cells. Biochemical and biophysical research communications, 474 (1), 91-96, 2016
- Ohta R et al., Laminin-guided highly efficient endothelial commitment from human pluripotent stem cells. Scientific Reports, 6(35680), 1-12, 2016



LET US
ACCELERATE
YOUR
DISCOVERY



NEED SOMETHING FURTHER?



BIOSPECIMENS

Enhancing the development of specimens that are reliable, relevant, and reproducible.



3D CELL CULTURE:

Aiding in the creation of cultures that are relevant, robust and reproducible.



STEM CELLS

Extensive range of ready-to-use and custom kits for drug discovery and biomedical research.



KITS AND ASSAYS:

Extensive range of ready-to-use and custom kits for drug discovery and biomedical research.



GLYCOBIOLOGY:

Specialized products and expertise in glycobiology research, vital for cellular biology and drug discovery.



CUSTOM SERVICES:

Comprehensive suite of customizable services for advanced research and clinical applications.



AMS BIOTECHNOLOGY (EUROPE) LTD
UK & REST OF THE WORLD
184 Park Drive, Milton Park
Abingdon, OX14 4SE
T: +44 (0) 1235 828 200
F: +44 (0) 1235 820 482



AMS BIO LLC
USA & CANADA
1035 Cambridge Street,
Cambridge, MA 02141
T: +1 (617) 945-5033 or
+1 (800) 987-0985
F: +1 (617) 945-8218



AMS BIOTECHNOLOGY (EUROPE) LTD
SWITZERLAND
Via Lisano 3, (Cp.683)
Ch-6900 Messagno
T: +41 (0) 91 604 55 22
F: +41 (0) 91 605 17 85



AMS BIO EUROPE BV
EU
Berenkoog 41,
1822 BH Alkmaar,
Netherlands
T: +31 (0) 72 8080244
F: +31 (0) 72 8080142