

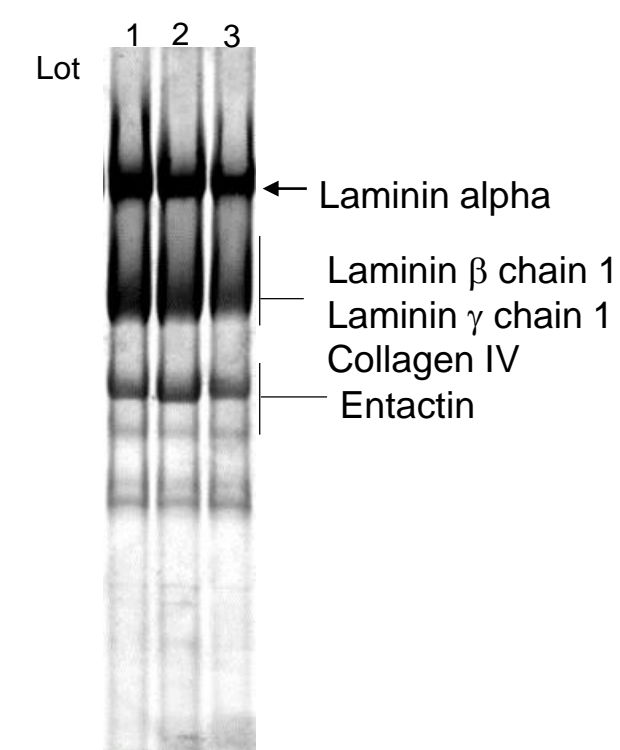
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INTRODUCTION

Organoid and stem cell-derived culture systems are evolving and enhancing our basic understanding of developmental biology and improving the predictability of *in vitro* disease modeling and drug screening. The quality and consistency of the adhesion matrix substrates, such as mouse EHS tumor basement membrane extracts (BME), used to embed organoids and expand pluripotent stem cells can greatly impact model variability. This study describes an advanced BME designed to address current shortfalls of existing EHS-derived matrices.

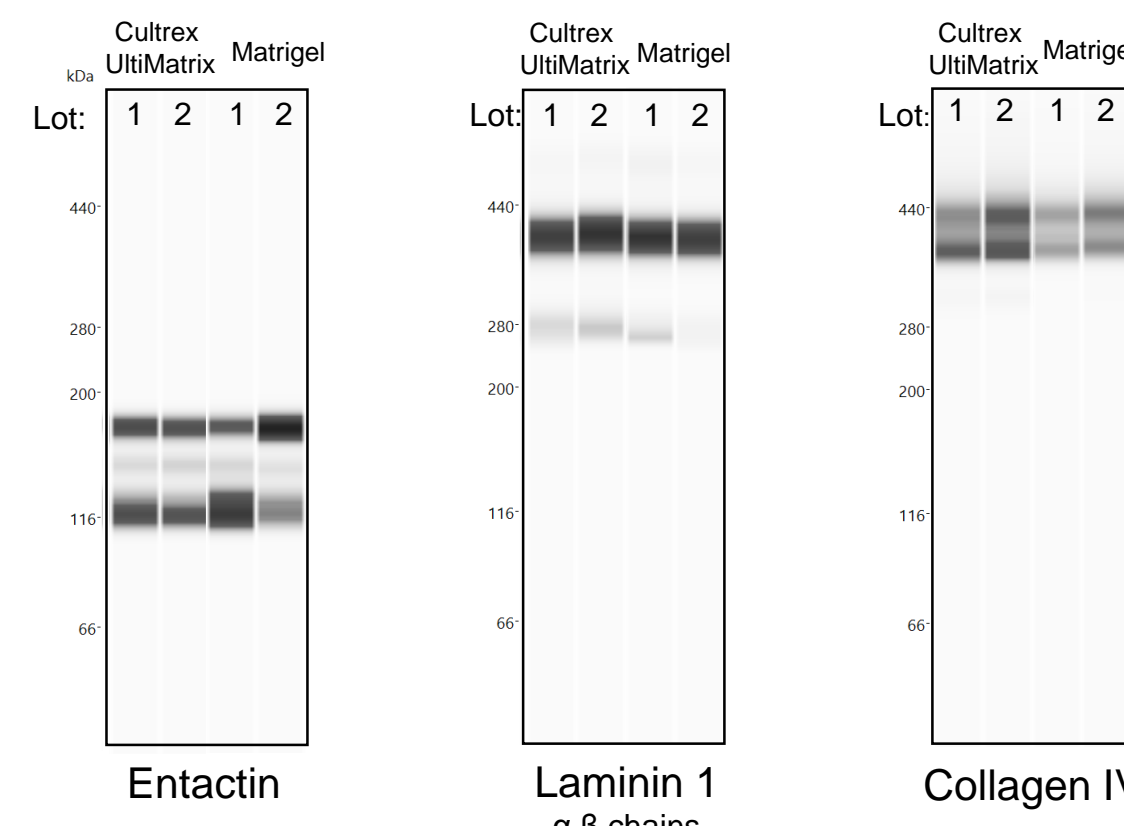
Cultrex™ UltiMatrix Reduced Growth Factor (RGF) BME is a soluble form of basement membrane that provides high tensile strength, enhanced levels of entactin/nidogen, elevated protein concentration, and robust clarity and purity. These compositional enhancements translate into substantial performance benefits that make Cultrex UltiMatrix RGF BME an ideal cell scaffolding matrix for stem cell and organoid cell culture.

OPTIMIZED ECM COMPOSITION FOR 3D CELL CULTURE

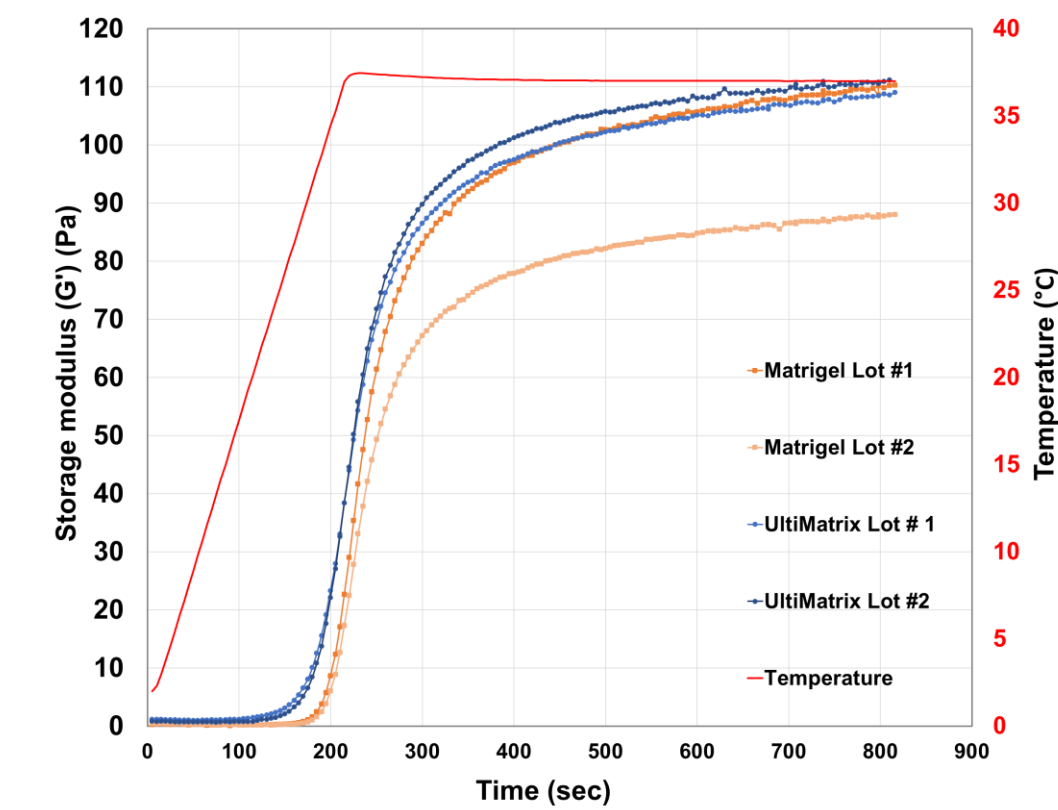


ECM Composition	
Laminins	38.8%
Collagen	44.6%
Entactin	13.3%

Cultrex UltiMatrix BME Contains consistent Entactin Levels. Western blot of three **Cultrex UltiMatrix BME** lots show its consistent extracellular matrix protein composition. Cultrex UltiMatrix features a high (~13%) percentage of entactin, a critical cross-linking protein that correlates with matrix stiffness.

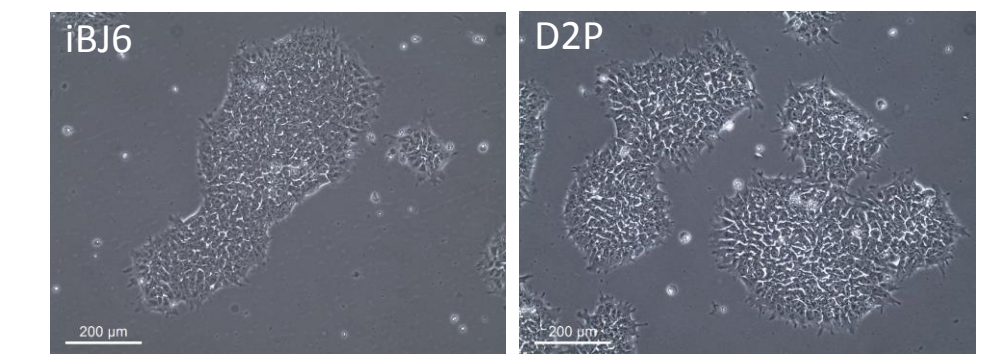


Consistent Lot-to-Lot ECM Composition. Simple Western analysis for Entactin, Laminin, and Collagen IV across two lots of both Cultrex UltiMatrix BME and Corning® Matrigel® Matrix (Matrigel). Cultrex UltiMatrix BME shows consistent expression of entactin, compared to Matrigel.

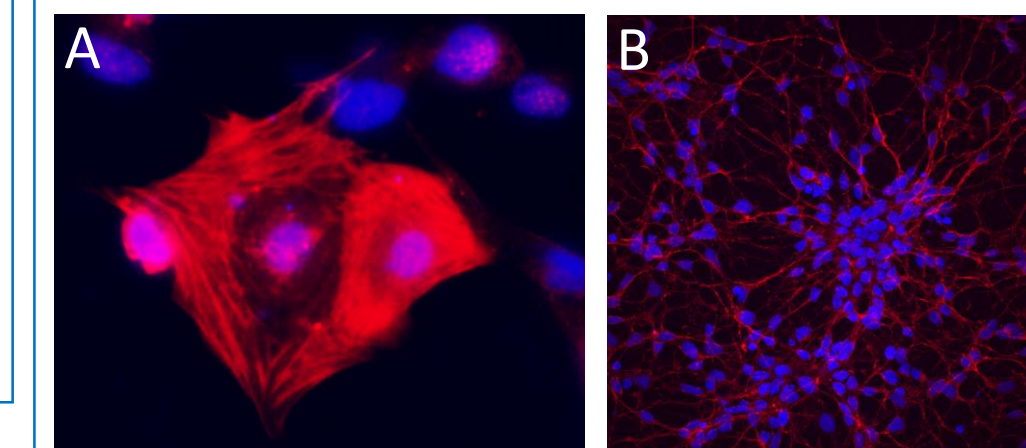


Cultrex UltiMatrix BME Displays Optimized Tensile Strength 3D Culture Applications. Cultrex UltiMatrix BME displays consistent similar gelling rates and high tensile strength (storage modulus) compared to Matrigel.

SUPPORTS iPSC CULTURE WORKFLOWS

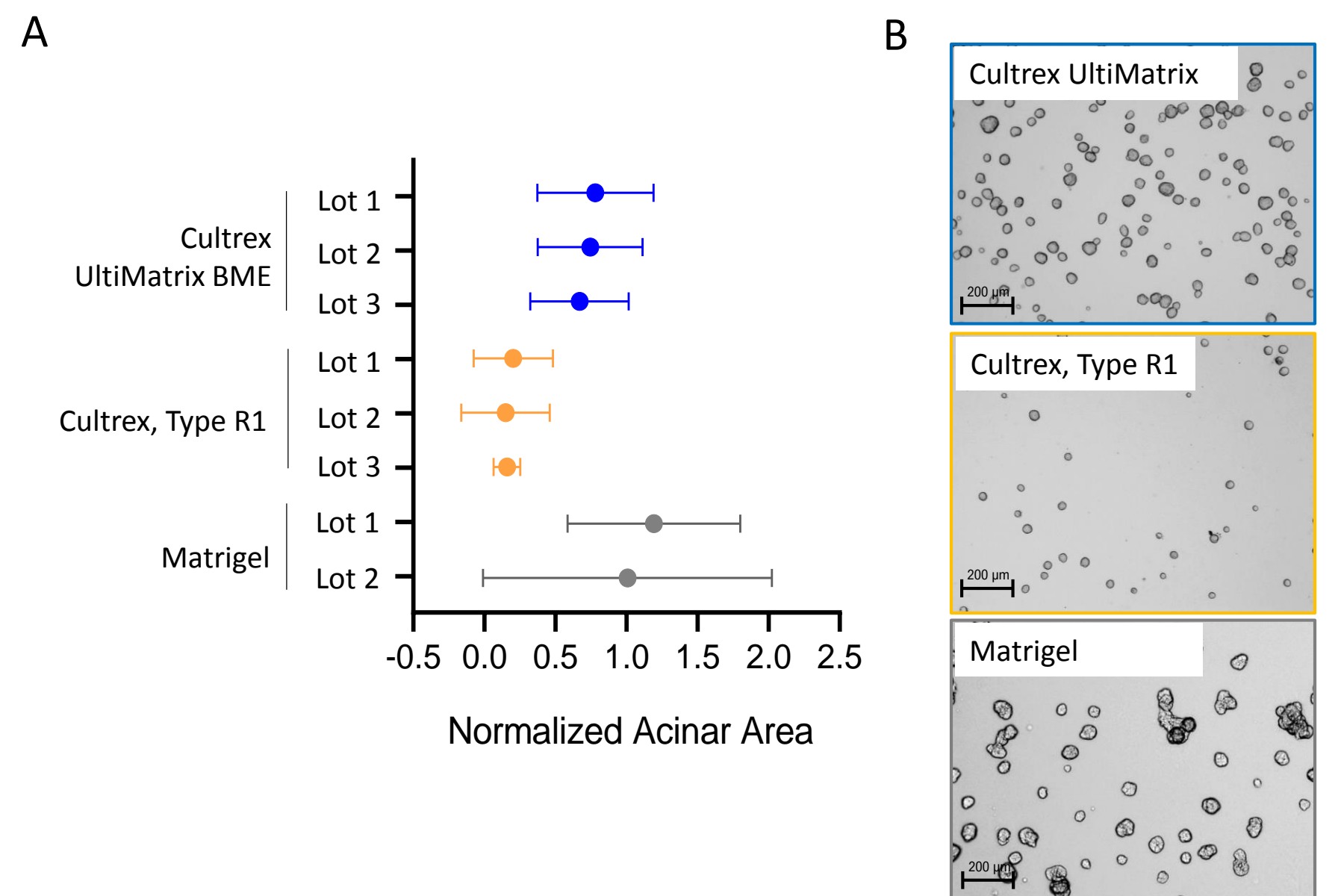


iPSC Expansion on Cultrex UltiMatrix BME. Images of iBJ6 (passage 7) and D2P (passage 3) human iPSCs cultured on **Cultrex UltiMatrix BME** diluted 1:100 (~100 µg/mL).



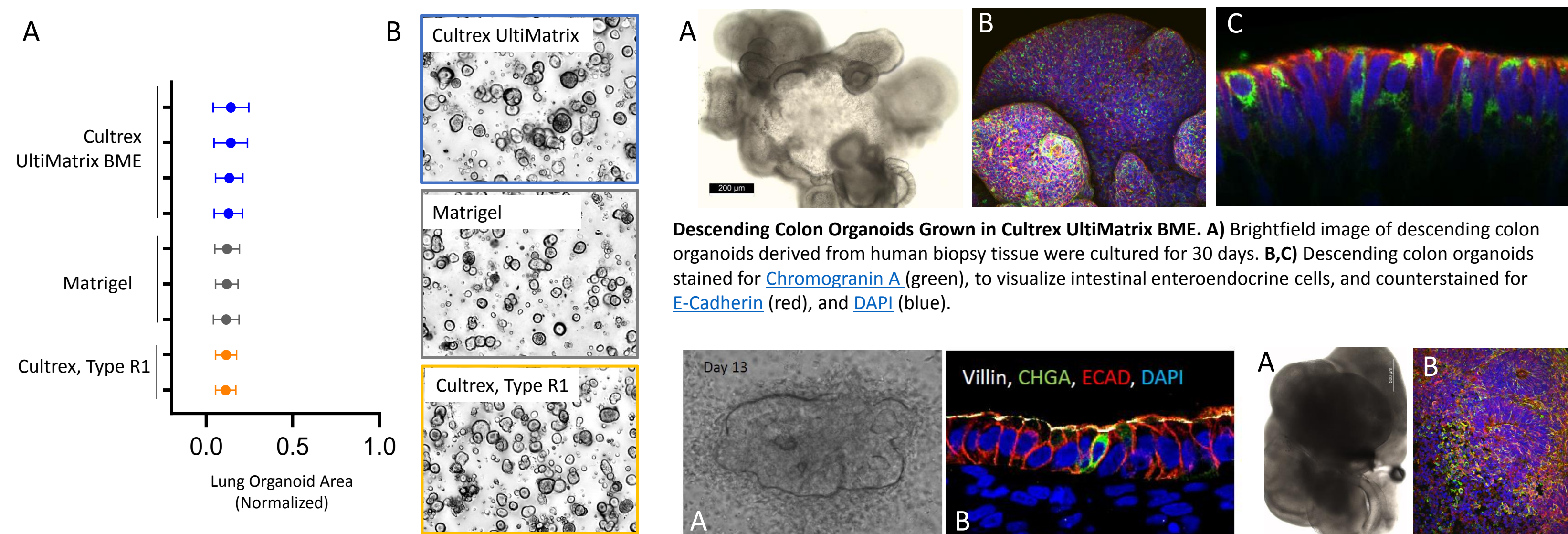
Human iPSC Differentiation Using Cultrex UltiMatrix BME. Human iBJ6 hiPSCs were expanded and differentiated into cardiomyocytes (A) or neurons (B) using **Cultrex UltiMatrix BME** as an adhesion substrate. A) hiPSC-derived cardiomyocytes stained for Troponin T (red) and DAPI (blue). B) hiPSC-derived neurons stained for N-Cad (red) and DAPI (blue).

IMPROVED SPHEROID (ACINAR) FORMATION



Cultrex UltiMatrix BME Improves Acinar Formation and Consistency. Single MCF10A cells cultured with **Cultrex UltiMatrix BME**, **Cultrex BME Type R1**, or Matrigel for 12 days will differentiate into luminal “acini” structures. A) Quantification of “acini” in Cultrex UltiMatrix BME show increased size and consistency compared to Cultrex BME, Type R1 and Matrigel, respectively. B) Representative images of acini in different matrices.

VERSATILE FOR ORGANOID CULTURE - LUNG, INTESTINAL, AND BRAIN



Lung Organoids Cultured Using Cultrex UltiMatrix BME. Adult stem cells isolated from human lung biopsy tissue were embedded in **Cultrex UltiMatrix BME**, Matrigel, or **Cultrex BME, Type R1** and cultured in airway lung media. A) After 13 days, lung organoids were analyzed for size. Cultrex UltiMatrix BME produced larger lung organoids while maintaining consistency. B) Representative images of lung organoids in respective matrices.

Descending Colon Organoids Grown in Cultrex UltiMatrix BME. A) Brightfield image of descending colon organoids derived from human biopsy tissue were cultured for 30 days. B,C) Descending colon organoids stained for **Chromogranin A** (green), to visualize intestinal enteroendocrine cells, and counterstained for **E-Cadherin** (red), and **DAPI** (blue).

iPSC-derived Intestinal Organoids Grown in Cultrex UltiMatrix BME. Human iPSCs were embedded in **Cultrex UltiMatrix BME** and cultured in growth medium. hiPSC-derived intestinal organoids cultured for 13 days were imaged using (A) brightfield microscopy or processed and (B) stained for **Chromogranin A** (green), Villin (white), **E-Cadherin** (red), and **DAPI** (blue).

iPSC-derived Cerebral Organoids Grown in Cultrex UltiMatrix BME. A) Representative image of iPSC-derived cerebral organoids (day 63) cultured using **Cultrex UltiMatrix BME**. B) Cerebral organoid stained for beta III-tubulin (green), Prox1 (red), and DAPI (blue).

CONCLUSION

Cultrex UltiMatrix RGF BME is designed to accelerate 3D and 2D model development for basic research, disease modeling, and drug discovery. This EHS-derived matrix provides a versatile matrix with compositional and performance benefits, including:

- Optimized extracellular matrix protein composition.
- Consistent ECM composition across lots.
- Elevated entactin concentration resulting in tensile strength ideal for 3D cell culture.
- Supportive of pluripotent stem cell expansion and differentiation.

For Additional Organoid Resources | www.rndsystems.com/organoids