TissueSpec® Matrix Hydrogel: Lung (MTLG101)

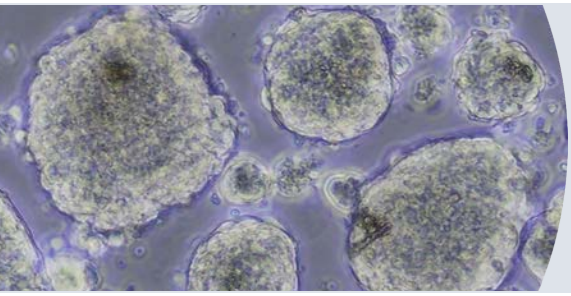
TissueSpec® Lung Hydrogel is a versatile extracellular matrix product comprised of collagens and other ECM molecules of lung-specific origin (porcine). TissueSpec® hydrogels provide lung cells a soft, physiologic substrate for 3D cell culture that is easy to use and enhances cell function and cell-cell interactions.

Human lung matrix hydrogel is available through custom order.

Features

- Derived from normal porcine lung tissue
- Contains lung-specific ECM components
- Supports lung cell and organoid cultures
- Compatible with standard cell culture protocols
- Lot-to-lot consistent
- Easy to use

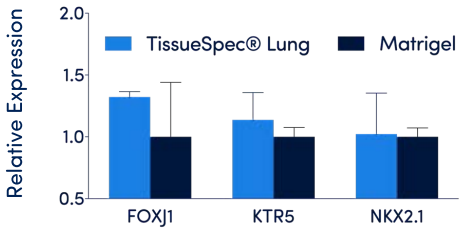
Applications in 3D cell culture



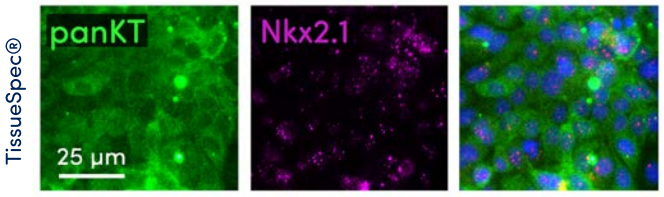
TissueSpec® Lung Hydrogel can be used for 3D culture of primary lung cells, bronchospheres, or organoids to study epithelial cell differentiation, airway development, and alveologenesis. TissueSpec® Lung Hydrogel can also be used to encapsulate primary lung or metastatic tumor cells to recapitulate the 3D human lung microenvironment in vitro.

Maintenance of lung cell identity in TissueSpec® Lung Hydrogel

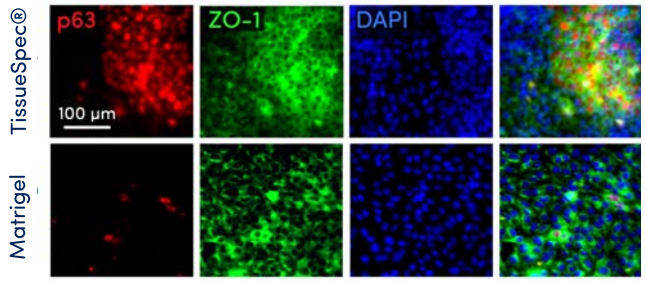
a Epithelial cell gene expression



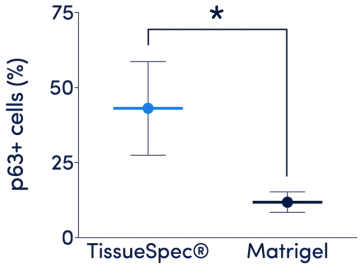
b Epithelial cell marker expression



c Airway progenitor cell maintenance



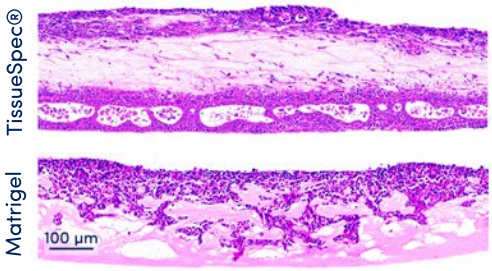
d Basal cell enrichment

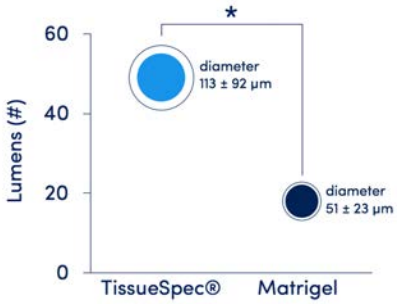


Primary normal human bronchial epithelial (NHBE) cells were cultured on thin layers of TissueSpec® Lung hydrogel or Matrigel for 10 days. TissueSpec® Lung hydrogel supported (a,b) robust expression of normal lung epithelial cell markers and (c,d) significantly larger subpopulation of p63+ basal airway cells ($p<0.05$) compared to Matrigel.

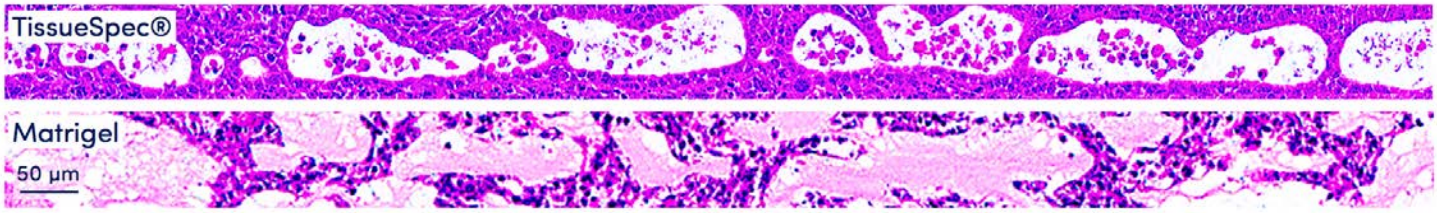
Lung cell differentiation in TissueSpec® Lung Hydrogel

a 3D structural organization





b Luminal formation



Air liquid interface cultures of primary normal human bronchial epithelial (NHBE) cells after 21 days. NHBE cells in TissueSpec® Lung Hydrogels formed (a) more organized, stratified luminal structures recapitulating the cellular architecture of the human airway, with significantly larger average diameter compared to Matrigel ($p<0.05$), and (b) more complex and organized morphology.

TissueSpec® Lung Hydrogel composition & consistency

a Mass spec profile*

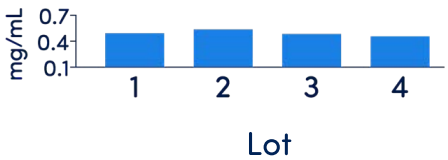
ECM components	Biomolecules
collagens	type I–VI, VIII, IX, XI, XVI
laminins	subunit α5, β2, γ1
elastin	
glycoproteins	fibrillin 1, fibulin 5
	nidogen
proteoglycans	heparan sulfate
	aggrecan, hyaluronan

* partial list of components

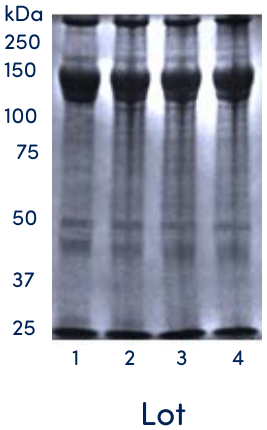
b Key components (µg/mL)

collagens (soluble)	400 – 530
elastin	40 – 50
glycosaminoglycans	3 – 5

c Collagen



d Electrophoresis



(a) Proteomic profile by mass spectrometry indicates that TissueSpec® Lung Hydrogel has a unique, lung-specific signature. (b) Ranges of key lung hydrogel matrix components. (c) Collagen concentration and (d) gel electrophoresis demonstrate a consistent protein profile across multiple TissueSpec® Lung Hydrogel lots.