

# TrailBio® Vascular Leptomeningeal Cells

Trailhead Biosystems® offers committed human iPSC-derived **vascular leptomeningeal cells (VLMCs)**, providing the opportunity to study the interface at the **blood-brain barrier and perivascular space**. VLMCs are unique fibroblast-like cells that line the blood vessels in the subarachnoid space and express specific markers confirming their unique identity and function at this interface. This cell type is also important in the study of cerebrospinal fluid dynamics, drug discovery for cerebrovascular disorders and disease modeling of leptomeningeal pathologies.

**1**

**Industry First**

First human iPSC-derived VLMC available for blood-brain barrier research

**Superior Quality**

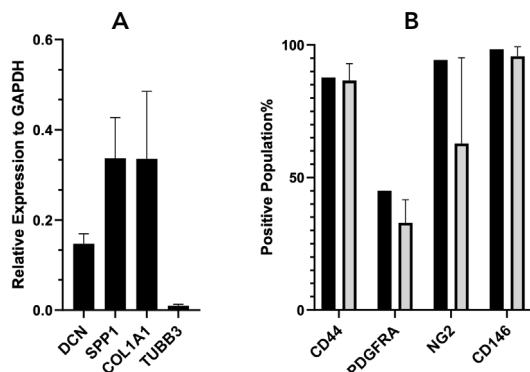
80% purity measured by expression of key markers

**Verified Identity**

Expression of VLMC-specific markers DCN and LUM confirmed by bulk RNA-seq

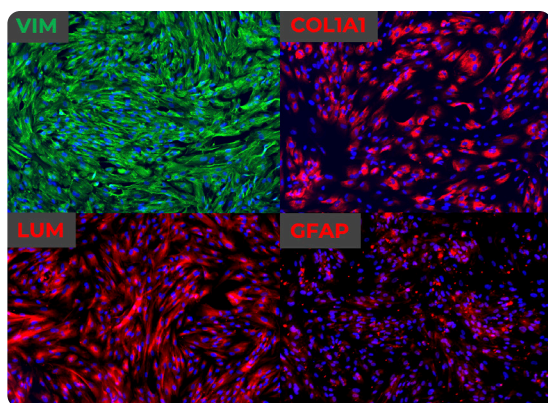
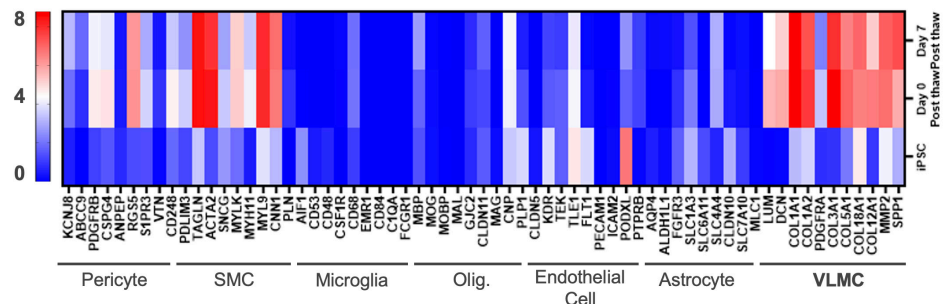
**Ready-to-Use**

Cryopreserved cells supplied with media, supplements and user instructions



**FIGURE 1. VLMC-Specific Gene Expression:** (A) qRT-PCR data shows high expression of selected VLMC genes, including DCN, SPP1 and COL1A1 relative to control gene GAPDH on day 7 post-thaw. In contrast, neuronal control gene TUBB3 is shows low expression in day 7 post-thaw cultures. (B) Flow cytometry data shows homogeneity of TrailBio® Vascular Leptomeningeal Cells upon thawing (day 0, white bars) and post-thaw (day 7, black bars). More than 80% of cells express CD44/CD146/NG2, and 50% of cells express PDGFRA, confirming the cellular identity of neuroectoderm-derived VLMCs.

**FIGURE 2. Distinct RNA-Seq Signatures:** Bulk RNA-seq analysis of TrailBio® Vascular Leptomeningeal Cells shows distinct gene expression signatures of VLMCs compared to iPSCs and selected relevant cell types upon thawing (day 0) and post-thaw culture (day 7).



**FIGURE 3. Validated Protein Markers:** Protein expression of selected VLMC markers in TrailBio® Vascular Leptomeningeal Cells was validated by immunocytochemistry in post-thaw cultures (day 7). ECM proteins lumican (LUM) and collagen-1a (Col1A1) and structural protein vimentin (VIM) (expressed in endothelial cells and glial cells) were detected in the majority of cells. Absence of the astrocytic marker glial fibrillary acidic protein (GFAP) confirmed that, despite the presence of common markers between VLMCs and astrocytes, cells do not differentiate into astrocytes in culture. Nuclei stained with DAPI. Imaging performed at 20X magnification.

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Product	Cell Density	Kit #
TrailBio® Vascular Leptomeningeal Cells <i>Kit includes: Cells, Basal Medium, Plating Supplement and Medium Supplement</i>	3 X 10 <sup>6</sup> cells per vial	KEC04000301

Production	
Donor Information	Human Male
Source Cell	iPSCs from CD34+ Cord Blood
Karyotype by G-Banding	Normal

Handling	
Shipping	Dry Ice
Storage	Liquid Nitrogen
Usage	Research Use Only

## Trailhead® Cells

- **Built from Scratch:** TrailBio® cells are produced by directed differentiation and are built to exhibit the properties of naturally occurring cells.
- **HD-DoE® Platform:** Trailhead's proprietary HD-DoE® (High-Dimensional Design-of-Experiments) technology has been utilized to create a multi-stage protocol for induction of VLMCs from iPSCs that express known VLMC markers.
- **Quality:** Cell quality is defined and verified at multiple stages during manufacturing using flow cytometry, gene expression by qRT-PCR, bulk RNA-seq data and functionality of cells is determined by key cellular markers using immunocytochemistry (ICC) data.
- **Data, Not Hypothesis, Driven:** Our methods are based on empirical data obtained using HD-DoE®.
- **Quality by Design:** Product development adheres to a Quality-by-Design standards at all stages.
- **Cellular Identity:** Cell fate is confirmed by molecular and functional attributes.

## Applications

TrailBio® cells are well suited for use in 2D and 3D applications, drug discovery, disease-modeling, drug toxicity, 3D tissue printing, organoid formation, tissue on-a-chip manufacturing and functional assay development.



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