Docket #: S23-233

Efficient manufacturing of esophageal basal cell therapies from pluripotent stem cells

The skin cells that line the esophagus are critical for protecting against the friction of food when we swallow. However, they can be damaged by genetic disorders, caustic burns, and surgical resections for cancer treatment. While cell therapies have the promise to repair such damage, there are no available methods for producing stem-cell derived esophageal basal cells.

Stanford researchers therefore developed a scalable, GMP-compliant, efficient method for producing pluripotent stem cell-derived esophageal basal cells. Researchers used single-cell multi-omics data to better understand the esophageal basal cell differentiation process, identifying the factors that enable their *ex vivo* differentiation. This clinical-grade differentiation process enables the production of cell therapies for a wide variety of esophageal conditions.

Stage of Development
In vitro: esophageal basal cells produced using this method self-renew and differentiate.

Applications

- Cell therapies for disorders affecting the esophageal tract (e.g., genetic disorders, caustic burns, and post-cancer surgical resections)
- Generating esophageal basal cell organoids for basic science and drug development

Advantages

- No available methods for producing esophageal basal cells
- Efficient differentiation process
- Enables scalable, GMP-grade manufacturing

Publications

- Ying Yang, Carmel Grace McCullough, et al. (2023). A Spatiotemporal and Machine-Learning Platform Accelerates the Manufacturing of hPSC-derived Esophageal Mucosa . BioRxiv, 2023.10.24.563664.

Patents

- Published Application: WO2024259353

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