



Immortalized Vocal Fold Fibroblasts

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The Wisconsin Alumni Research Foundation (WARF) is seeking commercial partner interested in developing immortalized fibroblasts for tissue engineering vocal fold lamina propria.

Overview

Normal vibration of vocal folds (aka vocal cords) depends on the tissue's composition and viscoelasticity. When that composition is altered by scarring or damage, the vibratory functionality of the vocal folds can be severely disrupted, and the resulting dysphonias are difficult to treat effectively. The vocal fold fibroblast (VFF) is the key cell in the vocal fold lamina propria that not only plays an important role in supporting, but also contributes to healing of damaged vocal folds by producing the vast majority of ECM proteins, such as elastin, collagen, and fibronectin. However, the use of primary cell culture of VFFs of human origin has been problematical because the source of tissue – normal vocal fold from live donors – is virtually impossible to obtain, and if obtained, insufficient numbers of cells are more often than not cultivated. Thus, a reproducible, characterized source of VFFs of human origin would have far reaching implications, and it will have a significant impact on the field of tissue engineering for the vocal fold lamina propria.

The Invention

UW-Madison researchers have created immortalized vocal fold fibroblast cell lines to provide a reproducible, unlimited sources for hVFFs. Primary human VFFs (hVFFs) were steadily transduced by a retroviral vector containing human telomerase reverse transcriptase (hTERT) gene to prevent cellular senescence during isolation and expansion. The inventors further biochemically characterized these immortalized cells and confirm absence of inter- and intraspecies contamination. To substantiate applicability for tissue regeneration, immortalized cell behavior and transcript expression are measured in response to the presence of 2D scaffolds – collagen gel, fibronectin, and hyaluronic acid. Immortalized hVFFs demonstrated normal attachment and spread on 2D scaffolds.

Applications

- The immortalized VFFs can facilitate tissue regeneration applications for the larynx.

Key Benefits

- This is the first immortalized VFFs, which have been extensively characterized.

Stage of Development

The researchers have extensively characterized the cell lines.

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