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Molecular mechanisms of lacrimal gland development and regeneration
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Lay Abstract

The lacrimal gland is a functional unit that protects the surface of the eye by producing a water layer of the tears. Damage or dysfunction of the lacrimal gland leads to "dry eye" condition and damage to the cornea. We focus our proposal on understanding the regulatory connections between fibroblast growth factors, transcription factor, Barx2 and cell matrix molecules that according to our preliminary evidence, play critical roles in morphogenesis of the gland. Our long-term goal is the understanding of the detailed mechanism of lacrimal gland development which may help to promote the regeneration of damaged glands.

Scientific Abstract

The goal of our experiments is to find new mechanisms of LG branching morphogenesis that have a vital impact on LG function and repair. In this application we will focus on understanding the regulatory mechanisms that control LG gland branching and repair. The experiments proposed will assess the interactions between FGFs and negatively charged extracellular matrix molecules that, according to our preliminary evidence, play critical roles in morphogenesis of the gland (Aim 1); investigate the specific role of FGFR2 at the different stages of LG development (Aim 2); determine the Barx2 downstream targets (Aim 3); and we will find out whether there are regulatory interactions between FGFs and Barx2 pathways during LG branching morphogenesis (Aim 4). The experiments proposed will provide new insights into molecular regulation of LG branching morphogenesis and may lead to the development of new treatments to promote LG regeneration.