Pluripotent stem cell-derived bladder epithelial progenitors for definitive cell replacement therapy of bladder cancer

Grant Award Details

Pluripotent stem cell-derived bladder epithelial progenitors for definitive cell replacement therapy of bladder cancer

Grant Type: Quest - Discovery Stage Research Projects

Grant Number: DISC2-11105

Project Objective: Deriving pluripotent stem cell-derived bladder epithelial progenitors for definitive cell replacement therapy of bladder cancer

Investigator:

Name:	Philip Beachy
Institution:	Stanford University
Type:	PI

Disease Focus: Bladder or Urinary Tract Disorder, Cancer, Skeletal/Smooth Muscle disorders, Solid Tumors

Human Stem Cell Use: Embryonic Stem Cell

Award Value: $1,265,436

Status: Active

Grant Application Details

Application Title: Pluripotent stem cell-derived bladder epithelial progenitors for definitive cell replacement therapy of bladder cancer

Public Abstract:

Research Objective

We will 1) identify non-invasive bladder cancer patients with (pre)cancerous urothelium by single-cell RNA-seq and 2) replace this dangerous lesion with normal hESC-derived bladder progenitors.

Impact

Replacement of corrupted (pre)cancerous urothelium with pluripotent cell-derived normal bladder progenitors will provide a definitive treatment for bladder cancer, expected to eliminate recurrence.

Major Proposed Activities

- To develop a diagnostic surface marker assay to quantify the purity of hPSC-derived human bladder progenitor populations
- To use single-cell RNA-seq to determine the purity of hPSC-derived human bladder progenitors and how closely they resemble primary human bladder cells
- To test engraftment of primary mouse bladder stem cells, and eventually, hPSC-derived bladder progenitors, in injured mouse bladders
- To profile (pre)cancerous bladder cells from patient samples and to develop diagnostic tools to monitor their spread using single-cell RNA-seq

Statement of Benefit to California:

Bladder cancer frequently recurs and progresses after treatment because of an extensive reservoir of (pre)cancerous cells that can serve as a source for development of new cancers. We propose to develop a stem cell-based cell replacement therapy to eliminate the devastating effects of bladder cancer recurrence and progression, and reduce the need for and expense of continuous patient monitoring. We also propose to develop methods to identify patients that would benefit most from such treatment.
