Autologous iPSC-derived smooth muscle cell therapy for treatment of urinary incontinence

Grant Award Details

Autologous iPSC-derived smooth muscle cell therapy for treatment of urinary incontinence

Grant Type: Therapeutic Translational Research Projects

Grant Number: TRAN1-10958

Project Objective: pre-IND meeting for autologous iPSC-derived smooth muscle progenitors, to treat stress urinary incontinence via injection into urethral sphincter

Investigator:

Name:	Bertha Chen
Institution:	Stanford University
Type:	PI

Disease Focus: Bladder or Urinary Tract Disorder, Incontinence, Skeletal/Smooth Muscle disorders

Human Stem Cell Use: iPS Cell

Award Value: $5,977,155

Status: Active

Grant Application Details

Application Title: Autologous iPSC-derived smooth muscle cell therapy for treatment of urinary incontinence

Public Abstract:

Translational Candidate

Smooth muscle cell progenitors (pSMCs) differentiated from patient iPSCs which is injected into the urethral muscle to regenerate a a weak urethra.

Area of Impact

Surgery for urinary incontinence is effective in 80% of patients. Our target is those who failed surgery (20%), or those who cannot undergo surgery.

Mechanism of Action

Our animal data suggest a paracrine stimulation of native elastin metabolism and smooth muscle cell engraftment with differentiation of these cells into terminal smooth muscle cells. Both effects are complimentary to urethral function; while elastin increases elasticity of the sphincter muscle, the regenerated smooth muscle cells provide the contractile forces required to close the urethral to prevent leakage of urine.

Unmet Medical Need

Our target is those who failed surgery (20%) or those who are not candidates for standard therapy. This population is without options. This group is generally older and will increase drastically with the number of women with UI forecasted to increase by 55% by 20501 and as the US population ages.

Project Objective

Pre-IND meeting

Major Proposed Activities

- Development of cGMP compliant procedures for isolation and production of patient iPSC lines
- Development of cGMP compliant manufacturing process for iPSC-derived pSMCs and production of 3 pSMC pilot lots from patient iPSC lines
- Perform preliminary toxicology, biodistribution, safety, potency, and efficacy studies using the pSMC pilot lots

Statement of Benefit to California:

Surgery for urinary incontinence (UI) is one of the most common indication for surgery in women with more than 210,000 women undergoing surgery for UI annually in the US. Unfortunately 20% of these will fail. There is also a number of patients who cannot undergo surgery due to older age or medical conditions. This results in one third of older Californian women without options. This population will increase drastically with the number of women with UI forecasted to increase by 55% by 2050.
