



## **Isolating Prostatic Stem Cells for Use in Diagnosis and Treatment of Prostatic Diseases**

### **Principal Investigator**

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Stem cells are rare cells located in specific niches where they are maintained in a quiescent state. Stem cells have been defined as cells that have the ability to perpetuate themselves through self-renewal and to generate mature cells of a particular tissue through differentiation. Although one would assume that each tissue arises from a tissue-specific stem cell, rigorous identification and isolation of these somatic stem cells has been accomplished only in a few instances. It has recently been proposed that stem cells are the cells most likely to accumulate mutations that result in neoplasia, and that tumors may contain a stem cell reservoir that can self-renew indefinitely. Isolation of prostatic stem cells would present the opportunity to examine the relationship between prostatic stem cells and two common diseases of the prostate - benign prostatic hypertrophy (BPH) and prostate carcinoma - as both diseases may arise in prostatic stem cells.

### **Description of the Project**

Experiments were conducted to determine if the sub-renal capsule prostatic tissue formed an 'organ' that maintained a proximal – distal axis similar to that observed in a prostate and, if so, whether cells isolated from different regions of this graft displayed different growth properties. Cells were isolated and implanted under the renal capsule of intact animals and prostatic tissue was harvested. Micro dissection revealed an interconnected series of ducts consisting of proximal and distal regions very similar to that obtained after dissecting the murine prostate. Quite remarkably, when these ducts, obtained from sub-renal capsule tissue, were dissected and certain isolated cells re-implanted under the renal capsule, the cells once again formed large amounts of prostatic tissue.

### **Applications**

- 1) Isolation and characterization of special features of these stem cells may make it possible to design rational therapies to treat prostate carcinoma, BPH, benign prostatic hypertrophy and other proliferative disease of the prostate.
- 2) A method for selectively targeting therapeutic or diagnostic agents to a tumor site.
- 3) A method for determining prostate cancer staging or monitoring the effects of a therapeutic drug on cancer and other proliferative diseases of the prostate.

### **Patent Status**

A provisional patent application has been filed in the United States.