**Gene Therapy with RhoB Variants to Suppress Cancer Growth**

*RhoB is known to suppress tumor growth and induce apoptosis. Because RhoB expression is reduced in certain tumors, restoration of RhoB may be an effective form of cancer therapy. The patented technology encompasses RhoB variants that could restore its tumor-suppressive functions. Introduction of RhoB variants into tumor cells by gene therapy or other means may overcome the reduced expression and/or reduced activity of the endogenous RhoB and elicit therapeutic effects by tumor growth suppression.*

**COMMERCIAL OPPORTUNITY**

- Studies show that RhoB expression and/or activity is diminished in human tumor tissues of pancreatic, kidney, head and neck, brain, lung and thyroid cancers specimens. Of these, the American Cancer Society estimates that for pancreatic and lung cancers, there will be 53,760 and 225,500 new cases respectively with 43,090 and 155,870 deaths in 2017. Patients with RhoB-low tumors have poor survival and may benefit from RhoB restoration therapy.

- In mice bearing ovarian tumors with low RhoB expression, RhoB restoration by adenoviral gene transfer demonstrated a 50% cure rate. The patented technology covers the compositions of RhoB variants and a vector containing the variant that could restore the RhoB tumor suppressor in cancer cells.

- The first gene therapy that works by replacing missing or mutated genes with healthy wild-type versions has been approved by the FDA in December 2017. Spark Therapeutic’s Luxuturna (voretigene neparvovec) is an adenovirus-based gene therapy for an inherited form of blindness. Also, in October 2015, the FDA approved the first oncolytic viral therapy that introduces a new gene and kills tumors. Amgen’s Imlygic (talimogene laherparepvec) is a genetically modified herpes virus expressing GM-CSF. Imlygic ruptures tumors releasing tumor-derived antigens, which along with GM-CSF, may promote an anti-tumor immune response. Various clinical trials testing gene therapies for spinal muscular dystrophy, hemophilia A, thalassemia, multiple myeloma, heart disease, and metastatic cancers are currently underway.

**TECHNOLOGY**

The effects of multiple RhoB variants on cancer cell growth were tested in vitro using pancreatic, prostate and kidney cancer cell lines transfected with RhoB variant constructs. Tests, including colony formation, cellular proliferation, apoptosis, and growth assays were performed. Mutational analysis identified that cysteine 192 (palmitoylation site) and cysteine 193 (prenylation site) in the RhoB protein as required for its tumor suppressive and pro-apoptotic functions ($P<0.005$ for all cell lines). In contrast, other RhoB variants with mutations spanning residues 1-180 of RhoB retained transcriptional repressor activity, cell proliferation inhibition and apoptotic effects comparable to that of wild-type RhoB.

**PUBLICATION/PATENT**

- US patent issued to Dr. Sebti on 05/31/11 and filed on 11/14/05.

**CONTACT**

Haskell Adler PhD MBA CLP
Senior Licensing Manager
Registered Patent Agent
Haskell.Adler@Moffitt.org
(813) 745-6596

**LICENSING OPPORTUNITY**

Moffitt Cancer Center