Innovations
UNIVERSITY OF COLORADO
ANSCHUTZ MEDICAL CAMPUS

Tyrosine Kinase Inhibitors Protect & Regenerate Salivary Glands damaged in Cancer Treatment

Category
Technology: Repurposed Tyrosine Kinase Inhibitors

Problem
Salivary gland damage from cancer treatment

Technology Overview
Use of tyrosine kinase inhibitors to protect & regenerate non-cancerous tissue

IP Status
- Patent Issued
- Available for Exclusive Licensing

Value Proposition
- New method of use for FDA-approved drugs
- Protection of non-cancerous tissue
- Reduces apoptosis and promotes regeneration

Market Attractions
- Accelerated regulatory process
- Reduce adverse effects from cancer treatment
- Sustained treatment schedules

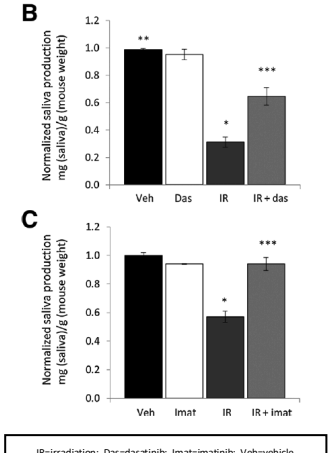
Contact
Heather Callahan
Heather.Callahan@ucdenver.edu
Ref# CU3374H
CU4354H

CU Innovations
13001 E. 17th Place
Suite W5130, Aurora, CO 80045

Problem: Most traditional cancer treatments are cytotoxic, indiscriminately targeting both cancerous cells and normal cells. Many of the side effects from treatment can be attributed to the damage and death of non-cancerous cells (especially fast-growing cells). For instance, the impact of cancer treatment on salivary glands can cause changes in taste, oral discomfort, difficulty swallowing (dysphagia), malnutrition, xerostomia, and increased oral infections. Deterioration of salivary gland tissues results in substantial morbidity, reduced quality of life, and, in some cases, delays in treatment regimens due to extreme pain and/or discomfort resulting from the therapy. Hence, finding the optimal balance of killing cancer cells without adversely affecting normal cells is an ongoing challenge.

Technical Solution and Key Value Propositions: A University of Colorado research group led by Dr. Mary Reyland discovered that treatment with tyrosine kinase inhibitors (TKIs) limits off-target tissue damage and apoptosis of normal cells[1,2], and facilitates regeneration[3,4]. By treating non-cancerous cells or mice with commercially available TKIs in combination with traditional cancer therapies (i.e. radiation or chemotherapy), normal cells and tissues are less sensitive to apoptotic stimuli, and also undergo higher levels of regeneration and functional recovery. Dr. Reyland showed that TKIs reduced the apoptotic cells in mice undergoing radiotherapy by >60%[2]. A more recent study showed that continuous dosing promotes the regeneration of non-cancerous tissue[3,4]. In Figure 1, TKIs normalized saliva production in mice treated pre- and post-radiotherapy (IR)[3,4].

Fig. 1[4]



Highlights:
- Reduces adverse effects from chemotherapy or irradiation to reduce morbidity and maximize patient comfort
- Improves clinical response by allowing sustained treatment schedules, avoiding treatment-free periods that allow the tumor to grow
- Accelerated regulatory approval process, reducing the time and costs associated with developing a new drug

Key Documents and Sources:

1. *Use of Tyrosine Kinase Inhibitor in Cancer Treatment*. Issued Patent #10,076,520.
2. Wie, S. M., et al. (2014). *Inhibiting tyrosine phosphorylation of protein kinase Cdelta (PKCdelta) protects the salivary gland from radiation damage*. J Biol Chem 289(15): 10900-10908.
3. *Tyrosine Kinase Inhibitors Regenerate Non-Cancerous Tissue after Cancer Therapy*. PCT pending. Available under CDA.
4. Wie S.M., et al. (2017). *Tyrosine Kinase Inhibitors Protect the Salivary Gland from Radiation Damage by Inhibiting Activation of Protein Kinase C-δ*. Mol Cancer Ther 16:1989-1998.