GRANT SNAPSHOT

2013 Pancreatic Cancer Action Network – AACR Career Development Award

Grantee:	Pankaj Singh, PhD
Institution:	Eppley Institute for Cancer Research, University of Nebraska Medical Center
Research Project:	*Targeting a novel metabolic chemoresistance mechanism in pancreatic cancer*
Award Period:	July 1, 2013 – June 30, 2015
Amount:	$200,000

Biographical Highlights

Dr. Singh performed his PhD work in the laboratory of Tony Hollingsworth, PhD at the University of Nebraska Medical Center, providing him a broad background in pancreatic cancer biology. Dr. Hollingsworth is a member of the Pancreatic Cancer Action Network's Scientific Advisory Board, and currently heads Specialized Program of Research Excellence (SPORE) and Early Detection Research Network (EDRN) programs for pancreatic cancer. As a postdoctoral fellow at Salk Institute, Dr. Singh worked in the field of metabolism and was co-mentored by Geoffrey Wahl, PhD, a former AACR president and also a member of our organization's Scientific Advisory Board. Dr. Singh's professional training during postdoctoral study allowed him to acquire theoretical and technical knowledge in the field of cancer metabolism.

The Eppley Cancer Center at the University of Nebraska provides a favorable environment for collaborative and interactive research. Dr. Singh is currently working in the field of cancer metabolism, with special emphasis on pancreatic cancer. Dr. Singh's long-term goals are to identify/characterize new genes/therapeutic targets for effective clinical treatment of metastatic pancreatic cancer.

Project Overview

The current standard of care for pancreatic cancer is gemcitabine chemotherapy. However, a significant number of pancreatic tumors are resistant to this treatment. Gemcitabine functions by blocking DNA synthesis in cells that are actively dividing. Gemcitabine is designed to mimic the structure of cytidine, one of the bases that make up DNA. When gemcitabine gets incorporated into DNA, instead of the normal cytidine, DNA synthesis stops and the cells cannot divide.

Dr. Singh and his colleagues have proposed a resistance mechanism of pancreatic cancer cells, involving the cells' ability to build their own large supply of cytidine, so they are less likely to include the gemcitabine into their newly formed DNA. In order to make lots of cytidine, pancreatic cancer cells metabolize glucose (sugar) at an increased rate. Dr. Singh's project aims to validate this hypothesis by determining whether the breakdown of glucose (glycolysis) is necessary for gemcitabine resistance. Moreover, Dr. Singh will test whether a byproduct of glycolysis, lactate, can strengthen stroma, the dense tissue surrounding pancreatic tumors. The stroma has been shown to protect and nourish the tumor, and create treatment resistance by impeding drug delivery. Dr. Singh theorizes that the tumor cells also protect the stromal cells. Dr. Singh's studies will investigate, for the first time, the link between tumor metabolism and gemcitabine resistance in pancreatic cancer.