GRANT SNAPSHOT

2012 The Daniel and Janet Mordecai Foundation – Pancreatic Cancer Action Network – AACR Pathway to Leadership Grant

Grantee:	Oliver McDonald, MD, PhD
Institution:	Johns Hopkins University
Research Project:	*Genome-wide epigenetic reprogramming during evolution of pancreatic cancer*
Award Period:	July 1, 2012 – June 30, 2017
Amount:	$600,000

Biographical Highlights

Dr. McDonald graduated Summa Cum Laude from the University of Tennessee, Martin as a Biology major, and then enrolled in a joint MD and PhD program at the University of Virginia. His PhD was in the field of Molecular Physiology, with a focus on the development of smooth muscle under normal conditions, compared to during cardiovascular disease. After graduate school, Dr. McDonald began a Pathology residency program at Johns Hopkins University, and then started a fellowship in Gastrointestinal and Liver Pathology in 2011.

In addition to his clinical fellowship, Dr. McDonald is also a research fellow in the laboratory of Christine Iacobuzio-Donahue, MD, PhD. Dr. Iacobuzio-Donahue was the recipient of a 2007 Pancreatic Cancer Action Network Pilot Grant, and recently joined the organization's Scientific Advisory Board. Within Dr. Iacobuzio-Donahue's laboratory, Dr. McDonald is focused on studying changes to pancreatic cancer cells that allow them to metastasize, or spread, to other parts of the body.

Project Overview

As pancreatic tumors grow and progress, the cancer cells become able to depart the tumor, survive in the bloodstream, and colonize in other organs, a process known as metastasis. The metastatic spread is thought to be related to the cells' ability to undergo a process called epithelial-to-mesenchymal transition, or EMT. The initial tumor arises from epithelial cells, a cell type that is unable to move away from the pancreas. The adoption of mesenchymal characteristics allows the cells to migrate from the pancreas, a necessary precursor to metastatic spread.

Dr. McDonald hypothesizes that the EMT that occurs in pancreatic cancer cells is related to epigenetic changes. Epigenetic changes lead to altered DNA expression in cells, without modifying the DNA sequence itself. Instead, chemicals are added or removed from the DNA structure, in a highly regulated process, to alter the expression and timing of particular genes' expression. In collaboration with Dr. Iacobuzio-Donahue, Dr. McDonald will be able to compare genetic characteristics of normal tissue, pancreatic tumor, and metastases from the same patient, through the Gastrointestinal Cancer Rapid Medical Donation Program at Johns Hopkins. Dr. McDonald aims to use this powerful resource to understand the relationship between epigenetic changes, EMT, and pancreatic cancer progression.