# GRANT SNAPSHOT

## The Daniel and Janet Mordecai Foundation – Pancreatic Cancer Action Network – AACR Career Development Award

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| Grantee: | Kazuki Sugahara, MD, PhD |
| Institution: | Sanford-Burnham Medical Research Institute |
| Research Project: | *Tissue-Penetrating Drug Delivery to Desmoplastic Pancreatic Tumors* |
| Award Period: | July 1, 2012 – June 30, 2014 |
| Amount: | $200,000 |

## Biographical Highlights

Dr. Sugahara's professional training started in Japan. He earned his MD from Shiga University of Medical Science, did a surgical residency in Osaka, and earned his PhD in cancer biology/glycobiology from the Osaka University Graduate School of Medicine. He then moved to the US to do his postdoctoral training at Sanford-Burnham Medical Research Institute in La Jolla, CA. Currently, Dr. Sugahara is a Research Assistant Professor at Sanford-Burnham, and also holds a Clinical Visitor status in the Department of Surgery at the University of California, San Diego.

Included among Dr. Sugahara's impressive list of publications is a first-author *Science* paper (one of the most prestigious overall scientific journals), and his work was featured as the cover story of that issue. He has received several honors, and his research findings have resulted in numerous international patents. Overall, Dr. Sugahara's research interest lies in the development of drug delivery systems for cancer targeting. His current focus is to study how pieces of protein (called peptides) can penetrate through tissue, and determine whether these peptides can be translated to clinical benefit for pancreatic cancer patients. Dr. Sugahara's passion in fighting pancreatic cancer originates from his experience in losing his supervisor to the disease during surgical residency.

## Project Overview

Pancreatic tumors are notorious for being surrounded and infiltrated by a dense microenvironment, which impedes the ability of drugs to reach the tumor and attack cancer cells. Dr. Sugahara and his colleagues have recently identified a short piece of protein, known as a peptide, that can penetrate through and create holes in the tumor microenvironment. This iRGD peptide binds to a protein receptor called neuropilin-1 that is expressed in the pancreatic tumor microenvironment, and only works in the presence of neuropilin-1.

Previous data have suggested that iRGD can effectively get into tumors, and can shuttle in drugs that are tethered (attached) to the peptide. Even more encouragingly, co-administration of iRGD along with other drugs enhances the drugs' concentration in the tumor, even if the drug and iRGD are not physically attached. Drug delivery is a significant hurdle in the treatment of pancreatic cancer, so the addition of iRGD to increase drug concentration inside the tumor could have a big impact. Dr. Sugahara proposes to test iRGD combination therapy in pancreatic cancer mouse models that mimic human disease. These types of analyses will indicate whether iRGD may be an effective treatment strategy for pancreatic cancer patients.