# National Cancer Institute
# Clinical Trials and Translational Research
# Advisory Committee (CTAC)

# Progress in Pancreatic Ductal Adenocarcinoma (PDAC)
# Research Working Group
# (PDAC Progress Working Group)

## Working Group Report
## March 6, 2019

**The report was accepted at the March 6, 2019 CTAC Meeting**

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# CLINICAL TRIALS AND TRANSLATIONAL RESEARCH ADVISORY COMMITTEE (CTAC)
# PROGRESS IN PANCREATIC DUCTAL ADENOCARCINOMA (PDAC) RESEARCH WORKING GROUP
# (PDAC PROGRESS WORKING GROUP)

WORKING GROUP REPORT, MARCH 2019

## INTRODUCTION

On September 19, 2012, the 112th Congress amended the Public Health Service Act by enacting the Recalcitrant Cancer Research Act (RCRA) of 2012 (Public Law 112-239, §1083). The legislation called upon the National Cancer Institute (NCI) to identify two or more recalcitrant cancers that have a five-year relative survival rate of less than 20 percent and cause more than 30,000 deaths per year in the United States and to develop scientific frameworks that will assist in making progress against these cancers. Pancreatic ductal adenocarcinoma (PDAC) was identified by NCI as a recalcitrant cancer as defined, with its five-year relative survival rate of less than 6 percent that translates into the loss of almost 40,000 lives per year. A report focused on the NCI's scientific framework for PDAC was submitted to Congress in 2014 and posted on NCI's website. NCI convened the Progress in PDAC Research Working Group (PDAC Progress WG), chaired by Dr. James Abbruzzese, Duke Cancer Institute, to advise NCI on the implementation progress of the initiatives outlined in the scientific framework. Working Group members represent the broad clinical and translational research and advocacy communities (Appendix 1).

This report summarizes the recent deliberations of the PDAC Progress WG which focused on research progress of the scientific initiatives to date and suggestions for future areas of scientific research. The PDAC Progress WG focused on the impact of the four 2014 Scientific initiatives on the following broad cross-cutting areas of research: 1) Biology (genomics/metabolomics/tumor biology); 2) Animal and Human Tissue Models; 3) Risk, Prevention, Screening, Diagnosis; and 4) Treatment. A fundamental objective was to address the continued scientific relevance of the 2014 scientific initiatives. Other issues considered were the appropriateness of the NCI's overall research direction as well as research gaps and opportunities. In addition to current progress, the importance of future therapies and new methods and clinical strategies to advance the field were emphasized.

## THE 2014 SCIENTIFIC INITIATIVES

The 2014 Scientific Framework for Pancreatic Ductal Adenocarcinoma provided the background, rationale and implementation plans for four initiatives to expand PDAC research. These initiatives are summarized below:

1. Development of an in-depth understanding of the biological and clinical relationship between PDAC and diabetes mellitus (DM) of recent onset

   Understanding the clinical and biological characteristics of new onset diabetic patients who subsequently develop or have undiagnosed PDAC is important for defining risk factors for screening and early diagnosis efforts.

2. Evaluate longitudinal screening protocols for biomarkers for early detection of PDAC and its precursors

   Identification of patients with the earliest stage PDAC or those who have precursor lesions (pancreatic intraepithelial neoplasia - PanIN-3 - and cystic neoplasms of the pancreas) that are likely to evolve into PDAC have the best chance of cure. More accurate and sensitive methods to identify the molecular alterations that characterize these early lesions and predict future malignant invasion are needed. Longitudinal screening protocols that collect specimens from early lesions from patients at high risk of developing PDAC are important for identifying markers of disease progression.

3. New therapeutic approaches in immunotherapy

   Validation of new immunotherapeutic and stromal targets as well as interventions for clinical testing in animals and human tissue models is important for the identification of new therapeutic approaches.

4. Developing new treatment approaches that interfere with *RAS* oncogene-dependent signaling pathways

   Mutant forms of KRAS are present in 95 percent of patients with PDAC and are thought to play a role in the initiation and maintenance of pancreatic carcinogenesis and resistance to therapy. Opportunities now exist, based on the structural biology of the KRAS molecule to make progress in targeting this pathway.

## ASSESSMENT OF RESEARCH PROGRESS

In September 2018 over the course of several weeks, the Working Group divided into four subgroups; 1) Animal and Human Tissue Models, 2) Biology (genomics/metabolomics/tumor biology), 3) Risk, Prevention, Screening, Diagnosis, and 4) Treatment. These subgroups convened via webinars to discuss current pancreatic cancer research being conducted in relation to each of the 2014 scientific initiatives. A Working Group member was appointed to guide the assessment of the research progress for each subgroup. NCI provided the WG the following information about NIH-supported research:

- Abstracts for FY 2015 – FY2017 NCI-supported grant projects and subprojects coded to 25 percent or greater relevance to pancreatic cancer; NIH grant projects identified as relevant to PDAC in one of the four initiatives in the scientific framework; related information from specific NCI programs and initiatives along with other NIH projects with relevance to pancreatic cancer retrieved from the NIH RePORTER database (Appendix 2).
- Publications supported by grants submitted in response to relevant Funding Opportunity Announcements; NCI CDP Pancreatic Cancer Detection Consortium (NCI-PAR 15-289), and NCI-NIDDK Joint FOAs Consortium for the Study of Chronic Pancreatitis, Diabetes and Pancreatic Cancer Clinical Centers and Coordination and Data Management Center (RFA-DK-14-027/RFA-DK-14-028) (Appendix 3).
- A listing of all open NIH supported clinical trials as of February 2018 (Appendix 4).

The full Working Group convened via an in-person meeting in October 2018 (Appendix 5) to discuss progress, opportunities, and gaps within the current PDAC scientific framework portfolio. The overall impression was that the initiatives in the scientific framework were still relevant. While important developments have been made, further work is needed to identify patients at risk for developing PDAC, optimize data/tissue collection, identigy biomarkers, and improve clinical trial accrual, efficiency and outcomes.

## SUMMARY OF PROGRESS

### Topics

#### *Biomarkers, Early Detection, Screening* Assessment

Updates on the Early Detection Research Network (EDRN), the Pancreatic Cancer Detection Consortium (PCDC), the Consortium for the Study of Chronic Pancreatitis, Diabetes and Pancreatic Cancer (CPDPC), and the Consortium for Molecular Cellular Characterization of Screen-Detected Lesions (MCL) were presented. Two main areas were discussed; 1) evaluation of longitudinal screening protocols with new imaging biomarkers for patients at high-risk of PDAC and 2) studies of the biological relationship between PDAC and diabetes mellitus (DM) in collaboration with the National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK).

EDRN's goal is to develop and validate biomarkers for diagnosis and prognosis of early-stage cancer. A panel of integrated biomarkers including proteins, autoantibodies, metabolites and miRNA has been created. A major consideration is the ability to identify those at high risk of pancreatic cancer from the many patients found to have cysts. Opportunities exist for collaboration in the development of reference sets and standardized protocols. A US-Japan collaboration of pancreatic cancer was formed for the development of plasma biomarkers for early detection in early-stage disease.

#### *Consortium for the Study of Pancreatitis, Diabetes and Pancreatic Cancer (CPDPC)* Assessment

The CPDPC conducts clinical research on; 1) Chronic Pancreatitis (CP) (including those with recurrent acute pancreatitis), and 2) Pancreatic cancer and pancreatogenic or Type 3c Diabetes Mellitus (T3cDM) and their pathogenic interrelationships.

The CPDPC is composed of working groups. The DM-PDAC working group cohort study is collecting bio-samples from diabetes patients to 1) establish a new onset diabetes (NOD) cohort, 2) estimate the probability of PDAC in the NOD cohort, and 3) validate biomarkers and develop early detection screening protocols. The goal of the NOD studies is to detect pancreatic cancer at an early and potentially curable stage and identify high risk groups for prevention. Several other studies are also underway. The Diabetes Cardiovascular Risk-Evaluation: Targets and Essential Data for Commitment of Treatment (DETECT) study is testing whether pancreatic polypeptides will provide valid biomarkers to identify and distinguish T3cDM from T2DM. The adult Chronic Pancreatitis (CP) working group is establishing a cohort for study of CP and its complications. The pediatric study (INSPIRE2) will collect data from subjects with recurrent acute pancreatitis and chronic pancreatitis to evaluate risk factors, time frame for progression to CP, and characterize this cohort.

#### *Moonshot (Immunotherapy and Microenvironment) Pancreatic Cancer Microenvironment Network (PaCMEN)* Assessment

An update on the PaCMEN was provided. The purpose of the network is to stimulate research on the PDAC microenvironment with the goal of understanding the interaction between tumors and the microenvironment to design new immunotherapy and other treatment interventions. PaCMEN has advanced the study of the immunogenicity of pancreatic cancer. New evidence suggests the ability to reprogram the tumor microenvironment, making it more amenable to immunotherapy.

The development of resource centers with a multidisciplinary team approach and research projects focused on 1) dissecting multi-cellular heterogeneity, 2) disrupting the immune and drug privileged microenvironment, 3) defining neoantigen immunodominance and quality for biomarker and target discovery, 4) interrupting cellular cross-talk and 5) reprogramming the PDAC tumor environment which could lead to the success of this program.

### *RAS Initiative* Assessment

The major goals are to discover small molecules that bind to RAS directly or disrupt RAS/effector interactions, and to molecularly describe the RAS/RAF signaling complexes in the membranes. The RAS Initiative follows a *hub and spoke* model for collaboration with academia, industry and other partners. Cooperative research and development agreements with private companies have amplified initiatives and efforts. RAS resources can be distributed worldwide.

Developing and understanding of the structural components of RAS is a priority; new targetable pockets and configurations in oncogenic RAS mutants have been identified. The specific aim of the RAS Initiative is to find molecules that target RAS. Once molecules that bind RAS have been identified they will be studied in PDAC. The initiative is interested in using cell lines derived from pancreatic cancer, but the overall initiative goal is to find molecules that bind to wild type and mutant RAS.

The RAS Synthetic Lethality Network (SLN) has been up and running for two years. Groups are starting to generate a list of targets and are comparing lists to cross validate the targets. The challenge will be to evaluate the output and determine overlap, and to validate those findings.

An important experimental gap is the pathway to activation of RAS. The RAS Initiative has been consolidated to 1) direct targeting of KRAS and 2) understanding the biology in the context of the plasma membrane. Novel classes of compounds to target KRAS have been identified. Partnering with biopharmaceutical companies (Pharma) and NIH is needed to screen leads and move candidates toward the clinic.

### Discussion

The PDAC Progress Working Group agreed that NCI-funded initiatives have been useful for advancing research. Sustaining funding is an important consideration. Additional high quality molecular studies will provide evidence of efficacy to engage Pharma in PDAC research and will provide important collaborative opportunities to expand research initiatives. There was a consensus that early detection alone is not sufficient because even at an early stage, patients may have metastatic disease. All agree that novel techniques and approaches are needed to treat PDAC.

Grant mechanisms to create academic-industrial partnerships to validate and move technical developments into the clinic are in place. This is a welcomed development as it is important to partner to make real progress. A new consortium has been developed for industry-academic partnerships to study liquid biopsies and biomarkers. The established consortia are an enormous resource. However, the Working Group felt that representatives from Pharma at the consortia meetings would be beneficial and that facilitation by NIH would be of value.

For early detection, CPCDC is a clinical consortium that the Working Group felt was missing a basic science component. Instead of recasting the consortia every five years, perhaps basic scientists need to be encouraged to interact with the consortia via the use of investigator-initiated projects to stimulate creativity. To move forward with discovery broad areas of expertise are needed. Additionally, the Working Group reminded NCI that even if biomarkers for early detection are validated, there is a huge educational component to get them into the community setting.

New clinical studies, programs and collaborations are underway including plasma biomarkers studies for early stage disease, surveillance methods for distinguishing precancerous and cancer lesions and creation of annotated tissue banks for in-depth study of the molecular basis of disease. The RAS Initiative was highlighted with a focus on direct targeting of allele specific RAS/KRAS and understanding of its structure, biology, and interactions within the plasma membrane. The PaCMEN has advanced immunotherapy options as part of the Moonshot initiative, while the CPDPC has initiated both adult and pediatric studies for evaluating pancreatitis and establishing a new onset diabetes cohort.

## PDAC BIOLOGY- GENOMICS/METABOLOMICS/TUMOR BIOLOGY

### Assessment

There is a need to better understand systemic and local metabolic perturbations, and the effect of the microbiome and the intratumoral microbiome that underlies the diabetes axis and its relationship to cachexia. NCI Moonshot has pioneered new therapy approaches in immunotherapy. RAS remains central to PDAC with the NCI RAS Initiative as a primary effort and RAS SLN as a secondary. Scientific gaps for new opportunities exist in the areas of genomics, metabolomics, tumor biology and immunology. Considerations include oncogenic drivers, biology of RAS variants, KRAS effect on metabolism, tumor evolution, and the tumor microenvironment. Circumventing bypass signaling pathways and understanding of the role of the stromal elements of the tumor microenvironment remains critical.

Better correlative studies will provide information on study failures and exceptional responders. Risk prevention, screening, and diagnosis are the basis for future model systems. A well-annotated biorepository, and refined screening and assay criteria are necessary for therapeutic advances in this disease. Imaging, screening, and integration of biomarkers are all essential for clinical advancement.

### Research Gaps and Opportunities

- New methodologies to improve the feasibility of obtaining serial biopsies will increase research options
- The role of the pancreas in regulating nutrition and metabolism and the biological mechanisms of PDAC associated cachexia
- How PDAC evolves in response to treatment and the biological mechanism of treatment resistance
- The role of stroma in the disease process
- Identification of targets that bind RAS in diseases of the pancreas

### Discussion

NCI has been responsive; however, continuous efforts are needed to move the field forward. Endocrine/exocrine factors, early detection, and the importance of therapy to those at risk was highlighted.

With NOD as a marker for disease, looking at glycemic control 7-8 years prior to pancreatic cancer diagnosis is critical. There is some evidence that hyperinsulinemia leading to poor glycemic control and PDAC are related. Metabolism studies need to be included and expanded. For early detection, stage I and II is too late for pancreatic cancer. Focusing on developing more sensitive methodologies is important for the earliest detection.

Systemic and local metabolic perturbations, and the effect of the microbiome and the intertumoral microbiome, are an area of emerging exploration. The biophysics of the pancreas and PDAC are unique. Stromal progression models are needed since the biophysical properties of the pancreas change with tumor progression. This area of research will aid in the identification of dependent therapeutic products. Additionally, the current treatment system can be enhanced by the addition of *in vivo* imaging and investment in agents that can image drug delivery. *In vivo* imaging can also be helpful to study the biomechanics and fluid mechanics of the tumors.

A more thorough understanding of the biology of tumor progression is needed. There are sophisticated methods to analyze the cellular composition of tissue that can be used to analyze pancreatic cancer versus chronic pancreatitis. Research in locally advanced disease and metastatic lesions that occur very early in the disease process need further study. Longitudinal sampling across different stages of disease will provide opportunities important for this type of research.

The science coming out of the RAS Initiative is extraordinary. However, more emphasis on RAS mutations in pancreatic cancer is desired as mutation of KRAS appears to be an initiating event in this disease. Different specific RAS mutations may have different downstream effectors, emphasizing the need for a more directed effort in this space.

## ANIMAL AND HUMAN TISSUE MODELS

### Assessment

There have been tremendous advances in mouse and organoid model systems over the past several years. Animal and human tissue models remain an important component to PDAC related research. They are useful for cause and effect studies of mutant genes. Mouse models showed that the KRAS mutation is an initiating event in PDAC. The KPC mouse is a useful model that develops invasive ductal disease. In this mouse model **KPC** stands for: Kras, p53, and Cre. Kras and p53 are two genes that are often mutated in human pancreatic tumors. Cre is a special tool gene that is used to control where Kras and p53 are turned on. Mouse models that specifically allow for a deeper understanding of the transition from high grade PanIN to invasive cancer are an unmet need, as are models of pancreatitis

Organoids, artificially grown masses of cells or tissue that resemble tumors can be made from human or mouse cancer cells. They may serve well in biomarker discovery, drug testing, and in the study of biological properties of cancer. For organoid pancreatic model systems, there are no reports of model comparisons, including success rates and validation to the primary tumor. Modified and non- epidermal growth factor/Noggin/R-spondin1 (ENR) organoids need comparison and validation to be used for therapeutic modeling. Organoid models provide stromal cultures for biological medicine applications. A comprehensive analysis of the extracellular matrix is needed as are more efficient ways of disseminating organoids.

The further development of additional models of pancreatitis, diabetes, obesity, genetic deficiency and metastasis are relevant to PDAC research. Additional studies of high grade PanIN and focal PDAC, imaging, and liquid biomarkers are also critical. A well annotated mouse tissue resource will be beneficial to the field.

### Research Gaps and Opportunities

- Mouse models of high grade PanIN, pancreatitis and DM that recapitulate human disease
- Collection and interrogation of samples from exceptional responders and non-responders
- Better models of metastatic disease
- Combining models of cachexia with models of PDAC

### Discussion

NCI has initiatives and programs to help stimulate research in PDAC animal and human tissue model systems. The NCI PDM (Patient Derived Models) repository (pdmr.cancer.gov) contains cell lines, and organoids available to extramural scientists. The tissue samples are sequenced, many associated with a clinical history. Additionally, the NCI supported Rapid Autopsy program has been collecting samples and is developing SOPs for both the collection and shipping of fresh tissue, which can be made available.

## RISK, PREVENTION, SCREENING, DIAGNOSIS

### Assessment

In prevention and diagnosis, progress has been made in understanding risk and prevention of pancreatic cancer such as: IPMN classification, and the genetics of cysts and molecular testing. Improved study design and larger validation cohorts are needed to further elucidate risk and prevention. Screening to identify high risk individuals will aid in detection of early stage disease. There is an effort to have more ethnic and racial minority representation in clinical trials and understand potential genetic differences and similarities. To date studies in minority populations have identified a higher incidence of the CD2K mutation. These studies need to be continued.

### Research Gaps and Opportunities

- Artificial intelligence/machine learning
- Integration of blood-based biomarkers
- Delivery of genetic testing /counseling to patients and relatives
- Development of vaccines for PDAC prevention

- Relationship between the microbiome and increasing rates of obesity and DM
- Knowledge of the relationship between obesity and Maturity Onset Diabetes in the Young (MODY) as risk factors for pancreatic cancer
- Identification of high-risk patients in those with pancreatic cysts

### Discussion

Education initiatives include identification of at-risk patients, education on diagnosis and treatment, and expanding knowledge of pancreatic diseases. Methods to capture the patient population lacking a family history need to be investigated. Detection of patients who have sporadic risk will have the greatest impact.

Computer science and molecular imaging have made great strides. Revolutionary changes will occur when we can evaluate the molecular characteristics through imaging. The nature of surveillance, physical exam versus imaging, plays a role in the ability to identify lesions and progression in pancreatic cancer. Use of ultrasonic and optoacoustic methods for diagnosis hold promise but will need continued support. There are opportunities to do screening trials utilizing imaging technologies. There are currently microbubble agents that can be used with hand-held ultrasound detectors—a technology that is exciting and promising. Optoacoustic imaging is being developed which might be of use in imaging of PDAC related lesions. These will need additional technological development along with the development of diagnostic drugs. Radiomics and machine learning with sophistical imaging analyses are possibilities of the near future.

The relationship between obesity and inflammation, and the recognition that obesity is a significant risk factor for pancreatic cancer was highlighted. It is a difficult area to study but is thought to be critically important in sporadic pancreatic cancer. Epidemiological studies have shown with bariatric surgery patients, only some of them are diabetic, but research implies they have insulin resistance. After bariatric surgery the incidence of pancreatic cancer is cut in half and insulin levels return to normal. This implies that insulin might be an active player in pancreatic cancer. The estimated proportion of pancreatic cancer incidence attributable to overweight and obesity in the US is 15 to 20 percent. This proportion is greater than the proportion estimated to be attributable to smoking or genetic susceptibility given the current high prevalence of overweight and obesity (71.6 percent) in the US adult population. Therefore, overweight and obesity is important to understand as risk factors for pancreatic cancer. In view of the current obesity epidemic in this country, the Working Group felt that NIH investment in obesity research and the link between obesity, DM, and PDAC is important.

A high priority is to bring together centers that have a large number of genetically tested and high-risk patients. For high-risk individuals, the question of how often to collect samples is critical; currently, there are no standards. We need to educate physicians and patients with convincing evidence. Our best chance of having patients survive PDAC is the identification of pre-invasive disease. We need to understand better the relationship between pancreatitis, obesity, glucose intolerance, and diabetes. Competing tissue needs for limited samples is a challenge in the use of diagnostic biopsies; development of new methodologies that use smaller quantities of tissue is critical.

## TREATMENT

### Assessment

An update on progress in the treatment of PDAC was provided. Updates on modalities, management of disease states, and horizon opportunities were discussed.

Improvement in treatment methods have included enhanced surgical and laparoscopic techniques resulting in reduced morbidity, improved risk/benefit determination and enhanced patient quality of life (QOL). However, for most patients, systemic therapy for PDAC has not improved outcomes significantly and there is urgency on the part of patients, families, and oncologists that expedited efforts are needed to expand therapies beyond traditional cytotoxic chemotherapy approaches. The importance of new therapies is underscored by its inclusion in two points of the scientific framework.

Over the past 5 years surgical improvements have resulted in a reduction in morbidity and mortality allowing more surgical intervention within quality centers of expertise. Other therapies including radiation, endoscopic ultrasound, and systemic therapy have had improvements in technique for better patient selection, diagnosis, reduced morbidity and improved QOL. Progress has been made in resectable and borderline disease allowing for management of micro-metastatic disease and a decrease in R1 resection rates. Promising results have been seen for 6-months treatment with adjuvant FOLFIRINOX (a combination of chemotherapeutic agents; leucovorin calcium, fluorouracil, irinotecan hydrochloride, and oxaliplatin) following resection. However, patient selection and chemotherapy tolerance remain a concern. Although systemic therapy is used to prevent disease recurrence, there is still a problem with local control. Advances is surgical techniques and radiotherapy may help to limit local disease progression.

Future objectives discussed included novel treatment strategies and precision medicine for mutant KRAS tumors, and more rapid return of molecular analysis for clinical decision-making. Patients should not wait more than 10 days to begin treatment. Improved understanding of cachexia and sarcopenia, immunotherapy, and the microenvironment are necessary for the design of future treatment strategies.

Focus on development of endpoints and statistics relevant to pancreatic cancer clinical trials is important for the design of future clinical trials. Current clinical trial designs do not take into the account the aggressiveness of the disease, making accrual to PDAC trials difficult.

Further, the high symptom burden faced by many patients with PDAC warrants additional research into improving palliative and supportive care, optimizing pain management, and improving care of patients at the end of life.

### Research Gaps and Opportunities

- Treatments other than cytotoxic chemotherapy
- Advances in precision medicine
- Opportunities to learn from clinical trial failures
- Consensus on endoscopy methods
- Methods to improve palliative and supportive care including optimization of pain management and end-of-life care

### Discussion

For tissue acquisition, there is no clear consensus on protocols. Assembling a working group to look at how best to obtain tissues is of great interest. An organized, systemized approach would be helpful. There is a shortage of effective systemic treatments. Only 5 percent of patients are going on trials; how can we encourage patients to go on trials? Are we over-selecting patients, such as those with the most aggressive disease? Are inclusion criteria too restrictive and perhaps irrelevant to the treatment?

Any biomarkers that signal disease would need to be followed up by biopsy unless we have better imaging. One third of patients will die with a component of local disease, so local disease is important to study. The potential for radioimmunotherapy is very exciting in PDAC.

An area of imaging to further explore is after neoadjuvant therapy. Understanding characteristics of tumors after neoadjuvant therapy would help determine the difference between fibrosis and disease progression. If imaging is going to be important, we need better pancreatic-specific treatments and more specific imaging markers.

## RESEARCH GAPS AND OPPORTUNITIES

### RESEARCH GAPS

- Biological relationship between PDAC and metabolic disruptions, including diabetes, obesity, cachexia and sarcopenia
- The relationship between diabetes and PDAC in minority/underserved populations
- Recapitulating the relationship between PDAC, diabetes, and insulin metabolism in animal models
- Intratumoral heterogeneity
- New therapies
- New statistical approached and methodologies to clinical trial designs for rare and aggressive cancers
- Clinical trial accrual issues; barriers to trial entry, inclusion/exclusion criteria, and trial design issues

### RESEARCH OPPORTUNITIES

#### PDAC Biology- Genetics/Metabolomics/Tumor Biology

- Perturbations of the tumor microenvironment and its impact on tumor progression and therapeutic response
- Understanding the role of the microbiome
- Greater understanding of PDAC disruption of metabolic pathways
- The role tumor cell heterogeneity plays in drug resistance

#### Animal and Human Tissue Models

- Mouse models of high grade PanIN, pancreatitis, and DM that recapitulate human disease
- Use of organoids as pre-clinical and co-clinical platforms for biomarker discovery and therapeutic prediction
- Complementary strategies to model the disease as a whole
- Collection and interrogation of samples from exceptional responders and non-responders

### Risk, Prevention, Screening, Diagnosis

- Development and validation of biomarkers for detection of sporadic early stage pancreatic cancer
- Integration of imaging methods with screening and biomarkers
- Artificial intelligence/machine learning to integrate different biomarkers, i.e., cell-free DNA, blood-based genetic susceptibility markers
- Enhanced delivery of genetic testing to patients and relatives
- Education initiatives to identify at-risk patients, improve diagnosis, and accelerate and expand treatment opportunities

### Treatment

- Improvements to immune therapy including capitalizing on resource centers and diverse scientific expertise, addressing multi-cellular heterogeneity, disrupting drug privileged sites
- Improving the integration of radiation therapy with immunotherapy, targeted therapies, and chemotherapy for resectable and locally advanced disease
- Determining the impact of chemotherapy on the immune system and immunotherapy
- Partnerships with biotech, Pharma, and NIH to more rapidly screen for lead compounds and collaboration for the development of reference sets and standardized protocols
- New treatment methods for pancreatic cancer especially metastatic disease
- Innovative designs to address challenges with pancreatic clinical trials
- Precision medicine, serial biopsy, and longitudinal assessments
- Strategies to enhance clinical trial accrual
- Standards for clinical data and tissue acquisition
- Clinical trials with longitudinal biospecimen collection
- Improvements in palliative, supportive, and end-of-life care

## CONCLUSIONS AND NEXT STEPS

The 2014 Initiatives are still relevant and vital to continued progress.

The Group agreed while significant progress has been made the initiatives identify key areas for continued focus. NCI has been responsive in developing new approaches and initiatives in diverse research areas including molecular targets, risk factors, and immunotherapy. However, continued efforts and continued evolution of research methods are needed to move the field forward.

Although progress has been made in understanding risk factors of pancreatic cancer new study designs and larger validation cohorts are needed to further identify individuals at risk. Methodologies to detect patients who have sporadic risk will have the greatest impact on outcomes. Epidemiologic studies suggest that 15-20 percent of pancreatic cancers are attributable to overweight and obesity. Alterations of metabolic processes that occur because of diabetes are better understood than the unusual disruption of metabolic processes that occur as a result of pancreatic cancer. Understanding the metabolic perturbation will aid in the development of prevention activities (lifestyle alterations) and treatment decisions that often must be made in the setting of diabetes, cachexia, and sarcopenia due to

advanced disease. The relationship between the microbiome, obesity, and diabetes, although difficult to study will provide opportunities for improving outcomes for patients at risk of developing pancreatic cancer.

Clinically, a fundamental change is needed in treatment approaches that can offer better therapies and patient care in this recalcitrant disease. There is a history of trial failures that needs to be evaluated and addressed to create change in pancreatic cancer therapeutics. In addition, maintaining a patient centered research design and optimizing palliative and supportive care while incorporating new techniques and assessing patient benefit will optimize study impact and patient outcomes.

Specific tissue collection methods, better quantitation of available biopsy material, and standardization across the field are modifications that can benefit clinical research efforts. Incorporating new technology such as organoids and animal models that better recapitulate the human disease will provide opportunities for increased efficiency and reproducibility. Likewise, barriers to trial entry including strict eligibility and organ function criteria need be re-evaluated and amended to increase patient enrollment since many patients have co-morbidities. Expanding and diversifying the patient population that is eligible to participate in trials will enhance research in this disease.

## APPENDICES - SUPPLEMENTAL RESOURCES

Appendix 1: Progress in Pancreatic Ductal Adenocarcinoma (PDAC) Research Working Group (PDAC Progress WG) 2018 Roster

Appendix 2: Funded Project Summary FY 2015 – FY2017

- NIH PDAC Funded Projects, Initiative 1: Understanding the Biological Relationship Between PDAC and Diabetes Mellitus
- NIH PDAC Funded Projects, Initiative 2: Evaluating Longitudinal Screening Protocols for Biomarkers for Early Detection of PDAC and its Precursors
- NIH PDAC Funded Projects, Initiative 3: Studying New Therapeutic Strategies in Immunotherapy
- NIH PDAC Funded Projects, Initiative 4: Developing New Treatment Approaches that Interfere with RAS Oncogene-Dependent Signaling Pathways
- NIH PDAC Funded Projects, not related to the Framework Initiatives

Appendix 3: PDAC Publications Supported by Grants Submitted in Response to Funding Announcements

- NCI-PAR 15-289: NCI CDP Pancreatic Cancer Detection Consortium
- RFA-DK-14-027 and RFA-DK-14-028: NCI-NIDDK Joint FOAs Consortium for the Study of Chronic Pancreatitis, Diabetes and Pancreatic Cancer Clinical Centers and Coordination and Data Management Center

Appendix 4: Open NCI PDAC Supported Clinical Trials as of February 2018

Appendix 5: NCI Clinical Trials and Translational Research Advisory Committee (CTAC) Progress in Pancreatic Ductal Adenocarcinoma Research Working Group (PDAC Progress WG) October 17, 2018 Meeting Agenda

# National Cancer Institute

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# Appendices - Supplemental Resources
# Working Group Report Appendices
# March 6, 2019

**The report was accepted at the March 6, 2019 CTAC Meeting.**

# National Cancer Institute
# Clinical Trials and Translational Research Advisory Committee (CTAC)
# Progress in Pancreatic Ductal Adenocarcinoma Research Working Group (PDAC Progress WG)

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**Robert H. Vonderheide, M.D.**
John H. Glick MD Abramson Cancer Center's
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Professor of Medicine
Perelman School of Medicine
Director
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University of Pennsylvania
Pennsylvania, PA

**Executive Secretary**

**Deborah Jaffe, Ph.D.**
Program Director
Coordinating Center for Clinical Trials
Office of the Director
National Cancer Institute
National Institutes of Health
Rockville, MD

Appendix 2
NIH PDAC Funded Projects,
Initiative 1: Understanding the Biological
Relationship Between PDAC and Diabetes Mellitus

| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s) All<br>Institution |
|---|---|
| K01AA19996<br>Mediators of pancreatic cancer induction by alcoholic pancreatitis and smoking | Edderkaoui, Mouad<br>Cedars-Sinai Medical Center |
| R01CA180949<br>Early detection of pancreatic cancer in diabetics | Chen, Ru (Contact); Pan, Sheng<br>University of Washington |
| R01DK107767<br>Omega-3 derived epoxy fatty acids and sEH in pancreatitis-induced carcinogenesis | Yang, Guang-Yu<br>Northwestern University at Chicago |
| R01DK52913<br>The Role of Zinc Finger Cofactors in Pancreatic Cell Growth | Urrutia, Raul A<br>Mayo Clinic Rochester |
| R01DK61220<br>Transcriptional Regulators of the Exocrine Pancreatic Phenotype | Macdonald, Raymond J (Contact); Murtaugh, Lewis C<br>UT Southwestern Medical Center |
| R03CA181584<br>Targeting cancer stem cell initiation during pancreatic cancer development | Janakiram, Naveena B<br>University of Oklahoma Hlth Sciences Ctr |
| U01DK108288<br>The Exocrine and Endocrine Pancreas in Type 2 Diabetes, Pancreatitis and Cancer | Chari, Suresh T (Contact); Topazian, Mark D<br>Mayo Clinic Rochester |
| U01DK108300<br>A Clinical Center to Study Immunological and Hormonal Biomarkers for the Diagnosis, Prediction and Treatment of Chronic Pancreatitis and its associated development to Diabetes and Pancreas Cancer | Park, Walter Gwang-Up (Contact); Habtezion, Aida ; Kim, Seung K<br>Stanford University |
| U01DK108306<br>Consortium for the Study of Pancreatitis: Pittsburgh Clinical Center | Whitcomb, David Clement<br>University of Pittsburgh at Pittsburgh |
| U01DK108314<br>Pathophysiology, Epidemiology, and Prevention of Pancreatogenic Diabetes | Pandol, Stephen J (Contact); Goodarzi, Mark<br>Cedars-Sinai Medical Center |
| U01DK108320<br>U01-Consortium for the Study of Chronic Pancreatitis, Diabetes and Pancreatic Cancer Clinical Centers | Forsmark, Christopher E (Contact); Cusi, Kenneth ; Hughes, Steven J<br>University of Florida |
| U01DK108323<br>Indiana University (IU) Clinical Center for Chronic Pancreatitis Clinical Research Network | Fogel, Evan<br>Indiana Univ-Purdue Univ at Indianapolis |
| U01DK108326<br>Altered Microbiome In Pancreatitis, Diabetes And Pancreatic Cancer | Fisher, William E<br>Baylor College of Medicine |

Appendix 2
NIH PDAC Funded Projects,
Initiative 1: Understanding the Biological
Relationship Between PDAC and Diabetes Mellitus

| **Base Project Number**<br>**Title (linked to RePORTER abstract)** | **PI Name(s) All**<br>**Institution** |
|---|---|
| U01DK108327<br>The Ohio State University Pancreatic Disorders Network (OSU-PDN) | Conwell, Darwin Lewis (Contact); Banks, Pamela G; Bellin, Melena D; Gariepy, Cheryl E; Gelrud, Andres ; Gress, Francis G; Hart, Philip A; Palermo, Joseph ; Steen, Hanno ; Topazian, Mark D; Whitcomb, David Clement<br>Ohio State University |
| U01DK108328<br>Consortium for the Study of Chronic Pancreatitis, Diabetes and Pancreatic Cancer: Coordinating and Data Management Center (CSCPDPC-CDMC) | Feng, Ziding (Contact); Maitra, Anirban<br>University of Tx Md Anderson Can Ctr |
| U01DK108332<br>Chronic Pancreatitis, Diabetes and Pancreatic Cancer: A Prospective Approach | Van Den Eeden, Stephen K<br>Kaiser Foundation Research Institute |

Appendix 2
NIH PDAC Funded Projects,
Initiative 2: Evaluating Longitudinal Screening Protocols for Biomarkers for Early Detection of PDAC and its Precursors

| Project Number<br>Title | PI Names (All)<br>Institution |
|---|---|
| R21CA209366<br>Identifying insulin resistance biomarkers and metabolomic signature as predictors of precursors to pancreatic cancer | Zhang, Jianjun None (Contact); Schmidt, Christian Maximillian<br>Indiana Univ-Purdue Univ At Indianapolis |
| U01CA200466<br>Validation of biomarkers for early diagnosis and risk prediction of pancreatic neoplasms | Brand, Randall (Contact); Batra, Surinder K<br>University Of Pittsburgh At Pittsburgh |
| U01CA152653<br>Detection and prognosis of early-stage pancreatic cancer by interdependent plasma markers | Haab, Brian B (Contact); Allen, Peter J; Brand, Randall<br>Van Andel Research Institute |
| R01CA136526<br>Mechanism of Pancreatic Carcinogenesis | Fernandez-Zapico, Martin Ernesto<br>Mayo Clinic Rochester |
| R21CA185689<br>Non-invasive Differentiation of Benign Lesions from Aggressive Pancreatic Cancer | Craik, Charles Scott (Contact); Kirkwood, Kimberly Saunders<br>University Of California, San Francisco |
| R01CA183101<br>Biophotonics to Couple Pancreatic with Upper GI Screening via Ultrathin Endoscopy | Backman, Vadim (Contact); Rogers, Jeremy D; Roy, Hemant K<br>Northwestern University |
| R33CA225380<br>Molecular Beacon Based Extracellular mRNA and Protein Detection for Early Cancer Diagnosis | Lee, Ly James (Contact); Fleisher, Martin<br>Ohio State University |
| U01CA214254<br>Noncoding RNA Biomarkers for Noninvasive and Early Detection of Pancreatic Cancer | Goel, Ajay (Contact); Von Hoff, Daniel D<br>Baylor Research Institute |
| U01CA210020<br>Molecular Imaging Methods for the Detection of Pancreatic Ductal Adenocarcinoma | Iagaru, Andrei (Contact); Park, Walter Gwang-Up<br>Stanford University |
| R01CA180949<br>Early detection of pancreatic cancer in diabetics | Chen, Ru (Contact); Pan, Sheng<br>University Of Washington |

Appendix 2
NIH PDAC Funded Projects,
Initiative 2: Evaluating Longitudinal Screening Protocols for Biomarkers for Early Detection of PDAC and its Precursors

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|---|---|
| R33CA206907<br>Rapid unbiased isolation and in situ RNA analysis of circulating tumor cells using a magnetic micropore-based diagnostic chip | Issadore, David Aaron<br>University Of Pennsylvania |
| U01CA217665<br>Peptide-based targeted molecular imaging for early detection in pancreatic cancer | Sutcliffe, Julie L<br>University Of California At Davis |
| R21CA206013<br>(PQ1) Cellular senescence as an initiating event in malignant transformation | David, Gregory<br>New York University School Of Medicine |
| N01CA0<br>IGF::OT::IGF PREVENT EFFICACY: OPTIMIZATION OF GEM MODELS FOR HIGH-RISK COHORTS OF HUMAN PANCREATIC CYSTADENOMAS, IPMNS, AND PANINS PROGRESSION TO PDAC. | Rao, Chinthalapally<br>University Of Oklahoma Hlth Sciences Ctr |
| R43CA199058<br>Profiling Circulating miRNA Without PCR for Early Detection of Pancreatic Cancer | Saraf, Ravi (Contact); Roy, Santanu<br>Vajra Instruments, Inc. |
| F32CA210396<br>Development of 18F-based Pretargeted PET imaging strategies for the PET imaging of cancer | Meyer, Jan-Philip<br>Sloan-Kettering Inst Can Research |
| R01CA172045<br>Epigenetic regulation of pancreatic cancer | Hebrok, Matthias<br>University Of California, San Francisco |
| R01CA195733<br>Employing mouse models to translate early detection of pancreas cancer | Kalluri, Raghu (Contact); Piwnica-Worms, David<br>University Of Tx Md Anderson Can Ctr |
| R43CA200052<br>Screening for pancreatic cancer via nanocytology of duodenal cells | Cherkezyan, Lusik Surenovna (Contact); Subramanian, Hariharan<br>Nanocytomics, Llc |
| R03CA181584<br>Targeting cancer stem cell initiation during pancreatic cancer development | Janakiram, Naveena B<br>University Of Oklahoma Hlth Sciences Ctr |
| R01CA216879<br>Targeted Molecular Imaging of Plectin-1; Bench to bedside and back again | Sutcliffe, Julie L (Contact); Kelly, Kimberly A<br>University Of California At Davis |

Appendix 2
NIH PDAC Funded Projects,
Initiative 2: Evaluating Longitudinal Screening Protocols for Biomarkers for Early Detection of PDAC and its Precursors

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|---|---|
| F30CA196087<br>TSPO-PET to Image Pancreatic Cancer and High-Risk Precursor Lesions | Watchmaker, Jennifer M<br>Vanderbilt University |
| R43CA200398<br>Digital Analysis of Plasma miRNA populations in Pancreatic Cancer | Metzker, Michael L<br>Redvault Biosciences, Lp |
| R01CA217207<br>The Development And Progression Of IPMN To PDA In The Context Of Inactivated Activin Signaling | Su, Gloria Huei-Ting<br>Columbia University Health Sciences |
| R15GM110632<br>Label-Free Nanopore Biosensor for Rapid, Ultrasensitive, and Multiplex Detection of Protease Activities | Guan, Xiyun<br>Illinois Institute Of Technology |
| U01CA200468<br>A Clinical Validation Center for Early Detection of Pancreatic Cancer | Maitra, Anirban<br>University Of Tx Md Anderson Can Ctr |
| R21CA185536<br>(PQC5)Early Detection Pancreatic Cancer by Hyperpolarized Silicon Nanoparticles | Bhattacharya, Pratip K<br>University Of Tx Md Anderson Can Ctr |
| R21CA185962<br>Pancreatic Cyst Fluid miRNOME for Biomarkers of Pancreatic Cancer | Sen, Subrata<br>University Of Tx Md Anderson Can Ctr |
| R01CA211927<br>Reconstituting human pancreatic cancer development for translational research | Kim, Seung K<br>Stanford University |
| R21CA187869<br>Detection of 5-hmC as a Novel Screening Biomarker for Pancreatic Cancer | Zhang, Wei (Contact); Hou, Lifang<br>Northwestern University At Chicago |
| R35CA210039<br>Immunoprevention and immunosurveillance of human non-viral cancers | Finn, Olivera J<br>University Of Pittsburgh At Pittsburgh |
| R41CA203090<br>Pancreatic Ductal Adenocarcinoma Targeted Ultrasound Contrast Agent Development | Unger, Evan Charles (Contact); Willmann, Juergen Karl<br>Nuvox Pharma, Llc |
| R35CA197699<br>Molecular strategies for early detection and targeting of cancer | Reya, Tannishtha<br>University Of California, San Diego |

Appendix 2
NIH PDAC Funded Projects,
Initiative 2: Evaluating Longitudinal Screening Protocols for Biomarkers for Early Detection of PDAC and its Precursors

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|---|---|
| U01CA111294<br>Early Diagnosis of Pancreatic Cancer | Hollingsworth, Michael A (Contact);<br>Batra, Surinder K<br>University Of Nebraska Medical Center |
| R01HD65800<br>Mechanisms Controlling Epithelial Homeostasis | O'reilly, Alana M<br>Research Inst Of Fox Chase Can Ctr |
| R01CA176828<br>Using Markers to Improve Pancreatic Cancer Screening | Goggins, Michael G<br>Johns Hopkins University |
| U01CA210170<br>Using markers to improve pancreatic cancer screening and surveillance | Goggins, Michael G<br>Johns Hopkins University |
| R21CA174594<br>Single molecule microarrays for the detection of mutant DNA in body fluids | Celedon, Alfredo Andres<br>Scanogen, Inc. |
| R01CA200572<br>PKD1 signaling in the initiation of pancreatic cancer | Storz, Peter<br>Mayo Clinic Jacksonville |
| U01CA111302<br>Biomarkers for the Early Detection of Pancreatic Cancer | Killary, Ann M (Contact); Sen, Subrata<br>University Of Tx Md Anderson Can Ctr |
| R21CA196485<br>High Specificity MicroRNA Microarray Analysis without PCR for Cancer Screening and Research | Saraf, Ravi F<br>University Of Nebraska Lincoln |
| R01CA208401<br>Protein and proteolytic activity biomarkers of early stage pancreatic cancer | Tempst, Paul (Contact); Yu, Kenneth H<br>Sloan-Kettering Inst Can Research |
| R01CA182076<br>Biomarker validation for intraductal papillary mucinous neoplasms of the pancreas | Allen, Peter J (Contact); Fernandez-Del Castillo, Carlos ; Wolfgang, Christopher L<br>Sloan-Kettering Inst Can Research |
| R21CA175833<br>Use of DND1 to counteract miRNA function in cancers | Matin, Angabin<br>University Of Tx Md Anderson Can Ctr |
| R01CA135650<br>Predictive Cancer Diagnostics and Therapy Response | Moore, Anna (Contact); Medarova, Zdravka O<br>Massachusetts General Hospital |

Appendix 2
NIH PDAC Funded Projects,
Initiative 2: Evaluating Longitudinal Screening Protocols for Biomarkers for Early Detection of PDAC and its Precursors

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|---|---|
| R21CA188059<br>Long non-coding RNAs in pancreatic cancer | Sussel, Lori<br>Columbia University Health Sciences |
| U01CA196403<br>Imaging and Molecular Correlates of Progression in Cystic Neoplasms of the Pancreas | Maitra, Anirban<br>University Of Tx Md Anderson Can Ctr |
| F31CA220937<br>The Novel Role of REST in the Development of Pancreatic Ductal Adenocarcinoma | Bray, Julie<br>University Of Florida |
| K08DK109492<br>The role of progenitor cells in pancreatic acinar renewal and pre-malignant progression | Maddipati, Ravikanth<br>University Of Pennsylvania |
| U01CA210240<br>Pancreatic Cancer Detection Consortium | Hollingsworth, Michael A<br>University Of Nebraska Medical Center |
| R41CA213718<br>Ultrasensitive SERS Nano-Sensors for Pancreatic Cancer Diagnosis and Prognosis | Junker, Wade M (Contact); Kaur, Sukhwinder<br>Sanguine Diagnostics And Therapeutics |
| R01CA202917<br>JAK1 Signaling in Pancreatic Cancer Initiation and Progression | Wagner, Kay-Uwe<br>University Of Nebraska Medical Center |
| R01CA196286<br>Validation of pancreatic cancer biomarkers in large prospective cohorts | Lokshin, Anna E<br>University Of Pittsburgh At Pittsburgh |
| R01CA174294<br>Multifunctional immunoPET tracers for pancreatic and prostate cancer | Wu, Anna M (Contact); Reiter, Robert E<br>University Of California Los Angeles |
| F32CA196120<br>A cell-based liquid biopsy approach for early pancreatic cancer detection | Bhagwat, Neha<br>University Of Pennsylvania |
| R21CA191343<br>Defining the Role for A Lipid Kinase in the Progression of Pancreatic Cancer | Ling, Kun<br>Mayo Clinic Rochester |
| R43DK115341<br>Development of fluorogenic substrates for the diagnosis of pancreatic cysts | Knudsen, Giselle M<br>Alaunus Biosciences, Inc. |

Appendix 2
NIH PDAC Funded Projects,
Initiative 2: Evaluating Longitudinal Screening Protocols for Biomarkers for Early Detection of PDAC and its Precursors

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|---|---|
| R21CA212827<br>Single-molecule mechanical detection of protein and microRNA cancer biomarkers | Wong, Wesley Philip<br>Boston Children's Hospital |
| R01CA207110<br>Prospective immune profiling using methylation markers and pancreatic cancer risk | Michaud, Dominique S (Contact); Kelsey, Karl Timothy<br>Tufts University Boston |
| R01CA192381<br>Exploitation of RAS signaling to develop therapy and early detection strategies for PDA | Brekken, Rolf A (Contact); Wilkie, Thomas M<br>Ut Southwestern Medical Center |
| R21CA198287<br>Aptamers as Proteomic Tools for Pancreatic Cancer Biomarker Identification | White, Rebekah<br>Duke University |
| R43CA213863<br>A Scalable Blood-based Pancreatic Cancer Test for High-Risk Screening | Freedman, David<br>Nanoview Diagnostics, Inc. |
| R21CA194839<br>A novel mouse model to identify biomarkers of IPMN formation and progression | Sander, Maike<br>University Of California, San Diego |
| R01CA218513<br>Development and application of asymmetric-flow field-flow (AF4) technology in fractionation and characterization of exosome subpopulations and novel nanoveiscles in pancreatic cancer model | Lyden, David Charles (Contact); Zhang, Haiying<br>Weill Medical Coll Of Cornell Univ |
| U01CA210171<br>Circulating Biomarker Consortium for Pancreatic Cancer Early Detection | Wolpin, Brian Matthew<br>Dana-Farber Cancer Inst |
| U01CA210138<br>Mayo Clinic Prospective Resource for Biomarker Validation and Early Detection of Pancreatic Cancer | Petersen, Gloria M (Contact); Zaret, Kenneth S<br>Mayo Clinic Rochester |
| U01CA168896<br>Targeted Glycomics and Affinity Reagents for Cancer Biomarker Development | Haab, Brian B (Contact); Smith, David Fletcher<br>Van Andel Research Institute |

Appendix 2
NIH PDAC Funded Projects,
Initiative 2: Evaluating Longitudinal Screening Protocols for Biomarkers for Early Detection of PDAC and its Precursors

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|---|---|
| K99CA204725<br>Exploring Glycobiology and Discovering Biomarkers for Pancreatic Cancer | Engle, Dannielle<br>Cold Spring Harbor Laboratory |
| U01CA128454<br>Discovery and Development of Cancer Glycomarkers | Pierce, J Michael<br>University Of Georgia |
| R43CA210854<br>A highly specific NIRF/PET probe for the detection of cancer and metastases | Yang, Xinlin<br>Imol Radiopharmaceuticals, Llc |
| R03CA195453<br>Endoenteric Balloon Coils for Improved MR Imaging of the Pancreas and Upper GI Tract | Hadley, John Rock<br>University Of Utah |

Appendix 2
NIH PDAC Funded Projects,
Initiative 3: Studying New Therapeutic Strategies in Immunotherapy

| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s) All<br>Institution |
|---|---|
| F30CA196124<br>Pro- and anti-phagocytices signals on pancreatic cancer regulate tumor macrophag | Liu, Mingen<br>University of Pennsylvania |
| F31CA189757<br>The Role of Cancer Associated Fibroblasts in Pancreatic Tumor Progression | Pitarresi, Jason R<br>Ohio State University |
| F31CA220970<br>Image-guided, sonoporation-enhanced immunotherapy for pancreatic cancer treatment | Fix, Samantha Marie<br>Univ of North Carolina Chapel Hill |
| F32CA189633<br>Targeted Delivery of Theranostic Nanoparticles Carrying Immune Modulators | Bozeman, Erica<br>Emory University |
| F32CA206330<br>Novel Pancreatic Cancer T Cell Immunotherapy | Woodham, Andrew Wallace<br>Whitehead Institute for Biomedical Res |
| F32CA213795<br>Targeting hyaluronan in the tumor microenvironment to improve DNA vaccine immunotherapy | Duperret, Elizabeth Kennedy<br>Wistar Institute |
| F32CA217033<br>Epigenetic therapy for pancreatic cancer | Liang, Gaoyang<br>Salk Institute for Biological Studies |
| F99CA223043<br>Defining the barriers to immune surveillance in solid tumors | Hegde, Samarth<br>Washington University |
| K08CA138907<br>CD40 Pathway in Pancreatic Adenocarcinoma | Beatty, Gregory L<br>University of Pennsylvania |
| K22CA181611<br>Online monitoring and image-guided treatment of chemoresistant micrometastases | Spring, Bryan Quilty<br>Northeastern University |
| K23CA163672<br>Cyclophosphamide modified GM-CSF pancreatic tumor vaccine + listeria-mesothelin | Le, Dung T<br>Johns Hopkins University |
| N01CA0<br>Effect Of A Multipeptide KRAS Vaccine in the Prevention of Pancreatic Cancer Driven by KRAS Oncoprotein HHSN2612015000371_TORFP: 2017-E02 | You, Ming<br>Medical College of Wisconsin |
| R01CA120409<br>IMMUNOTHERAPY WITH CAR T CELLS | June, Carl H (Contact); Zhao, Yangbing<br>University of Pennsylvania |
| R01CA163441<br>Radiotherapy as Immunotherapy of Tumors | Strober, Samuel<br>Stanford University |
| R01CA168863<br>CCR2 Blockade in Human Pancreatic Cancer | Linehan, David C<br>University of Rochester |

Appendix 2
NIH PDAC Funded Projects,
Initiative 3: Studying New Therapeutic Strategies in Immunotherapy

| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s) All<br>Institution |
|---|---|
| R01CA169123<br>Immunobiology and immunotherapy of pancreatic cancer | Vonderheide, Robert H (Contact); Stanger, Ben Z<br>University of Pennsylvania |
| RR01CA177670<br>Reprogramming the Metastatic Microenvironment of Pancreatic Cancer Through CSF1R | Denardo, David G<br>Washington University |
| R01CA182311<br>High dose radiation therapy to direct immune responses to pancreatic cancer | Gough, Michael James<br>Providence Portland Medical Center |
| R01CA184926<br>(PQB-3) Driver gene-induced inflammation in pancreatic cancer development | Jaffee, Elizabeth M<br>Johns Hopkins University |
| R01CA187923<br>Novel Strategies to Potentiate a Ras-targeted Oncolytic Herpes Simplex Virus | Zhang, Xiaoliu<br>University of Houston |
| R01CA189209<br>Radio-immunotherapy to Target Cancer Stem Cells in Solid Tumor Malignancies | Murphy, William Joseph<br>University of California at Davis |
| R01CA191191<br>IDO2 Targeting in Pancreatic Cancer | Prendergast, George C<br>Lankenau Institute For Medical Research |
| R01CA197296<br>Reprogramming the pancreatic tumor microenvironment with immunotherapy | Zheng, Lei (Contact); Jaffee, Elizabeth M<br>Johns Hopkins University |
| R01CA197916<br>Targeting macrophages for immunotherapy in pancreatic cancer | Beatty, Gregory L<br>University of Pennsylvania |
| R01CA198095<br>Novel Strategies for Precision T-cell Therapies | Almo, Steven C<br>Albert Einstein College of Medicine, Inc |
| R01CA203890<br>Combined Tumor and Stromal Targeting to Improve Pancreatic Cancer Response To Immunotherapy | Denardo, David G<br>Washington University |
| R01CA208108<br>MUC16 in Pancreatic Cancer Progression and Metastasis | Radhakrishnan, Prakash<br>University of Nebraska Medical Center |
| R01CA208253<br>Enhancing immune therapy in pancreatic cancer by targeting IL-6 | Lesinski, Gregory B<br>Ohio State University |
| R01CA208514<br>Mechanisms of durable antitumor immunity via CD26hiCD4+ T cells | Paulos, Chrystal Mary<br>Medical University of South Carolina |

Appendix 2
NIH PDAC Funded Projects,
Initiative 3: Studying New Therapeutic Strategies in Immunotherapy

| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s) All<br>Institution |
|---|---|
| R01CA209886<br>MRI-Guided Dendritic-Cell-Based Vaccine Immunotherapy for Pancreatic Cancer | Zhang, Zhuoli<br>Northwestern University at Chicago |
| R01CA210553<br>Image-guided ultrasound therapy and drug delivery in pancreatic cancer | Ferrara, Katherine W<br>University of California at Davis |
| R01CA211070<br>The Pancreatic Cancer Microenvironment | Kang, Rui<br>University of Pittsburgh at Pittsburgh |
| R01CA211098<br>Thrombin-dependent mechanisms of pancreatic ductal adenocarcinoma disease | Flick, Matthew J (Contact); Konieczny, Stephen F<br>Cincinnati Childrens Hosp Med Ctr |
| R01CA211752<br>Heparanase in Tumor Progression, Metastasis and Chemoresistance | Sanderson, Ralph D<br>University of Alabama at Birmingham |
| R01CA33084<br>Mechanisms of Murine Turmor Eradication by Immunotherapy | Greenberg, Philip D<br>University of Washington |
| R03CA219725<br>IRF2BP2 modification by Cdk5 modulates interferon-gamma response tumor PD-L1 level | Petrosiute, Agne<br>Case Western Reserve University |
| R21CA182701<br>Targeting CCR2 to Overcome Immunosuppression and Improve Immunotherapy | Denardo, David G<br>Washington University |
| R21CA205094<br>Primers: Combining Radiotherapy and Immunotherapy using next genertaion radiotherapy biomaterials | Ngwa, Wilfred<br>Dana-Farber Cancer Inst |
| R21CA218495<br>Inhibition of Stromal-Derived DKK3 to Enhance the Response of Pancreatic Cancer to Immunotherapy | Hwang, Rosa F<br>University of TX MD Anderson Can Ctr |
| R35CA209960<br>Molecular Imaging and Theranostics of Cancer | Bhujwalla, Zaver M<br>Johns Hopkins University |
| R35CA210039<br>Immunoprevention and immunosurveillance of human non-viral cancers | Finn, Olivera J<br>University of Pittsburgh at Pittsburgh |
| R35CA210088<br>The Role of Stem Cells and the Microenvironment in Gastrointestinal Cancers | Wang, Timothy Cragin<br>Columbia University Health Sciences |
| R41CA195947<br>Novel immunotherapy strategy for treatment of pancreatic cancer | Mukherjee, Pinku<br>Oncotab, Inc |

Appendix 2
NIH PDAC Funded Projects,
Initiative 3: Studying New Therapeutic Strategies in Immunotherapy

| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s) All<br>Institution |
|---|---|
| R41CA217482<br>Development of a protein drug for pancreatic cancer treatment | Liu, Zhi-Ren<br>Proda Biotech, LLC |
| R43CA189436<br>Development of an ADC against Pancreatic Cancer | Schlosser, Michael J<br>Coare Biotechnology, Inc. |
| R43CA221400<br>Novel monobody therapy for pancreatic cancer | Yu, Bo (Contact); Larrick, James W<br>Larix Bioscience, LLC |
| R44CA174025<br>Development of Monoclonal Antibodies to Treat Pancreatic Cancer | Sureban, Sripathi M<br>Coare Biotechnology, Inc. |
| R44CA203336<br>Immuno-Oncology for Pancreatic Cancer: A Combination Clinical Trial with Chemotherapy and Radiation | Aguilar-Cordova, Estuardo (Contact); Aguilar, Laura K<br>Advantagene, Inc |
| R50CA211425<br>Defining and targeting mechanisms of pancreas cancer pathogenesis | Whittle, Martin<br>Fred Hutchinson Cancer Research Center |
| U01CA176058<br>The Dana-Farber Cancer Institute Cancer Target Discovery and Development Center | Hahn, William C<br>Dana-Farber Cancer Inst |
| U01CA213862<br>Nanovaccine platforms to combat pancreatic cancer | Narasimhan, Balaji (Contact); Jain, Maneesh ; Salem, Aliasger K<br>Iowa State University |
| U01CA224145<br>Interrupting Cellular Crosstalk in the Immunosuppressive Microenvironment of Pancreas Cancer | Crawford, Howard C (Contact); Pasca Di Magliano, Marina<br>University of Michigan at Ann Arbor |
| U01CA224146<br>Systematic interrogation of the pancreatic cancer microenvironment in patient-derived specimens | Hahn, William C<br>Dana-Farber Cancer Inst |
| U01CA224175<br>Defining neoantigen immunodominance for antigen selection and biomarker discovery in human pancreatic cancer immunotherapy | Balachandran, Vinod P (Contact); Leach, Steven D<br>Sloan-Kettering Inst Can Research |
| U01CA224193<br>Disrupting the immune and drug-privileged microenvironment in pancreas cancer | Hingorani, Sunil R<br>Fred Hutchinson Cancer Research Center |
| U01CA224348<br>Reprogramming PDAC tumor microenvironment to improve immunotherapy | Jain, Rakesh K (Contact); Pittet, Mikael<br>Massachusetts General Hospital |
| U24CA224020<br>Pancreatic Ductal Adenocarcinoma Translational Resource Center (PATReC) | Wistuba, Ignacio I (Contact); Maitra, Anirban<br>University of TX MD Anderson Can Ctr |

Appendix 2
NIH PDAC Funded Projects,
Initiative 3: Studying New Therapeutic Strategies in Immunotherapy

| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s) All<br>Institution |
|---|---|
| ZIABC10298<br>Growth Regulation Section | Pastan, Ira<br>National Cancer Institute |
| ZIABC10774<br>T Cell Alternative p38 Activation Pathway | Ashwell, Jonathan<br>National Cancer Institute |
| ZIABC11185<br>Role of Immune and Inflammation Mediators in Progression of Pancreatic Cancer | Hussain, Syed Perwez<br>National Cancer Institute |

## Administrative supplements

| Base Project Number<br>Title | PI Name(s) All<br>Institution |
|---|---|
| P30CA091842<br>How the Microenvironment of Pancreatic Ductal Adenocarcinoma Affects Immunotherapy | David Denardo<br>Washington University |
| P30CA016520<br>Abramson Cancer Center Support Grant (Pancreatic Cancer) | Robert Vonderheide<br>University of Pennsylvania |
| P30CA013330<br>The tumor micro-environment in early metastasis of pancreatic ductal adenocarcinoma | John S. Condeelis<br>Albert Einstein College Of Medicine, Inc |
| P30CA014051<br>Extracellular matrix-targeted immunocytokines for pancreatic cancer treatment | Richard Hynes<br>Massachusetts Institute of Technology |
| P30CA046592<br>Therapeutic modulation of immune microenvironment in pancreatic cancer | Howard Crawford, Maria Pasca Di Magliano<br>University of Michigan at Ann Arbor |
| P30CA008748<br>Genetic and transcriptional identification of immunogenic human pancreatic cancer subtypes | Steven Leach<br>Sloan-Kettering Inst Can Research |
| P30CA036727<br>Effects of pancreatic cancer microenvironment on tumor immune responses | Michael Hollingsworth<br>University of Nebraska Medical Center |
| P30CA015704<br>Modifying the tumor microenvironment to enhance engineered T cell therapy for PDA | Sunil Hingorani<br>Fred Hutchinson Cancer Research Center |
| P30CA013696<br>Targeting the Granulocyte/Fibroblast Axis to Overcome Immunosuppression in Pancreatic Ductal Adenocarcinoma | Kenneth Olive<br>Columbia University Health Sciences |

Appendix 2
NIH PDAC Funded Projects,
Initiative 4: Developing New Treatment Approaches that Interfere with RAS Oncogene-Dependent Signaling Pathways

| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(S) All<br>Institution |
|---|---|
| DP1CA228041<br>Enhancer RNA Therapy | Shiekhattar, Ramin<br>University of Miami School of Medicine |
| F30CA168063<br>Roles of MiR-17-92 Cluster MicroRNAs in K-Ras-Induced Pancreatic Tumorigenesis | Quattrochi, Brian Joseph<br>Univ of Massachusetts Med Sch Worcester |
| F30CA180601<br>The Role of p120ctn in Pancreatic Ductal Morphogenesis and Adenocarcinoma | Bakir, Basil<br>University of Pennsylvania |
| F30CA189793<br>Design and Development of a Small Molecule-controlled Activator of RAS | Rose, John Christopher<br>University of Washington |
| F30CA200240<br>Role of Nix in pancreatic ductal adenocarcinoma | Alagesan, Brinda<br>State University New York Stony Brook |
| F30CA206240<br>Mechanisms of Pancreatic Carcinogenesis | He, Ping<br>State University New York Stony Brook |
| F30CA220680<br>Physiological Role of Dynamin-Related Protein 1 in Pancreatic Ductal Adenocarcinoma | Nagdas, Sarbajeet<br>University of Virginia |
| F31CA180628<br>Defining the Role and Mechanism of Pak1 in Supporting Pancreatic Cancer | Baker, Nicole Marie<br>Univ of North Carolina Chapel Hill |
| F31CA180693<br>Targeting K-Ras effector signaling for pancreatic cancer treatment | Hayes, Tikvah K<br>Univ of North Carolina Chapel Hill |
| F31CA180738<br>Genetic and pharmacological manipulation of system xc in pancreatic cancer | Badgley, Michael Alexander<br>Columbia University Health Sciences |
| F31CA192829<br>Defining the role of ERK1 and ERK2 in Pancreatic Cancer | Ryan, Meagan B<br>Univ of North Carolina Chapel Hill |
| F31CA196329<br>Tumor-associated Physiological Changes Arising from Ras-induced Mitochondrial Fission | Nascimento, Aldo<br>University of Virginia |
| F31CA217070<br>Role of the hexosamine biosynthesis pathway in pancreatic cancer. | Campbell, Sydney<br>University of Pennsylvania |
| F32CA192769<br>MYC is a critical downstream effector in KRAS-driven pancreatic cancer | Allen-Petersen, Brittany<br>Oregon Health & Science University |
| F32CA200313<br>K-Ras mutant-specific vulnerabilities for novel pancreatic cancer therapies | Hobbs, Guy Aaron<br>Univ of North Carolina Chapel Hill |

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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(S) All<br>Institution |
|---|---|
| F32CA221005<br>Targeting CDK4/6 for pancreatic cancer treatment | Goodwin, Craig<br>Univ of North Carolina Chapel Hill |
| K08CA208016<br>Elucidating KRAS-specific vulnerabilities in pancreatic cancer | Muzumdar, Mandar Deepak<br>Dana-Farber Cancer Inst |
| K08CA218420<br>Functional interrogation of epigenetic vulnerabilities in KRAS-mutant pancreatic cancer | Aguirre, Andrew James<br>Dana-Farber Cancer Inst |
| K99CA197816<br>The SMYD3-ERK5 signaling module in pancreatic cancer | Mazur, Pawel K<br>Stanford University |
| K99CA208032<br>Deciphering the role of Lin28b in pancreatic cancer to guide therapeutic discovery | Kugel, Sita<br>Massachusetts General Hospital |
| P01CA117969<br>Genetics and Biology of Pancreatic Ductal Adenocarcinoma | Depinho, Ronald Anthony<br>University of TX MD Anderson Can Ctr |
| P01CA203657<br>Defining RAS isoform- and mutation-specific roles in oncogenesis | Der, Channing J<br>Univ of North Carolina Chapel Hill |
| P50CA127297<br>SPORE in Pancreatic Cancer | Hollingsworth, Michael A<br>University of Nebraska Medical Center |
| P50CA196510<br>Washington University SPORE in Pancreatic Cancer | Hawkins, William G<br>Washington University |
| P50CA62924<br>SPORE in Gastrointestinal Cancer | Klein, Alison P<br>Johns Hopkins University |
| R01CA109525<br>Mouse Model for Human Pancreatic Ductal Adenocarcinoma | Su, Gloria Huei-Ting<br>Columbia University Health Sciences |
| R01CA116034<br>Regulation of K-Ras by a Farnesyl-electrostatic Switch | Philips, Mark Reid<br>New York University School of Medicine |
| R01CA123031<br>Dynamic requirements of Ras signaling during cancer | Counter, Christopher M<br>Duke University |
| R01CA124586<br>Kras-Induced Cellular Plasticity in Pancreatic Cancer | Konieczny, Stephen F<br>Purdue University |
| R01CA140290<br>Role of PKC iota in metaplasia and initiation of pancreatic cancer | Murray, Nicole R<br>Mayo Clinic Jacksonville |
| R01CA155198<br>Design of MEK Inhibitor Regimens for the Treatment of Pancreatic Cancer | Leopold, Judith S<br>University of Michigan at Ann Arbor |

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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(S) All<br>Institution |
|---|---|
| R01CA155784<br>Dissecting Hedgehog, TGF beta and BMP Signaling During Pancreatic Tumorigenesis | Lewis, Brian C<br>Univ of Massachusetts Med Sch Worcester |
| R01CA163489<br>Characterization of Icmt in Animal Models of Cancer | Philips, Mark Reid<br>New York University School of Medicine |
| R01CA168692<br>Targeting a non-canonical RAS-driven pathway in pancreatic cancer | Cheresh, David A<br>University of California, San Diego |
| R01CA175747<br>Mechanisms of PAK1 activation, signaling and tumor resistance | Der, Channing J (Contact); Hahn, Klaus M<br>Univ of North Carolina Chapel Hill |
| R01CA178445<br>The role of wild-type KRAS in the context of tumor profession and metastasis | Su, Gloria Huei-Ting<br>Columbia University Health Sciences |
| R01CA184687<br>Pancreatic Cancer Vulnerabilities Downstream of Cooperating Oncogenic Mutations | Land, Hartmut<br>University of Rochester |
| R01CA190408<br>Drugging the Switch-II Pocket of K-Ras | Shokat, Kevan M<br>University of California, San Francisco |
| R01CA194941<br>Suppression of pancreatic tumorigenesis by the PTF1 transcription factor network | Murtaugh, Lewis C (Contact); Macdonald, Raymond J<br>University of Utah |
| R01CA196228<br>The Role of post-translational activation of Myc in pancreatic cancer | Sears, Rosalie C<br>Oregon Health & Science University |
| R01CA201318<br>The Paradoxical Role of mTORC1 in the Growth of Nutrient-deprived Pancreatic Cancer Cells Harboring Ras Mutations | Thompson, Craig B<br>Sloan-Kettering Inst Can Research |
| R01CA204228<br>Comprehensive genetic dissection of druggable KRAS targets | Leach, Steven D<br>Sloan-Kettering Inst Can Research |
| R01CA206444<br>Rac1 GTPase in tumorigenesis and progression of pancreatic cancer | Ouellette, Michel M (Contact); Batra, Surinder K<br>University of Nebraska Medical Center |
| R01CA213233<br>Exosomes in Cancer Therapy | Kalluri, Raghu<br>University of TX MD Anderson Can Ctr |
| R01CA216987<br>K-Ras sumoylation in cell proliferation and transformation | Dai, Wei (Contact); Chen, Yuan<br>New York University School of Medicine |
| R01CA42978<br>Biological Activity of Ras Oncogenes | Der, Channing J<br>Univ of North Carolina Chapel Hill |

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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(S) All<br>Institution |
|---|---|
| R01CA45726<br>Integrin alpha v beta 3 promotes resistance to EGF receptor inhibitors | Cheresh, David A<br>University of California, San Diego |
| R01CA94184<br>RalA signal transduction | Counter, Christopher M<br>Duke University |
| R01CA97061<br>Chemical genetic profiling of engineered tumor cells | Stockwell, Brent R<br>Columbia Univ New York Morningside |
| R01DK52913<br>The Role of Zinc Finger Cofactors in Pancreatic Cell Growth | Urrutia, Raul A<br>Mayo Clinic Rochester |
| R03CA182552<br>A novel regimen to target both pancreatic cancer K-ras and antiapoptotic proteins | Li, Fengzhi<br>Roswell Park Cancer Institute Corp |
| R21CA176561<br>A Genetically Defined System to Identify Factors Essential for KRas Oncogenesis | Collisson, Eric<br>University of California, San Francisco |
| R21CA179193<br>ERK inhibitor resistance and ERK isoform-dependent growth in pancreatic cancer | Der, Channing J<br>Univ of North Carolina Chapel Hill |
| R21CA187498<br>Development of D-Peptide Inhibitors of Oncogenic KRAS Mutants | Danishefsky, Samuel J<br>Sloan-Kettering Inst Can Research |
| R21CA188857<br>Preclinical evaluation of a targeted Bmi1 inhibitor in pancreatic cancer | Olive, Kenneth P<br>Columbia University Health Sciences |
| R21CA191392<br>Identifying new drug targets to block K-Ras/Raf in pancreatic cancer. | Stork, Philip J S<br>Oregon Health & Science University |
| R21CA191622<br>Preclinical Validation of U1 Adaptors for Suppression of KRAS in Pancreatic Cancer | Gunderson, Samuel I (Contact); Carpizo, Darren Richard<br>Rutgers, The State Univ of NJ |
| R21CA195694<br>Targeting Pancreatic Cancer with Novel Mnk-eIF4E and AR Modulating Agents | Njar, Vincent Collins ofuka<br>University of Maryland Baltimore |
| R21CA199050<br>Targeting Kras in Pancreatic Cancer | Ozpolat, Bulent (Contact); Lopez-Berestein, Gabriel ; Maitra, Anirban<br>University of TX MD Anderson Can Ctr |
| R21CA202487<br>KRAS Muations in Plasma cfDNA as Predictor to Erolinib Response in Advanced Pancreatic Cancer | Li, Donghui (Contact); Overman, Michael J<br>University of TX MD Anderson Can Ctr |
| R35CA197709<br>New Ways of Targeting K-Ras | Mccormick, Frank Patrick<br>University of California, San Francisco |

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|---|---|
| R35CA197731<br>Targeting Mutant KRAS for Cancer Therapy | Sebti, Said M<br>H. Lee Moffitt Cancer Ctr & Res Inst |
| R43CA217502<br>Oral formulation for novel inhibitor of Ras driven cancers | Canzoneri, Joshua (Contact); Boyd, Michael R<br>Adt Pharmaceuticals, LLC |
| R44CA206663<br>Novel MAP Kinase Pathway Inhibitors to Treat Pancreatic Ductal AdenoCarcinoma | Slee, Deborah (Contact); Samatar, Ahmed<br>Kalyra Pharmaceuticals, Inc. |
| U01CA199235<br>Identification of synthetic lethal interactors in pancreatic cancer | Der, Channing J (Contact); Cox, Adrienne D<br>Univ of North Carolina Chapel Hill |
| U01CA199253<br>Systematic identification of oncogenic KRAS synthetic lethal interactions | Hahn, William C<br>Broad Institute, Inc. |

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Not Related to Framework Initiatives

| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| DP2CA216364<br>Tracking tumor evolution through in vivo organelle profiling | Perera, Rushika Miriam<br>University of California, San Francisco |
| DP2CA228042<br>Dissecting tumor metabolic heterogeneity in vivo | Birsoy, Kivanc<br>Rockefeller University |
| F30CA177123<br>Transcriptional Coregulation in Pancreatic Adenocarcinoma Progression | Ferreira, Mark Jakob<br>University of Pennsylvania |
| F30CA183474<br>Investigating Branched Chain Amino Acid Metabolism in Pancreatic Cancer | Mayers, Jared R<br>Harvard Medical School |
| F30CA192819<br>A differentiation-based mechanism limiting pancreatic tumor initiation | Krah, Nathan Michael<br>University of Utah |
| F30CA196040<br>Structural basis of chemokine receptor signaling in tumor progression | Kleist, Andrew B<br>Medical College of Wisconsin |
| F30CA196106<br>A role for macrophage phenotype in regulating metastasis in pancreatic carcinoma | Lee, Jae<br>University of Pennsylvania |
| F30CA200240<br>Role of Nix in pancreatic ductal adenocarcinoma | Alagesan, Brinda<br>State University New York Stony Brook |
| F30CA200301<br>Mechanistic and Informatics Based Analysis of STAT1 Actions in Pancreatic Cancer | Craven, Kelly Eileen<br>Indiana Univ-Purdue Univ at Indianapolis |
| F30CA203238<br>Mechanisms of Escape from TGFβ Tumor Suppression in the Pancreas | Huang, Yun-Han<br>Weill Medical Coll of Cornell Univ |
| F30CA210587<br>Mechanism behind CCL21/CCR7-mediated pancreatic cancer progression | Moussouras, Natasha A<br>Medical College of Wisconsin |
| F30CA213883<br>Identifying novel effectors of oncogenic Kras in pancreatic cells via proximity labelling | Cheng, Derek Kingman<br>State University New York Stony Brook |
| F30CA213916<br>FOLFOX-induced kinome reprogramming in pancreatic cancer tumor xenografts | Lipner, Matthew<br>Univ of North Carolina Chapel Hill |
| F30CA216998<br>The Role of ITIH5 in Suppressing Pancreatic Cancer Metastasis | Young, Eric<br>University of Kansas Medical Center |
| F30CA221175<br>LINE-1 genotoxicity and cytotoxicity and its relevance to cancer | Ardeljan, Daniel<br>Johns Hopkins University |

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|---|---|
| F30HL117546<br>Microparticle Docking in Pancreatic Cancer Induced VTE | Geddings, Julia E<br>Univ of North Carolina Chapel Hill |
| F31CA168350<br>SPARC as a regulator of collagen signaling in Pancreatic Cancer | Aguilera, Kristina Yolanda<br>UT Southwestern Medical Center |
| F31CA177153<br>Genome-wide Case-control Association Study of Pancreatic Cancer in Jews | Streicher, Samantha Acson<br>Yale University |
| F31CA177163<br>Elucidating the role and regulation of epithelial plasticity in metastasis | Aiello, Nicole<br>University of Pennsylvania |
| F31CA180392<br>The activity and molecular interactions of extracellular EMMPRIN | Kendrick, Agnieszka Anastazja<br>University of Colorado Denver |
| F31CA180602<br>The Role of Type III TGF-beta Receptor in the Fibrotic Tumor Stroma | Hesler, Rachel<br>Duke University |
| F31CA183493<br>Tumor expressed B7x accelerates disease and is a novel target for immunotherapy | Ohaegbulam, Kim C<br>Albert Einstein College of Medicine, Inc |
| F31CA186513<br>Intact protien as a cancer fuel source | Nofal, Michel<br>Princeton University |
| F31CA192767<br>Inhibiting UAP1/2 as a Novel Strategy for Regulating Carbohydrate Metabolic Flux | Saeui, Christopher<br>Johns Hopkins University |
| F31CA192890<br>Determining the kinetics and mechanism of pancreatic tumor regression following genetic deletion of PI3K p110a | Chapelliquen, Stephanie Rose<br>State University New York Stony Brook |
| F31CA203563<br>Investigating the Role of Novel Drug Target TBK1 in Pancreatic Cancer Pathogenesis | Brannon, Arthur Lee<br>University of Michigan at Ann Arbor |
| F31CA206233<br>High-Throughput Generation of Pancreatic Organoids with Controlled Stromal Milieus using Microraft-Based Cell Sorting | Disalvo, Matthew<br>Univ of North Carolina Chapel Hill |
| F31CA206416<br>Stem cell signals in pancreatic adenocarcinoma metastasis and therapy resistance | Lytle, Nikki Katherine<br>University of California, San Diego |
| F31CA210627<br>Functional Interrogation of Kdm6a-Dependent Tumor Suppression during Pancreatic Cancer | Winters, Ian Paul<br>Stanford University |

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|---|---|
| F31CA210631<br>Elucidating the Role of Fasting in GI Radioprotection: Applications in Pre-Clinical Pancreatic Cancer Model | De La Cruz Bonilla, Marimar<br>University of TX MD Anderson Can Ctr |
| F31CA213731<br>Pathophysiological role and therapeutic potential of microRNA-29 in pancreatic cancer autophagy | Kwon, Jason<br>Indiana Univ-Purdue Univ at Indianapolis |
| F31CA220750<br>at the nexus of redox and signaling pathways: regulation of NAD+ kinase | Schild, Tanya<br>Weill Medical Coll of Cornell Univ |
| F31CA221066<br>Examining the Heterogeneity of Fibroblasts in the Pancreatic Microenvironment | Garcia, Paloma Elizabeth<br>University of Michigan at Ann Arbor |
| F31EB22414<br>In-vivo characterization of pancreatic field carcinogenesis using spatially resolved reflectance measurements via a fiber optic probe | Eshein, Adam<br>Northwestern University |
| F31EY26786<br>Determining the role of 3D nuclear architecture in stochastic gene expression | Viets, Kayla Chelsea<br>Johns Hopkins University |
| F31HG8912<br>Computational Modeling of Heterogeneous Gene Expression in Single Cells | Welch, Joshua<br>Univ of North Carolina Chapel Hill |
| F32CA177072<br>Mechanisms of tumor suppression by epigenetic regulators in pancreatic cancer | Livshits, Geulah Yevgeniya<br>Sloan-Kettering Inst Can Research |
| F32CA180374<br>Deciphering the Role of eIF5A/PEAK1 Pathway in Pancreatic Cancer | Fujimura, Ken<br>University of California, San Diego |
| F32CA180452<br>Developing an Anti-sialyl-Lewisa Diabody for ImmunoPET Imaging of Pancreas Cancer | Houghton, Jacob<br>Sloan-Kettering Inst Can Research |
| F32CA180606<br>Investigating YAPs role during pathogenesis of pancreatic ductal adenocarcinoma | Staley, Binnaz Kucuk<br>University of California, San Francisco |
| F32CA180717<br>The Characterization of the New Tumor Suppressor USP9X in Pancreatic Cancer | Hwang, Chang-Il<br>Cold Spring Harbor Laboratory |
| F32CA192761<br>Genomic Landscape of Pancreatic Cancer Metastasis | Balli, David<br>University of Pennsylvania |
| F32CA192786<br>Novel Combination Therapeutic Strategies to Ablate Resistance to Hsp90 Inhibitors | Koren, John<br>Sloan-Kettering Inst Can Research |

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|---|---|
| F32CA192904<br>Finding Novel Pancreatic Cancer Oncogenes Using an Innovative 3D Culture System | Baker, Lindsey A<br>Cold Spring Harbor Laboratory |
| F32CA200024<br>Munc13-4 regulates Ca2+-stimulated exosome release during EMT | Messenger, Scott W<br>University of Wisconsin-Madison |
| F32CA200078<br>Chemical genetic investigation of metastatic seeding in pancreatic ductal adenocarcinoma using novel multiplexed in vivo screening | Schulze, Christopher James<br>Stanford University |
| F32CA200278<br>Novel BPTES Analogs for the Treatment of Pancreatic Cancer | Zimmermann, Sarah<br>Johns Hopkins University |
| F32CA206234<br>Exploring BCL-XL addiction in pancreatic ductal adenocarcinoma | Soderquist, Ryan<br>Duke University |
| F32CA210387<br>The role of Prrx1 in acinar-ductal metaplasia during pancreatic tumorigenesis | Collins, Meredith A<br>University of Pennsylvania |
| F32CA210421<br>Understanding cell intrinsic and context dependent metabolic adaptations of cancer cell | Danai, Laura Victoria<br>Massachusetts Institute of Technology |
| F32CA210568<br>Targeting cytokines to the tumor microenivronment using a high affinity single domain antibody to PD-L1 | Dougan, Michael Lawrence<br>Massachusetts General Hospital |
| F32CA213764<br>The role of neuroendocrine transdifferentiation of pancreatic cancer cells on tumor progression and chemoresistance. | Morrison Joly, Meghan Melinda<br>Oregon Health & Science University |
| F32CA213810<br>Understanding metabolic pathways that support redox homeostasis in cancer | Muir, Alexander<br>Massachusetts Institute of Technology |
| F32CA217455<br>Impact of Volume-Based Regionalization on Access to Care in Patients Undergoing Pancreatectomy | Fong, Zhi Ven<br>Massachusetts General Hospital |
| F32CA221094<br>The role of p120ctn in PDAC epithelial-to-mesenchymal transition and metastasis | Pitarresi, Jason R<br>University of Pennsylvania |
| F32CA221114<br>Examination of ceramide signaling in the crosstalk between pancreatic cancer cells and the tumor microenvironment | Hendley, Audrey Marie<br>University of California, San Francisco |

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|---|---|
| F32EB18715<br>Contrast-enhanced intravascular ultrasound imaging of vascular invasion | Lindsey, Brooks D<br>Univ of North Carolina Chapel Hill |
| F99CA223029<br>Class III PI3K as an Autophagy Reactivation Switch in Malignant Transformation | Young, Lindsey N<br>University of California Berkeley |
| K01CA172957<br>Cancer cell signaling through lipids complexed to proteins | Blind, Raymond Daniel<br>Vanderbilt University |
| K01DK98285<br>Resolving the role of nicotine-mediated phosphorylation on pancreatic fibrosis | Paulo, Joao A<br>Harvard Medical School |
| K07CA204201<br>Video Informed Consent Tools to Improve Care for Patients With Advanced Pancreatic Cancer | Enzinger, Andrea C<br>Dana-Farber Cancer Inst |
| K08CA172676<br>Exploration of a Mutant p53 Reactivating Compound | Carpizo, Darren Richard<br>Rbhs -Cancer Institute of New Jersey |
| K08CA201581<br>Role of Interleukin-22 and Innate Lymphoid Cells in Pancreas Cancer Initiation and Progression | Frankel, Timothy Louis<br>University of Michigan at Ann Arbor |
| K08CA218690<br>Defining diverse roles of p53 in pancreatic cancer | Kim, Michael Paul<br>University of TX MD Anderson Can Ctr |
| K08DK105326<br>The Role of NR5A2 in Pancreas Development and Disease | Nissim, Sahar<br>Brigham And Women's Hospital |
| K08DK107781<br>Characterization of the Molecular Determinants of High-Grade Dysplasia in Pancreatic Cancer Precursor Lesions | Wood, Laura Delong<br>Johns Hopkins University |
| K08DK88945<br>Dissecting stromal-epithelial interactions in the adult exocrine pancreas | Rhim, Andrew D<br>University of Michigan at Ann Arbor |
| K08EB12859<br>Validation of MRI Microvascular Biomarkers in Pancreatic Cancer with Magnetic Nanoparticles | Guimaraes, Alexander Savio Ramos<br>Oregon Health & Science University |
| K22CA175260<br>PD2/Paf1 and pancreatic cancer stem cells | Ponnusamy, Moorthy P<br>University of Nebraska Medical Center |
| K22CA175262<br>Cellular and Molecular Tumorsuppressor Processes Uncovered by DNA Fork Protection | Schlacher, Katharina<br>University of TX MD Anderson Can Ctr |
| K22CA178309<br>Parental Exposure to High Fats Diets and Risk of Pancreatic Cancer in the offspri | De Assis, Sonia<br>Georgetown University |

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|---|---|
| K99CA188259<br>Regulation of cancer cell metabolism and growth by the pancreatic tumor stroma | Sherman, Mara H<br>Salk Institute For Biological Studies |
| K99CA190889<br>Integrative Analyses to Identify Pancreatic Cancer Susceptibility Genes | Roberts, Nicholas Jason<br>Johns Hopkins University |
| K99CA207870<br>Recombinant antibodies containing L-DOPA for stability, functionalization and selection | Thyer, Ross T<br>University of Texas, Austin |
| N01CA0<br>IGF::OT::IGF Cancer Prevention By Alpha Enolase Vaccination | Brown, Paul<br>University of TX MD Anderson Can Ctr |
| N01CA0<br>IGF::OT::IGF IGF::OF::IGF- Phase III Trial of Carbon Ion Therapy | Guha, Chandan<br>Albert Einstein College of Medicine |
| N01CA0<br>IGF::OT::IGF Statin Therapy To Reduce The Risk of Recurrent Pancreatitis | Khan, Seema<br>Northwestern University |
| N01CA0<br>PHASE III Trial of Carbon Ion Therapy | Guha, Chandan<br>Albert Einstein College of Medicine, Inc |
| N43CA0<br>IGF::OT::IGF Targeted Radionuclide Therapy of Pancreatic Cancer | Budde, Raymond Joseph<br>Houston Pharmaceuticals, Inc. |
| P01CA159992<br>MR-Guided Precision Thermal Therapy of Retroperitoneal Tumors | Sommer, Frank Graham<br>Stanford University |
| P01CA163200<br>Inflammatory processes In diet-Induced pancreatic cancer promotion | Eibl, Guido Erwin Michael<br>University of California Los Angeles |
| P01CA210944<br>Project 1: Clinical and immune impact of radiation and dual checkpoint blockade in patients | Vonderheide, Robert H<br>University of Pennsylvania |
| P01CA67166<br>The Role of Ire1 in Modulating the Response of Tumors to Hypoxia and Radiation | Koong, Albert<br>Stanford University |
| P01CA80124<br>Targeting Stroma to Improve Therapy of Pancreatic Adenocarcinoma | Boucher, Yves<br>Massachusetts General Hospital |
| P01CA84203<br>Core B: Biological Models, Biostatistics, Molecular Pathology and Microscopy | Bouma, Brett E<br>Massachusetts General Hospital |

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|---|---|
| P01CA94237<br>Engineering T Cells For Pancreatic Cancer | Heslop, Helen E (Contact); Rooney, Cliona M<br>Baylor College of Medicine |
| P20CA192994<br>Administrative Core | Li, Ellen<br>State University New York Stony Brook |
| P20CA192996<br>Administrative Core | Mccombie, William Richard<br>Cold Spring Harbor Laboratory |
| P20GM103480<br>Development of Metabolically Active Linkers (MALs) to Improve Diagnostic and Radiotherapeutic HPMA Copolymers | Garrison, Jered C<br>University of Nebraska Medical Center |
| P20GM109024<br>Center for Diagnostic and Therapeutic Strategies in Pancreatic Cancer | Mallik, Sanku<br>North Dakota State University |
| P30CA13330<br>Experimental Therapeutics | Goldman, Israel David<br>Albert Einstein College of Medicine |
| P30CA15704<br>Research Program: Gastrointestinal Cancer | Grady, William Mallory<br>Fred Hutchinson Cancer Research Center |
| P30CA16520<br>Cancer Therapeutics Program | Lerman, Caryn E<br>University of Pennsylvania |
| P30CA36727<br>Planning and Evaluation | Cowan, Kenneth H<br>University of Nebraska Medical Center |
| P30CA46592<br>Cancer Cell Biology | Wicha, Max S<br>University of Michigan at Ann Arbor |
| P30CA56036<br>Gastrointestinal Cancer | Knudsen, Karen E<br>Thomas Jefferson University |
| P30CA68485<br>Gastrointestinal Cancer Research Program (GI) (Project-005) | Berlin, Jordan D<br>Vanderbilt University |
| P41EB24495<br>Imaging Agents for Inflammatory Components of Malignancy | Pomper, Martin G<br>Johns Hopkins University |
| P50AA11999<br>Animal Core | Tsukamoto, Hidekazu<br>University of Southern California |
| P50CA102701<br>NFAT Transcription Factors as Therapeutic Targets in Pancreatic Cancer | Billadeau, Daniel D<br>Mayo Clinic Rochester |
| P50CA127003<br>Administration, Evaluation, and Planning | Fuchs, Charles S<br>Dana-Farber Cancer Inst |
| P50CA130810<br>Translational Research in GI Cancer | Brenner, Dean E<br>University of Michigan at Ann Arbor |

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|---|---|
| P50CA196510<br>Core A: Administrative Core | Hawkins, William G<br>Washington University |
| P50CA86355<br>Center for Molecular Imaging Research at MGH/HMS | Weissleder, Ralph<br>Massachusetts General Hospital |
| R00CA155045<br>Mechanism-based therapies for pancreatic cancer informed by stromal microrheology | Celli, Jonathan P<br>University of Massachusetts Boston |
| R00CA158582<br>Role of epigenetic regulators in pancreatic cancer | Tzatsos, Alexandros<br>George Washington University |
| R01AA24698<br>Alcohol Carcinogenesis | Srivastava, Rakesh K<br>Lsu Health Sciences Center |
| R01AA24770<br>A pooling project on alcohol use and risk of cancers with inconsistent prior evidence, with an emphasis in non-smokers. | Ferrari, Pietro (Contact); Smith-Warner, Stephanie A<br>International Agency For Res On Cancer |
| R01AI58072<br>Structural Basis for Chemokine Function | Volkman, Brian F<br>Medical College of Wisconsin |
| R01AR60209<br>FoxO signaling and skeletal muscle atrophy | Judge, Andrew Robert<br>University of Florida |
| R01AT7448<br>Oxidative stress and programmed death pathways: Cross talk in pancreatic cancer | Kumar, Addanki Pratap<br>University of Texas Hlth Science Center |
| R01CA100062<br>Mechanism of myeloid cell defect in cancer | Gabrilovich, Dmitry I<br>Wistar Institute |
| R01CA104125<br>Cytoskeletal Dynamics in Pancreatic Cancer Metastasis | Mc Niven, Mark A (Contact); Razidlo, Gina Lynn<br>Mayo Clinic Rochester |
| R01CA118374<br>Calcineurin-NFAT regulates endothelial activation in pre-metastatic sites | Ryeom, Sandra W<br>University of Pennsylvania |
| R01CA124723<br>The Inhibition of HSP70 Induces Apoptosis in Pancreatic Cancer Cells | Saluja, Ashok K<br>University of Minnesota |
| R01CA131045<br>ATDC Function in Human Pancreatic Adenocarcinoma | Simeone, Diane M<br>University of Michigan at Ann Arbor |
| R01CA132755<br>Molecular Mechanisms of BRCA1-Dependent DNA Damage Response and Tumorogenesis | Yu, Xiaochun<br>Beckman Research Institute/City of Hope |
| R01CA135274<br>Overcoming pancreatic tumor resistance to gemcitabine | Cui, Zhengrong<br>University of Texas, Austin |

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Not Related to Framework Initiatives

| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| R01CA138441<br>Mechanisms of MEK/ERK growth arrest signaling | Park, Jong-In<br>Medical College of Wisconsin |
| R01CA138701<br>Role of Dietary Zinc Transporter ZIP4 in Pancreatic Cancer | Li, Min<br>University of Oklahoma Hlth Sciences Ctr |
| R01CA138723<br>Mechanism-Based Use of Chk1 Inhibitors in Pancreas Cancer | Maybaum, Jonathan (Contact); Lawrence, Theodore S<br>University of Michigan at Ann Arbor |
| R01CA142669<br>Fluorophore-Conjugated Antibodies for Imaging and Resection of GI Tumors | Bouvet, Michael (Contact); Yang, Meng<br>University of California, San Diego |
| R01CA150142<br>Cellular diversity and clinical relevance of stem cells in pancreatic cancer | Matsui, William H<br>Johns Hopkins University |
| R01CA150190<br>Targeting Pancreatic Cancer Using Peptide Chemistry: From Bench to Bedside | Mukhopadhyay, Debabrata (Contact); Spaller, Mark R<br>Mayo Clinic Jacksonville |
| R01CA151588<br>Mechanisms of Pancreatic Inflammation, Tissue Repair and Carcinogenesis | Pasca Di Magliano, Marina<br>University of Michigan at Ann Arbor |
| R01CA154321<br>Prevention of Tumor Progression by a Novel Approach | Sarkar, Fazlul H<br>Wayne State University |
| R01CA154451<br>Ultrasound-enhanced drug penetration for treatment of pancreatic cancer | Hwang, Joo Ha<br>University of Washington |
| R01CA154517<br>Disclosing Genomic Incidental Findings in a Cancer Biobank: An ELSI Experiment | Petersen, Gloria M (Contact); Koenig, Barbara A; Wolf, Susan M<br>Mayo Clinic Rochester |
| R01CA154586<br>The anti-senescence activity of trefoil factor 1 | Wang, Xiao-Fan<br>Duke University |
| R01CA154649<br>The role of entosis in human cancers | Overholtzer, Michael H<br>Sloan-Kettering Inst Can Research |
| R01CA154823<br>Validation and Fine-Scale Mapping of Pancreatic Cancer Susceptibility Loci (Study) | Klein, Alison P<br>Johns Hopkins University |
| R01CA154846<br>MRI Capable Receptor Targeted Drug Delivery for Pancreatic Cancer | Mao, Hui (Contact); Yang, Lily<br>Emory University |
| R01CA155117<br>Mutual regulation of PTEN and P-REX2a in normal and cancer cells | Parsons, Ramon E<br>Icahn School of Medicine at Mount Sinai |

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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| R01CA155332<br>Role of Hypoxia-Induced miR-210 in Tumor Metabolism | Ivan, Mircea<br>Indiana Univ-Purdue Univ at Indianapolis |
| R01CA155620<br>RON Receptor in Pancreatic Cancer Biology and Therapy | Lowy, Andrew M<br>University of California, San Diego |
| R01CA157490<br>Investigating the Role of Autophagy in Pancreatic Cancer Radiation Resistance | Kimmelman, Alec<br>New York University School of Medicine |
| R01CA157738<br>Novel Single Domain Antibodies with Multivalency and Multispecificity | Liu, Rihe<br>Univ of North Carolina Chapel Hill |
| R01CA157980<br>Mechanisms of the Stromal Response to Smoothened Inhibition in Pancreatic Cancer | Olive, Kenneth P<br>Columbia University Health Sciences |
| R01CA159222<br>ADAM17 in pancreatic cancer and pancreatitis | Crawford, Howard C<br>University of Michigan at Ann Arbor |
| R01CA160417<br>Targeting HMGB1-mediated Autophagy in Cancer Therapy | Tang, Daolin<br>University of Pittsburgh at Pittsburgh |
| R01CA160924<br>The role of telomere-related tetraploidization in cancer | De Lange, Titia<br>Rockefeller University |
| R01CA161112<br>Overcoming stromal barriers to therapeutics in pancreas cancer | Hingorani, Sunil R<br>Fred Hutchinson Cancer Research Center |
| R01CA161283<br>N-3 Fatty Acid-Induced Akt Suppression: Chemoprevention for Pancreatic Neoplasia | Grippo, Paul J<br>University of Illinois at Chicago |
| R01CA161976<br>Stat3 Signaling in Pancreas Cancer | Merchant, Nipun B<br>University of Miami School of Medicine |
| R01CA163541<br>Exploiting tumor stroma interactions for cancer therapy | Powis, Garth<br>Sanford Burnham Prebys Medical Discovery Institute |
| R01CA163649<br>Targeting MUC1-induced Tumor-stromal Metabolic Cross-talk in Pancreatic Cancer | Singh, Pankaj Kumar<br>University of Nebraska Medical Center |
| R01CA163698<br>Dissection and manipulation of RB function | Dyson, Nicholas J<br>Massachusetts General Hospital |
| R01CA163764<br>On the path to the clinic: Lead optimization and pathway analysis of the pancreatic cancer-selective drug conjugate SW V-49 | Hawkins, William G (Contact); Spitzer, Dirk M<br>Washington University |

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|---|---|
| R01CA163798<br>IKKalpha, autophagy, obesity and injury enhanced pancreatic cancer | Karin, Michael<br>University of California, San Diego |
| R01CA163895<br>Selective Sensitization of Pancreatic Cancer to Therapy by Chk1 and PARP1 Inhibit | Morgan, Meredith A<br>University of Michigan at Ann Arbor |
| R01CA164041<br>Aldo-keto reductase family 1 member B10 AKR1B10 in pancreatic carcinogenesis | Yang, Guang-Yu<br>Northwestern University at Chicago |
| R01CA164964<br>Prospective Study of Human Oral Microbiome and Pancreatic Cancer Risk | Ahn, Jiyoung<br>New York University School of Medicine |
| R01CA166150<br>Microbiomes in Human Pancreatic Cancer | Michaud, Dominique S<br>Tufts University Boston |
| R01CA167174<br>The role of fibroblasts in the activities of tissue penetrating peptides | Sugahara, Kazuki<br>Columbia University Health Sciences |
| R01CA167291<br>Novel Role of Ref-1 in Pancreatic Cancer Etiology and Progression | Kelley, Mark R (Contact); Fishel, Melissa L<br>Indiana Univ-Purdue Univ at Indianapolis |
| R01CA167535<br>Novel Nanoparticle Therapy for Pancreatic Cancer | Matters, Gail L (Contact); Kester, Mark<br>Pennsylvania State Univ Hershey Med Ctr |
| R01CA168448<br>Next Generation Oncolytic Adenovirus for Advanced Pancreatic Cancer Treatment | Yamamoto, Masato<br>University of Minnesota |
| R01CA168611<br>Toll-like Receptor Regulation of Pancreatic Tumorigenesis | Miller, George<br>New York University School of Medicine |
| R01CA168712<br>Highly Specific and Efficient Vectors for Targeting Pancreatic Cancer | Kelly, Kimberly A (Contact); French, Brent A; Logsdon, Craig D<br>University of Virginia |
| R01CA169046<br>The chemical biology of pharmacological ascorbate in cancer treatment | Buettner, Garry R<br>University of Iowa |
| R01CA169086<br>PDG Links Stem Cell Niche to Pancreatic Epithelial Renewal, Repair and Cancer | Thayer, Sarah P<br>University of Nebraska Medical Center |
| R01CA169122<br>Genetic Susceptibility and Risk Model for Pancreatic Cancer | Wei, Peng<br>University of Texas Hlth Sci Ctr Houston |
| R01CA169134<br>HLTF gene silencing: a novel determinant of sensitivity to autophagy inhibition | Amaravadi, Ravi K<br>University of Pennsylvania |

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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| R01CA169281<br>Targeting Stromal Collagen in Pancreatic Cancer | Han, Haiyong (Contact); Von Hoff, Daniel D<br>Translational Genomics Research Inst |
| R01CA169702<br>Annexin A2 as a mediator of pancreatic cancer metastases | Zheng, Lei<br>Johns Hopkins University |
| R01CA169774<br>Detection of in vivo enzyme activities with CEST MRI | Pagel, Mark 'Marty' David<br>University of Arizona |
| R01CA170495<br>A Drosophila Model Linking Diet-induced Obesity and Cancer (PQ 1) | Cagan, Ross Leigh<br>Icahn School of Medicine at Mount Sinai |
| R01CA170946<br>Triptolide Augments Death Receptor Mediated Apoptosis in Pancreatic Cancer | Saluja, Ashok K<br>University of Minnesota |
| R01CA172233<br>Molecular Mediators of Pancreatic Cancer Invasion and Progression | Xie, Keping<br>University of TX MD Anderson Can Ctr |
| R01CA172431<br>Inhibition of pancreatic carcinogenesis via targeting c-Raf and sEH | Yang, Guang-Yu<br>Northwestern University at Chicago |
| R01CA172560<br>Mechanisms of action of the Smyd3 methyltransferase in cancer cells | Gozani, Or P (Contact); Sage, Julien<br>Stanford University |
| R01CA172880<br>Advanced Glycation End-Products and Risk of Pancreatic Cancer | Jiao, Li<br>Baylor College of Medicine |
| R01CA174388<br>Single-cell phenotyping for therapeutic stratification in pancreatic cancer | Wirtz, Denis<br>Johns Hopkins University |
| R01CA174768<br>Understanding optimal delivery systems for cancer care | Miller, David C<br>University of Michigan at Ann Arbor |
| R01CA174861<br>Novel Theranostics for Pancreatic Cancer | Davydova, Julia<br>University of Minnesota |
| R01CA175495<br>The B7x pathway in the tumor microenvironment | Zang, Xingxing<br>Albert Einstein College of Medicine |
| R01CA175772<br>Targeting tumor-stromal interaction for pancreatic cancer therapy | Singh, Ajay Pratap<br>University of South Alabama |
| R01CA177857<br>Role of Neurogenic Inflammation in Pancreatic Cancer | Davis, Brian M<br>University of Pittsburgh at Pittsburgh |

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|---|---|
| R01CA178015<br>Crucial Microenvironmental Cofactors for Pancreatic Cancer Pathogenesis | Collisson, Eric<br>University of California, San Francisco |
| R01CA178627<br>Novel Experimental Therapeutics for Pancreatic Cancer | Lomberk, Gwen<br>Mayo Clinic Rochester |
| R01CA179645<br>Mechanisms and targeting of SWI/SNF alterations in pancreatic cancer | Pollack, Jonathan R<br>Stanford University |
| R01CA179991<br>(PQB6) Genetics of Subclonal Evolution in Pancreatic Cancer | Iacobuzio-Donahue, Christine A<br>Sloan-Kettering Inst Can Research |
| R01CA180057<br>(PQD6) Muscle stem cells and cancer cachexia | Guttridge, Denis C<br>Ohio State University |
| R01CA181185<br>Inhibition of CDC25B phosphatase by targeting protein-protein interactions | Cierpicki, Tomasz<br>University of Michigan at Ann Arbor |
| R01CA181244<br>Discovery of Risk Loci and Genomics of Pancreatic Cancer through Exome Sequencing | Scheet, Paul A (Contact); Huff, Chad Daniel<br>University of TX MD Anderson Can Ctr |
| R01CA181360<br>Clustered semi-competing risks analysis in quality of end-of-life care studies | Haneuse, Sebastien<br>Harvard School of Public Health |
| R01CA181385<br>Stellate cells and their progenitor precursors in pancreas cancer progression | Provenzano, Paolo<br>University of Minnesota |
| R01CA181450<br>Pancreatic Ductal Adenocarcinoma is a disease of constitutive autophagy | Zeh, Herbert J (Contact); Lotze, Michael T<br>University of Pittsburgh at Pittsburgh |
| R01CA182495<br>Fingerprinting Invasive Membrane Protrusions to Discover Metastatic Signatures | Klemke, Richard L<br>University of California, San Diego |
| R01CA182869<br>The role of DCLK1 in the initiation of pancreatic ductal adenocarcinoma | Houchen, Courtney Wayne<br>University of Oklahoma Hlth Sciences Ctr |
| R01CA183459<br>Targeting Mucin and EGFR Axis in Pancreatic Cancer | Batra, Surinder K<br>University of Nebraska Medical Center |
| R01CA183984<br>A novel miR-198 replacement therapy for pancreatic cancer | Yao, Qizhi C<br>Baylor College of Medicine |
| R01CA184051<br>Pharmacological Ascorbate as a Radiosensitizer in Pancreatic Cancer | Cullen, Joseph J<br>University of Iowa |

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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| R01CA184274<br>Functional Significance of CD133 in Pancreatic Cancer | Banerjee, Sulagna<br>University of Minnesota |
| R01CA185357<br>(PQD3)Molecular Profiles associated with Long-Term Survival in pancreas Cancer | Ahuja, Nita (Contact); Easwaran, Hariharan ; Iacobuzio-Donahue, Christine A<br>Johns Hopkins University |
| R01CA186043<br>Musashi-mediated control of pancreatic cancer growth and progression | Reya, Tannishtha (Contact); Lowy, Andrew M<br>University of California, San Diego |
| R01CA186286<br>Pancreatic Cancer Cell Mechanics and Imaging | Konstantopoulos, Konstantinos<br>Johns Hopkins University |
| R01CA186338<br>ZIP4 is a Novel Molecular Target in Human Pancreatic Cancer | Li, Min (Contact); Fernandez-Zapico, Martin Ernesto<br>University of Oklahoma Hlth Sciences Ctr |
| R01CA186662<br>Novel Small Molecule MDM2 Inhibitors for Pancreatic Cancer Therapy | Zhang, Ruiwen<br>Texas Tech University Health Scis Center |
| R01CA186885<br>Targeting BET Bromodomain in Pancreatic Cancer | Munshi, Hidayatullah G<br>Northwestern University at Chicago |
| R01CA187090<br>The Yap-Tead transcriptional complex in Kras-induced Pancreatic Ductal Adenocarci | Yi, Chunling<br>Georgetown University |
| R01CA187678<br>PET Imaging-guided Personalized Therapy in Pancreatic Cancer | Radu, Caius Gabriel (Contact); Czernin, Johannes ; Donahue, Timothy R<br>University of California Los Angeles |
| R01CA188048<br>Investigating a Novel Glutamine Metabolism Pathway in Pancreatic Cancer | Kimmelman, Alec<br>Dana-Farber Cancer Inst |
| R01CA188134<br>Nrf2 Regulation of Ductal Pancreatic Cancer Etiology and Treatment Response | Tuveson, David A<br>Cold Spring Harbor Laboratory |
| R01CA188252<br>ROS-targeted therapy for pancreatic cancer | Neamati, Nouri<br>University of Michigan at Ann Arbor |
| R01CA188300<br>Motion Management of Pancreatic Cancer in MRI-Guided Radiotherapy | Sheng, Ke<br>University of California Los Angeles |
| R01CA188430<br>Synergistic targeting of cholesterol metabolism and EGFR signaling in cancer | Astsaturov, Igor<br>Research Inst of Fox Chase Can Ctr |
| R01CA188464<br>Epigenetic priming in pancreatic cancer chemotherapy | Govindarajan, Rajgopal<br>Ohio State University |

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|---|---|
| R01CA188654<br>MR-HIFU induced drug delivery for pancreatic cancer treatment | Lee, Donghoon<br>University of Washington |
| R01CA190092<br>(PQA-4) Organoid Omics To Detect And Defeat Ductal Pancreatic Cancer | Tuveson, David A<br>Cold Spring Harbor Laboratory |
| R01CA190717<br>Alternatively Spliced Tissue Factor and Pathobiology of Pancreatic Cancer | Bogdanov, Vladimir<br>University of Cincinnati |
| R01CA193365<br>Molecular Imaging of Cachexia in Pancreatic Cancer | Bhujwalla, Zaver M<br>Johns Hopkins University |
| R01CA193650<br>The adaptive kinome in pancreatic cancer | Yeh, Jen Jen (Contact); Johnson, Gary L<br>Univ of North Carolina Chapel Hill |
| R01CA193887<br>Targeting extracellular matrix-cancer stem cell interactions in pancreatic cancer | Matsui, William H<br>Johns Hopkins University |
| R01CA193895<br>Glutaminase Inhibitor Drug Discovery and Nanoparticle-Based Delivery for Pancreatic Cancer Therapy | Slusher, Barbara Stauch (Contact); Hanes, Justin S; Le, Anne<br>Johns Hopkins University |
| R01CA194321<br>Imaging drug uptake and distribution in chemoradiation therapy of pancreatic cancer | Humm, John L (Contact); Lowery, Maeve Aine; Wu, Abraham<br>Sloan-Kettering Inst Can Research |
| R01CA194593<br>PQB3: Mechanisms & Targeting of Sonic Hedgehog Signaling in Muscle Wasting of Cancer Cachexia | Zimmers, Teresa A<br>Indiana Univ-Purdue Univ at Indianapolis |
| R01CA195473<br>Repurposing Disulfiram: A Novel Strategy to Help Cancer Patients Regain Muscle | Jatoi, Aminah (Contact); Fernandez-Zapico, Martin Ernesto<br>Mayo Clinic Rochester |
| R01CA195586<br>Targeted Radiation Therapy for Pancreatic Cancer | Batra, Surinder K (Contact); Jain, Maneesh<br>University of Nebraska Medical Center |
| R01CA195651<br>Clinical Significance of Pancreatic Cancer Differentiation and Dedifferentiation | Xie, Keping<br>University of TX MD Anderson Can Ctr |
| R01CA195708<br>Molecular mechanism of bitter melon juice efficacy against pancreatic cancer. | Agarwal, Rajesh<br>University of Colorado Denver |
| R01CA196215<br>Systemic Therapy with Infectivity-Selective Oncolytic Adenovirus for PDAC | Yamamoto, Masato<br>University of Minnesota |
| R01CA196941<br>Novel Signaling Pathways Regulating Pancreatic Cancer Pathogenesis | Wang, Huamin<br>University of TX MD Anderson Can Ctr |

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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| R01CA197999<br>Development of Quinoxaline Based IKKbeta Inhibitors for Kras Driven Cancers | Natarajan, Amarnath<br>University of Nebraska Medical Center |
| R01CA198074<br>Dosage-Dependent Hedgehog Signaling in Pancreatic Cancer | Allen, Benjamin (Contact); Pasca Di Magliano, Marina<br>University of Michigan at Ann Arbor |
| R01CA198090<br>Integrated Signaling in Pancreatic Cancer Progression | Xie, Keping<br>University of TX MD Anderson Can Ctr |
| R01CA198096<br>Tumor priming sequences combined with novel nanoparticle drug carriers for enhanced therapeutic efficacy in pancreatic cancer: a tripartite USA/Northern Ireland/Republic of Ireland consortium | Straubinger, Robert M (Contact); Barron, Niall ; Ma, Wen Wee ; Scott, Chris<br>State University of New York at Buffalo |
| R01CA198128<br>Exploiting Caveolae-Dependent Albumin Endocytosis to Optimize Therapy in Pancreatic Cancer | Williams, Terence Marques<br>Ohio State University |
| R01CA199064<br>Tumor subtypes and therapy response in pancreatic cancer | Yeh, Jen Jen (Contact); Graves, Lee M; Johnson, Gary L<br>Univ of North Carolina Chapel Hill |
| R01CA199646<br>Optimizing Ultrasound Enhanced Delivery of Therapeutics | Forsberg, Flemming<br>Thomas Jefferson University |
| R01CA200007<br>Multiplexed imaging of biliary intra-epithelial neoplasia | Seibel, Eric J (Contact); Wang, Thomas D<br>University of Washington |
| R01CA200755<br>Exploring the Role of Mitochondrial Fission in Pancreatic Tumorigenesis | Kashatus, David Francis<br>University of Virginia |
| R01CA201226<br>High Throughput Screening to Discover Chemical Inhibitors of Quiescin Sulfhydryl Oxidase 1 | Faigel, Douglas (Contact); Sergienko, Eduard A<br>Mayo Clinic Arizona |
| R01CA202762<br>Pharmacogenomic and circulating tumor cell approach to individualized treatment of pancreatic cancer | Yu, Kenneth H (Contact); Ricigliano, Mark<br>Sloan-Kettering Inst Can Research |
| R01CA202846<br>Targeted therapy of peritoneal carcinomatosis using theranostic nanoparticles | Yang, Lily (Contact); Mao, Hui ; Wang, Y Andrew<br>Emory University |
| R01CA203108<br>Prognostic Biomarkers for ZIP4-mediated Cachexia in Pancreatic Cancer | Li, Min (Contact); Li, Yi-Ping<br>University of Oklahoma Hlth Sciences Ctr |

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|---|---|
| R01CA203737<br>Targeting Human Cancers with Hemizygous Deletion of TP53 | Lu, Xiongbin<br>University of TX MD Anderson Can Ctr |
| R01CA204969<br>Uncovering Role of Exosomes in Regulating Pancreatic Cancer Cell Metabolism | Nagrath, Deepak<br>University of Michigan at Ann Arbor |
| R01CA206069<br>Development of Targeted Nanotechnology Platform for Pancreatic Cancer | Chauhan, Subhash C<br>University of Tennessee Health Sci Ctr |
| R01CA206105<br>Regulation of Pancreatic Oncogenesis by the Gut Microbiome | Miller, George (Contact); Saxena, Deepak<br>New York University School of Medicine |
| R01CA207031<br>The molecular mechanisms of metabolism reprogramming in mutant Kras/Ink4a-driven pancreatic ductal adenocarcinoma | Chiao, Paul J<br>University of TX MD Anderson Can Ctr |
| R01CA207189<br>Regulation of Nutrient Stress-Induced Macropinocytosis in Pancreatic Ductal Adenocarcinoma | Commisso, Cosimo<br>Sanford Burnham Prebys Medical Discovery Institute |
| R01CA207236<br>Fasting Protects Small Intestinal Stem Cells from Lethal DNA Damage: Mechanistic Insight and Preclinical Translation | Piwnica-Worms, Helen M<br>University of TX MD Anderson Can Ctr |
| R01CA207643<br>Real-time monitoring of circulating pancreatic tumor cells and clusters | Carpenter, Erica<br>University of Pennsylvania |
| R01CA208108<br>MUC16 in Pancreatic Cancer Progression and Metastasis | Radhakrishnan, Prakash<br>University of Nebraska Medical Center |
| R01CA208205<br>Reengineering obesity-induced abnormal microenvironment to improve PDAC treatment | Fukumura, Dai (Contact); Jain, Rakesh K<br>Massachusetts General Hospital |
| R01CA208272<br>Developing novel combination therapies for pancreatic cancer | Yoon, Karina J<br>University of Alabama at Birmingham |
| R01CA208335<br>Label free microfluidic isolation, characterization and ex vivo expansion of CTCs | Nagrath, Sunitha<br>University of Michigan at Ann Arbor |
| R01CA208517<br>Determinants of pancreatic cancer and malignant melanoma phenotypes in CDKN2A hereditary kindreds | Petersen, Gloria M (Contact); Fernandez-Zapico, Martin Ernesto; Li, Hu<br>Mayo Clinic Rochester |

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|---|---|
| R01CA208644<br>(PQ11) Targeting STING in the context of chemoradiation therapy to overcome poor preexisting immunity in mouse models of pancreatic cancer. | Crittenden, Marka<br>Providence Portland Medical Center |
| R01CA209798<br>Investigating the cause of racial/ethnic disparity in pancreatic cancer incidence | Setiawan, Veronica Wendy<br>University of Southern California |
| R01CA210192<br>Targeted Nanotherapy for Pancreatic Cancer | Chauhan, Subhash C<br>University of Tennessee Health Sci Ctr |
| R01CA210439<br>Targeting the Metabolic Basis of Cachexia in Pancreatic Cancer | Singh, Pankaj Kumar<br>University of Nebraska Medical Center |
| R01CA210637<br>Role of PD2/Paf1 in Pancreatic Acinar to Ductal Metaplasia | Ponnusamy, Moorthy P (Contact); Batra, Surinder K<br>University of Nebraska Medical Center |
| R01CA211082<br>Optical imaging of pancreas cancer organoids for drug development and personalized treatment | Skala, Melissa Caroline<br>Morgridge Institute For Research, Inc. |
| R01CA211087<br>Noninvasive prediction of tumor response to gemcitabine using MRI | Liu, Guanshu<br>Hugo W. Moser Res Inst Kennedy Krieger |
| R01CA211176<br>Preclinical Analyses of NAD Kinase as a Redox Vulnerability for the Treatment of Pancreatic Cancer | Elsea, Sarah H<br>Baylor College of Medicine |
| R01CA211554<br>First in human study with 18F-avb6-targeting peptide | Sutcliffe, Julie L<br>University of California at Davis |
| R01CA211720<br>Synthetic Lethal Targeting of Growth Factor Receptors | Peterson, Blake<br>University of Kansas Lawrence |
| R01CA211878<br>Common genetically altered pathways as targets for therapy in pancreatic cancer | Witkiewicz, Agnieszka (Contact); Knudsen, Erik<br>University of Arizona |
| R01CA212086<br>Optimizing the Treatment of Pancreatic Adenocarcinoma | Hur, Chin (Contact); Kong, Chung<br>Massachusetts General Hospital |
| R01CA212350<br>Stroma targeted theranostic nanoparticles for pancreatic cancer | Mcnally, Lacey R<br>Wake Forest University Health Sciences |
| R01CA212600<br>Targeting HuR to improve a synthetic lethal therapy for pancreatic cancer | Brody, Jonathan<br>Thomas Jefferson University |

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|---|---|
| R01CA213278<br>Reprogramming Tumor Microenvironment by Nanoparticle | Mukherjee, Priyabrata<br>University of Oklahoma Hlth Sciences Ctr |
| R01CA215607<br>Targeting cysteine import to induce ferroptotic cell death in pancreatic cancer | Olive, Kenneth P<br>Columbia University Health Sciences |
| R01CA216853<br>Metabolic Regulation of Tumor Progression, Metastasis and Chemoresistance by SIRT5/ELK3 signaling in Pancreatic Cancer | Singh, Pankaj Kumar<br>University of Nebraska Medical Center |
| R01CA220236<br>Wnt/?-catenin Signaling in Pancreatic Oncogenesis | Xie, Keping<br>University of TX MD Anderson Can Ctr |
| R01CA34610<br>TGFB-SMAD Signaling in Stem Cell Differentiation and Tumor Suppression | Massague, Joan<br>Sloan-Kettering Inst Can Research |
| R01CA51210<br>Biochemical and molecular studies on NQO1. Design of less toxic Hsp90 inhibitors | Ross, David<br>University of Colorado Denver |
| R01CA54358<br>Epigenetic Drivers of Cancer Progression | Feinberg, Andrew P<br>Johns Hopkins University |
| R01CA55360<br>Mechanisms of Signal Transduction by Ras Proteins | Bar-Sagi, Dafna<br>New York University School of Medicine |
| R01CA75059<br>Dysregulation of TGF Beta Action Pancreatic Cancer | Korc, Murray<br>Indiana Univ-Purdue Univ at Indianapolis |
| R01CA77575<br>Causes & Consequences of Acid pH in Tumors | Gillies, Robert J<br>H. Lee Moffitt Cancer Ctr & Res Inst |
| R01CA82683<br>Signal Transduction by Tyrosine Phosphorylation | Hunter, Tony R<br>Salk Institute For Biological Studies |
| R01CA97022<br>Survival Mechanisms of Invasive Carcinoma Cells | Klemke, Richard L<br>University of California, San Diego |
| R01CA98468<br>Improving CPT-11 Efficacy Using Structural and Chemical Biology | Redinbo, Matthew R<br>Univ of North Carolina Chapel Hill |
| R01DK106266<br>Development, cellular plasticity and homeostasis of the exocrine pancreas | Sosa-Pineda, Beatriz<br>St. Jude Children's Research Hospital |
| R01DK110361<br>The Hippo signaling pathway in pancreatic epithelial cells orchestrate the inflammatory response R01 | Wang, Pei<br>University of Texas Hlth Science Center |
| R01DK55489<br>Pancreas Transcription Factors and Disease Model Systems | Konieczny, Stephen F<br>Purdue University |

Appendix 2
NIH PDAC Funded Projects,
Not Related to Framework Initiatives

| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| R01DK60694<br>Networks for functional regulation of pancreatic acinar-ductal metaplasia and epithelial plasticity | Rustgi, Anil K<br>University of Pennsylvania |
| R01DK70888<br>Acinar Biology and Pancreatic Disease | Groblewski, Guy E<br>University of Wisconsin-Madison |
| R01EB17270<br>Light-Triggered Drug Release in Primed Pancreatic Tumors | Lovell, Jonathan F<br>State University of New York at Buffalo |
| R01EB17853<br>Polymeric Nanomedicines of Small Molecules and miRNA for Treating Pancreatic Canc | Mahato, Ram I<br>University of Nebraska Medical Center |
| R01EB20125<br>Theranostic nanoparticles for detection and treatment of pancreatic cancer | Mcnally, Lacey R<br>University of Louisville |
| R01EB25173<br>Endoscopic Fine-Needle Polarized Scanning Spectroscopy for Pancreatic Cystic Lesions Diagnosis | Perelman, Lev T<br>Beth Israel Deaconess Medical Center |
| R01GM105964<br>The molecular determinants of zinc uptake mediated by hZIP4 | Dempski, Robert Edward<br>Worcester Polytechnic Institute |
| R01GM111735<br>Phosphatidylinositol 4-phosphate Hydrolysis in Spatiotemporal Cell Signaling | Smrcka, Alan V<br>University of Rochester |
| R01GM113166<br>Polymeric Nanomedicines of Hedgehog Inhibitor and miRNA for Treating Pancreatic Cancer | Mahato, Ram I (Contact); Batra, Surinder K<br>University of Nebraska Medical Center |
| R01GM76186<br>Chromosome inverted fusions, dicentrics and genome instability | Weinert, Ted A<br>University of Arizona |
| R01HD65800<br>Mechanisms Controlling Epithelial Homeostasis | O'reilly, Alana M<br>Research Inst of Fox Chase Can Ctr |
| R03CA179681<br>Pancreatic cystic lesions: descriptive epidemiology and natural history | Bracci, Paige M<br>University of California, San Francisco |
| R03CA181727<br>A novel combination approach for pancreatic cancer prevention | Mackenzie, Gerardo Guillermo<br>State University New York Stony Brook |
| R03CA182679<br>Developing Nanotechnology to Target HMGA1 in Pancreatic Cancer | Resar, Linda M S<br>Johns Hopkins University |
| R03CA184544<br>Role of Piceatannol in Cancer Cachexia | Kim, Kee-Hong<br>Purdue University |

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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| R03CA191621<br>Developing a Screen for Novel Therapies with Reprogrammed Pancreatic Cancer Cells | Resar, Linda M S<br>Johns Hopkins University |
| R03CA201502<br>Multiplex Conditional Mice for Rapid and Affordable Pre-clinical Testing | Moriarity, Branden S<br>University of Minnesota |
| R03CA201738<br>Role of CRABP-II in pancreatic cancer metastasis | Yu, Shuiliang (Contact); Zhou, Lan<br>Case Western Reserve University |
| R03CA208510<br>Interpreting limits to nanoparticle delivery in high-stroma low-perfusion tumors | Russell, Stewart<br>Dartmouth College |
| R03CA212068<br>Epigenetic regulation of metabolic rerpogramming in pancreatic cancer | Tzatsos, Alexandros<br>George Washington University |
| R13AA20691<br>International Symposium of ALPD and Cirrhosis | Tsukamoto, Hidekazu<br>University of Southern California |
| R13DK107248<br>PancreasFest 2015: Applying Research Discoveries in Pancreatitis & Pancreatic Cancer to Patient-Centered Care | Whitcomb, David Clement<br>University of Pittsburgh at Pittsburgh |
| R15CA192160<br>Multifunctional nanoparticles for combinational therapy of pancreatic cancer | Vivero-Escoto, Juan Luis<br>University of North Carolina Charlotte |
| R15CA195463<br>Cellular Pathways Affecting Oncolytic Virus-Host Interactions In Cancer | Grdzelishvili, Valery Zurabovich<br>University of North Carolina Charlotte |
| R15ES26370<br>Promotion of pancreatic cancer by perfluorooctanoic acid | Hocevar, Barbara A<br>Indiana University Bloomington |
| R21AI124687<br>Stromal IL-6/Jak-STAT signaling and pancreatitis | Ostrowski, Michael C (Contact); Lesinski, Gregory B<br>Ohio State University |
| R21AR71021<br>Modeling muscle wasting in cancer cachexia | Guttridge, Denis C<br>Ohio State University |
| R21CA173120<br>Therapy of pancreatic cancer with 212Pb-labeled B7-H3 specific Ab and LDE225 | Buchsbaum, Donald J (Contact); Ferrone, Soldano<br>University of Alabama at Birmingham |
| R21CA175699<br>Pancreatic cancer control by a novel combination treatment | Mackenzie, Gerardo Guillermo<br>State University New York Stony Brook |
| R21CA176097<br>N-cadherin and Metastatic Dissemination | Radice, Glenn Lawrence<br>Thomas Jefferson University |

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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| R21CA176364<br>Directional Motility and ERM Scaffolding in Pathfinder Pancreatic Carcinoma Cells | Mulder, Kathleen M<br>Pennsylvania State Univ Hershey Med Ctr |
| R21CA179273<br>Targeting Cell Surface GRP78 as a Novel Therapy for Pancreatic Cancer | Lee, Amy S<br>University of Southern California |
| R21CA179362<br>A Creative Integration of Omega-3 Fatty Acids into Pancreatic Cancer Chemotherapy | Cui, Zhengrong<br>University of Texas, Austin |
| R21CA179541<br>Evaluation of Positron Emission Tomography-Magnetic Resonance Imaging (PET-MRI) | Fields, Ryan C<br>Washington University |
| R21CA179668<br>The Role of SHIP-1 in the Modulation of Immunoregulatory Cells in Pancreatic Canc | Ghansah, Tomar<br>University of South Florida |
| R21CA180764<br>An inhibitor of multiple anti-apoptotic gene products for pancreatic cancer | Li, Fengzhi<br>Roswell Park Cancer Institute Corp |
| R21CA181851<br>Improving Radiation Therapy For Pancreatic Cancer | Wang, Xinhui<br>Massachusetts General Hospital |
| R21CA182608<br>Quantitative Spectroscopic Imaging of Cancer Metabolites in Live Cells and Intact | Cheng, Ji-Xin<br>Purdue University |
| R21CA182651<br>Characterization of Drug Survival by Pancreatic Cancer Cells in vitro and in vivo | Yen, Timothy<br>Research Inst of Fox Chase Can Ctr |
| R21CA182662<br>Elucidating and targeting epigenetic oncogenic networks in pancreatic cancer | Tzatsos, Alexandros<br>George Washington University |
| R21CA182692<br>Utilizing HuR to optimize the treatment of pancreatic cancer | Brody, Jonathan<br>Thomas Jefferson University |
| R21CA182820<br>Phosphorylated Form of Activated IKKbeta and Pancreatic Cancer | Natarajan, Amarnath<br>University of Nebraska Medical Center |
| R21CA182977<br>Multi-Tracer PET/CT Imaging of Gemcitabine Response in Pancreatic Cancer | Kadrmas, Dan J (Contact); Garrido-Laguna, Ignacio<br>University of Utah |
| R21CA184429<br>Perioperative Stromal Depletion Strategies in Pancreatic Ductal Adenocarcinoma | Tempero, Margaret A<br>University of California, San Francisco |

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NIH PDAC Funded Projects,
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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| R21CA185209<br>Two phospho-compounds for pancreatic cancer prevention | Mackenzie, Gerardo Guillermo<br>State University New York Stony Brook |
| R21CA185276<br>A new energy restriction mimetic that targets pancreatic cancer | Lanza-Jacoby, Susan Patricia<br>Thomas Jefferson University |
| R21CA185808<br>Genetic Testing For Men From Hereditary Cancer Families | Schwartz, Marc D<br>Georgetown University |
| R21CA185909<br>H3K9 Methylation and Pancreatic Cancer Chemoresistance | Liu, Kebin<br>Augusta University |
| R21CA186175<br>Targeting DCLK1 kinase activity in pancreatic cancer | Houchen, Courtney Wayne<br>University of Oklahoma Hlth Sciences Ctr |
| R21CA186791<br>Needle biopsy preservation and preparation for rapid 3D pathology of pancreas | Seibel, Eric J<br>University of Washington |
| R21CA186957<br>Hedgehog Acyltransferase as a target in cancer | Resh, Marilyn D<br>Sloan-Kettering Inst Can Research |
| R21CA188818<br>Targeting PAK4 for Overcoming Drug Resistance in Pancreatic Cancer | Azmi, Asfar Sohail (Contact); Mohammad, Ramzi M<br>Wayne State University |
| R21CA188858<br>Investigation of therapeutic modulators of apoptotic priming in pancreatic cancer | Letai, Anthony G<br>Dana-Farber Cancer Inst |
| R21CA188863<br>Multiplexed in vivo drug screening: Inhibitors of metastatic seeding | Winslow, Monte Meier (Contact); Bogyo, Matthew<br>Stanford University |
| R21CA188911<br>Adaptable hydrogel platform to study pancreatic cancer | Lin, Chien-Chi<br>Indiana Univ-Purdue Univ at Indianapolis |
| R21CA189477<br>GPCRs: novel targets in cancer-associated fibroblasts | Insel, Paul A (Contact); Lowy, Andrew M<br>University of California, San Diego |
| R21CA189775<br>Therapeutic Monitoring in Pancreatic Cancer Using an Exosome Based Mass Spec Assay | Lubman, David M<br>University of Michigan at Ann Arbor |
| R21CA191347<br>Discoidin Domain Receptors: Novel Players in Pancreatitis and Pancreatic Preneoplasia | Fridman, Rafael A (Contact); Crawford, Howard C<br>Wayne State University |
| R21CA191515<br>New transgenic animal model to study pancreatic cancer | Fisher, Paul B<br>Virginia Commonwealth University |

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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| R21CA191631<br>Dual recombinase models of pancreatic cancer | Seeley, Elliott Scott<br>University of California, San Francisco |
| R21CA191715<br>AGX1/2 inhibitors as key modulators of the hexosamine biosynthetic pathway | Yarema, Kevin J<br>Johns Hopkins University |
| R21CA191923<br>Targeting PHD2 in Pancreatic Cancer | Han, Haiyong<br>Translational Genomics Research Inst |
| R21CA191956<br>TDG as a novel target to enhance gemcitabine killing of pancreatic cancer cells | Bellacosa, Alfonso (Contact); Yen, Timothy<br>Research Inst of Fox Chase Can Ctr |
| R21CA192629<br>Glycan control of stem cell-associated pathways in pancreatic cancer | Bellis, Susan L<br>University of Alabama at Birmingham |
| R21CA194745<br>High fat diet stimulates pancreatic cancer through the actions of Cholecystokinin | Smith, Jill P<br>Georgetown University |
| R21CA194764<br>Regulation of pancreatic ductal adenocarcinoma progression by Hnf4a | Snyder, Eric Lee<br>University of California, San Francisco |
| R21CA194836<br>Mouse model to study dependence of pancreatic cancer on Pik3ca for progression | Lin, Richard Z<br>State University New York Stony Brook |
| R21CA194910<br>Somatic Engineering-based Models of Pancreatic Cancer | Winslow, Monte Meier<br>Stanford University |
| R21CA198109<br>Deciphering SIRT6-dependent metabolic liabilities in Pancreatic cancer | Mostoslavsky, Raul<br>Massachusetts General Hospital |
| R21CA198265<br>New HuR inhibitor against pancreatic cancer EMT and CSCs | Chen, Qi<br>University of Kansas Medical Center |
| R21CA198292<br>IGF-II-Based Approach to Therapy for Pancreatic Cancer | Macdonald, Richard G<br>University of Nebraska Medical Center |
| R21CA198365<br>Dissecting ALK4 Function in Cancer Progression | Blobe, Gerard C<br>Duke University |
| R21CA199010<br>Treating pancreatic cancer with Listeria-32P | Gravekamp, Claudia<br>Albert Einstein College of Medicine |
| R21CA202745<br>Dim light at night alters pancreatic cell signaling and predisposes to pancreatic adenocarcinoma | Nelson, Randy J<br>Ohio State University |

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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| R21CA205501<br>Developing Therapy for the Treatment of Cholangiocarcinoma | Yoon, Karina J<br>University of Alabama at Birmingham |
| R21CA207779<br>Detection and Histopathology Localization of O-Glycans and Glycosaminoglycans in Tissues | Drake, Richard R<br>Medical University of South Carolina |
| R21CA209536<br>Targeting cytokine mediated CREB activation in pancreatic cancer | Nagathihalli, Nagaraj S<br>University of Miami School of Medicine |
| R21CA213114<br>Reprogramming Tumor-Associated Macrophages in PDAC with MicroRNA Nano-Vectors | Amiji, Mansoor M (Contact); Mackenzie, Gerardo Guillermo<br>Northeastern University |
| R21CA215860<br>CEST MRI assessment of tumor vascular permeability using non-labeled dextrans | Liu, Guanshu<br>Hugo W. Moser Res Inst Kennedy Krieger |
| R21CA218968<br>Novel model to study PDAC using normal human pancreatic tissue | Wang, Pei<br>University of Texas Hlth Science Center |
| R21CA220625<br>Targeting hyaluronan synthesis and signaling with BET inhibitors in pancreatic cancer | Kumar, Krishan<br>Northwestern University at Chicago |
| R21EB18537<br>EUS-Guided Optoelectronic Microprobe for Accurate Pancreatic Neoplasia Diagnosis | Mycek, Mary-Ann<br>University of Michigan at Ann Arbor |
| R21EB20737<br>Novel Platform to achieve high avidity of heterodimers for targeted cancer imaging | Zeng, Dexing<br>University of Pittsburgh at Pittsburgh |
| R21EB22770<br>High Sensitivity Molecular Ultrasound Imaging in Pancreatic Cancer | Willmann, Juergen Karl (Contact); Dahl, Jeremy<br>Stanford University |
| R21ES25839<br>Cytosolic Ah Receptor:  Mechanism of Action | Safe, Stephen H<br>Texas A&M Agrilife Research |
| R21HG9010<br>An Integrated Microfluidics Platform for Rapid and Sensitive Exosome RNA | Chang, Hsueh-Chia  (Contact); Go, David B; Hill, Reginald ; Senapati, Satyajyoti<br>University of Notre Dame |
| R33CA183685<br>Advanced Methods to Evaluate Extracellular Matrix and Crosslinking in the Tumor M | Hansen, Kirk C (Contact); Weaver, Valerie Marie<br>University of Colorado Denver |
| R33CA204704<br>Multiplex FRET Imaging of Kinase-Epigenome Interregulations in Live Cancer Cells | Wang, Yingxiao<br>University of California, San Diego |

Appendix 2
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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| R33CA206949<br>Advanced Development and Validation of 3 Dimensional Spheroid Culture of Primary Cancer Cells using Nano3D Technology | Spicer, Timothy Patrick<br>Scripps Florida |
| R33CA225248<br>Area A: In-Depth Proteome Mapping of the Tumor Microenvironment with Single-Cell Resolution | Kelly, Ryan T<br>Battelle Pacific Northwest Laboratories |
| R35CA197562<br>Mediators of cancer cell homeostasis: intervention targets common to diverse types of cancer | Land, Hartmut<br>University of Rochester |
| R35CA197563<br>Reversing Cellular immortality in cancer | Artandi, Steven E<br>Stanford University |
| R35CA197566<br>Mechanisms governing metastatic dormancy and reactivation | Giancotti, Filippo G<br>University of TX MD Anderson Can Ctr |
| R35CA197591<br>Integrative approaches to elucidate p53 transcriptional networks during carcinogenesis | attardi, Laura D<br>Stanford University |
| R35CA197627<br>Breaking the Obesity-Cancer Link: New Targets and Strategies | Hursting, Stephen D<br>Univ of North Carolina Chapel Hill |
| R35CA197684<br>IKK/NF-kappaB Signaling in Cancer: Therapy, Resistance, and Tumor Initiating Cells | Baldwin, Albert Sidney<br>Univ of North Carolina Chapel Hill |
| R35CA210263<br>Oncogenic Ras-induced macropinocytosis: A new paradigm for metabolic adaptation | Bar-Sagi, Dafna<br>New York University School of Medicine |
| R41CA192689<br>Retargeting FDA Approved Anticancer Liposomal Drugs to Cancer Stem Cells | Szoka, Francis C<br>Zoneone Pharma, Inc. |
| R43CA195684<br>Development of novel targeted agents in pancreatic cancer | Sigalov, Alexander B<br>Signablok, Inc. |
| R43CA203273<br>Plasma Generation of Aqueous Chemotherapeutic Solutions | Joslin, Jessica<br>Symbios Technologies, Inc |
| R43CA206581<br>ERASE - A new dual thermal ablation/SCN device system for treating pancreatic cancer | Van Buskirk, Robert G<br>Cell Preservation Services, Inc. |
| R43CA217400<br>First-in-class TREM-1 inhibitors in combination therapy for pancreatic cancer | Sigalov, Alexander B<br>Signablok, Inc. |

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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| R43CA225169<br>Endoscopic Flexible Pancreatic Tumor Ablation System with Reduced Force Effector and Specialized Ablation Zone | Snook, Kevin A<br>Actuated Medical, Inc. |
| R43DK107152<br>Novel technologies for improved slide quality of pancreatic fine-needle aspirates | Nair, Shrikumar Ambujakshan<br>Affinergy, LLC |
| R44CA183265<br>FrostBite - A Unique Catheter for Endoscopic Cryoablation | Baust, J M<br>Cell Preservation Services, Inc. |
| R44CA200186<br>Molecular MR Imaging of the Desmoplastic Response in Pancreatic Cancer | Humblet, Valerie<br>Collagen Medical, LLC |
| R44CA203052<br>Laser Tissue Welding: Breaching Barriers In The Surgical Management of The Pancreas | Wadia, Yasmin (Contact); Barakat, Omar<br>Laser Tissue Welding, Inc. |
| R44CA210770<br>Clinical evaluation of the novel, uni-directional, Pd-103 CivaSheet for Pancreatic Cancers | Perez, Kristy<br>Civatech Oncology, Inc. |
| R44CA224460<br>Implantable iontophoresis chemotherapy delivery device for direct infusion of gemcitabine into pancreatic adenocarcinoma: Device development and First-in-Human clinical trial | Daunch, William<br>Advanced Chemotherapy Technologies, Inc. |
| R44CA224994<br>Ultra-High Content Analysis (UHCA) of Single Cells in Tissue: 60+ channel immunofluorescence labeling kits and companion imaging software for everyone | Nederlof, Michel<br>Quantitative Imaging Systems, LLC |
| R44DK117472<br>MUC4/16 assay for the early diagnosis and management of benign and malignant pancreatic diseases | Junker, Wade M (Contact); Jain, Maneesh ; Sasson, Aaron R<br>Sanguine Diagnostics And Therapeutics |
| R50CA211437<br>Revealing cancer metabolism via mass spectrometry and isotope tracers | Lu, Wenyun<br>Princeton University |
| R50CA211462<br>Critical resources provided by UNMC RAP biorepository stimulate cancer research | Grandgenett, Paul M<br>University of Nebraska Medical Center |
| R50CA211506<br>Preclinical Models for Cancer Therapeutic Development | Park, Youngkyu<br>Cold Spring Harbor Laboratory |
| R56AG16379<br>RAS Induced Senescence and Tumor Suppression | Lowe, Scott W<br>Sloan-Kettering Inst Can Research |

Appendix 2
NIH PDAC Funded Projects,
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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| R56EB24320<br>Surrogate imaging biomarkers for tracking anti-stromal therapy | Doyley, Marvin M<br>University of Rochester |
| U01CA175315<br>MicroRNA-1291 in Regulation of Xenobiotic Disposition and Cell Differentiation | Yu, Aiming<br>University of California at Davis |
| U01CA176303<br>An integrated computational and functional genomics discovery engine for preclini | Kemp, Christopher J<br>Fred Hutchinson Cancer Research Center |
| U01CA178960<br>Targeting pancreatic cancer energy metabolism, tumor growth, and metastasis | Dwinell, Michael B (Contact); Kalyanaraman, Balaraman<br>Medical College of Wisconsin |
| U01CA187508<br>A Prospective Investigation of the Oral Microbiome and Pancreatic Cancer | Palmer, Julie R (Contact); Shu, Xiao-Ou<br>Boston University Medical Campus |
| U01CA198846<br>UCLA Multifunctional Mesoporous Silica Nanoparticle Platform for Treatment of Pancreas Cancer | Nel, Andre Elias (Contact); Donahue, Timothy R; Meng, Huan ; Zink, Jeffrey I<br>University of California Los Angeles |
| U01CA198913<br>Stroma Breaking Theranostic Nanoparticle for Targeted Pancreatic Cancer Therapy | Yang, Lily (Contact); Mao, Hui<br>Emory University |
| U01CA202241<br>ECM geometrical and mechanical properties modulate RTK signaling | Groves, Jay T (Contact); Weaver, Valerie Marie<br>University of California Berkeley |
| U01CA216449<br>Sensitization to Chemoradiation by Therapeutic Targeting of the DNA Damage Response | Lawrence, Theodore S<br>University of Michigan at Ann Arbor |
| U01CA216468<br>Enhancing Chemoradiation Efficacy through Unbiased Drug Discovery Approaches | Lin, Steven Hsesheng (Contact); Krishnan, Sunil<br>University of TX MD Anderson Can Ctr |
| U01CA217842<br>Integrative bioinformatics and functional characterization of oncogenic driver aberrations in cancer | Mills, Gordon B (Contact); Scott, Kenneth L<br>University of TX MD Anderson Can Ctr |
| U24CA209996<br>Building protected data sharing networks to advance cancer risk assessment and treatment | Foster, Ian<br>University of Chicago |
| U24CA210986<br>Center of Excellence for High Throughput Proteogenomic Characterization | Carr, Steven A (Contact); Gillette, Michael A<br>Broad Institute, Inc. |

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NIH PDAC Funded Projects,
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| Base Project Number<br>Title (linked to RePORTER abstract) | PI Name(s)<br>All Institution |
|---|---|
| U54CA163111<br>Targeting Cancer-Associated Myofibroblasts by DNA Hypomethylation | Tycko, Benjamin<br>Columbia University |
| U54CA163120<br>Interplay of Tumor Microenvironment and MUC4 in Pancreatic Cancer | Batra, Surinder K<br>University of Nebraska Medical Center |
| U54CA210181<br>Administrative Core | Ferrari, Mauro<br>Methodist Hospital Research Institute |
| U54CA210190<br>Core 2: Cell and Whole Animal Genome Engineering | Largaespada, David Andrew<br>University of Minnesota |
| U54CA217377<br>Biospecimens and Patient-derived xenografts | Weinstock, David Marc<br>Massachusetts Institute of Technology |
| U54CA224065<br>University of Texas PDX Development and Trial Center | Roth, Jack (Contact); Meric-Bernstam, Funda<br>University of TX MD Anderson Can Ctr |
| U54CA224083<br>Washington University PDX Development and Trial Center | Govindan, Ramaswamy (Contact); Ding, Li ; Li, Shunqiang<br>Washington University |
| UH2CA191284<br>Leveraging GxE interaction to understand pancreatic cancer and altered metabolism | Kraft, Peter<br>Harvard School of Public Health |
| UM1CA183727<br>Tennessee Valley Cooperative Human Tissue Network | Washington, Mary Kay<br>Vanderbilt University |
| UM1HG9426<br>Center for Functional Validation and Evaluation of ENCODE Enhancer Regions | White, Kevin P<br>University of Chicago |
| ZIABC11267<br>Preclinical drug development in pancreatic cancer | Rudloff, Udo<br>National Cancer Institute |
| ZIABC11463<br>Development of GEM and GDA models of Pancreatic Adenocarcinoma | Van Dyke, Terry<br>National Cancer Institute |
| ZIABC11739<br>Development and Preclinical Application of Pancreatic Adenocarcinoma Models | Sharan, Shyam<br>National Cancer Institute |

# Appendix 3
# NCI-PAR 15-289: NCI CDP Pancreatic Cancer Detection Consortium


1. Desmoplasia in pancreatic ductal adenocarcinoma: insight into pathological function and therapeutic potential.

   Cannon A, Thompson C, Hall BR, Jain M, Kumar S, Batra SK.

   Genes Cancer. 2018 Mar;9(3-4):78-86. doi: 10.18632/genesandcancer.171. Review.

   PMID: 30108679

2. Disruption of C1galt1 Gene Promotes Development and Metastasis of Pancreatic Adenocarcinomas in Mice.

   Chugh S, Barkeer S, Rachagani S, Nimmakayala RK, Perumal N, Pothuraju R, Atri P, Mahapatra S, Thapa I, Talmon GA, Smith LM, Yu X, Neelamegham S, Fu J, Xia L, Ponnusamy MP, Batra SK.

   Gastroenterology. 2018 Aug 4. pii: S0016-5085(18)34836-4. doi: 10.1053/j.gastro.2018.08.007. [Epub ahead of print]

   PMID: 30086262

3. Genome-Wide Somatic Copy Number Alterations and Mutations in High-Grade Pancreatic Intraepithelial Neoplasia.

   Hata T, Suenaga M, Marchionni L, Macgregor-Das A, Yu J, Shindo K, Tamura K, Hruban RH, Goggins M.

   Am J Pathol. 2018 Jul;188(7):1723-1733. doi: 10.1016/j.ajpath.2018.03.012. Epub 2018 Apr 22.

   PMID: 29684357

4. Mutations in the pancreatic secretory enzymes *CPA1* and *CPB1* are associated with pancreatic cancer.

   Tamura K, Yu J, Hata T, Suenaga M, Shindo K, Abe T, MacGregor-Das A, Borges M, Wolfgang CL, Weiss MJ, He J, Canto MI, Petersen GM, Gallinger S, Syngal S, Brand RE, Rustgi A, Olson SH, Stoffel E, Cote ML, Zogopoulos G, Potash JB, Goes FS, McCombie RW, Zandi PP, Pirooznia M, Kramer M, Parla J, Eshleman JR, Roberts NJ, Hruban RH, Klein AP, Goggins M.

   Proc Natl Acad Sci U S A. 2018 May 1;115(18):4767-4772. doi: 10.1073/pnas.1720588115. Epub 2018 Apr 18.

   PMID: 29669919

5. Prediagnosis Use of Statins Associates With Increased Survival Times of Patients With Pancreatic Cancer.

   Hamada T, Khalaf N, Yuan C, Morales-Oyarvide V, Babic A, Nowak JA, Qian ZR, Ng K, Rubinson DA, Kraft P, Giovannucci EL, Stampfer MJ, Fuchs CS, Ogino S, Wolpin BM.

   Clin Gastroenterol Hepatol. 2018 Aug;16(8):1300-1306.e3. doi: 10.1016/j.cgh.2018.02.022. Epub 2018 Feb 21.

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT00609336 | Combination Chemotherapy, Intensity-Modulated Radiation Therapy, and Surgery in Treating Patients With Localized Pancreatic Cancer That Can Be Removed By Surgery | Fred Hutch/University of Washington Cancer Consortium | II | TREATMENT | Complete |
| NCT00727441 | Vaccine Therapy with or without Cyclophosphamide in Treating Patients with Newly Diagnosed Pancreatic Cancer That Can Be Removed by Surgery | Johns Hopkins University/Sidney Kimmel Cancer Center | NA | TREATMENT | Closed to Accrual and Intervention |
| NCT00733746 | Gemcitabine Hydrochloride and Erlotinib Hydrochloride before and after Surgery in Treating Patients with Pancreatic Cancer That Can Be Removed by Surgery | Alliance for Clinical Trials in Oncology | II | TREATMENT | Closed to Accrual and Intervention |
| NCT00769483 | Gemcitabine Hydrochloride, Erlotinib Hydrochloride, and Dalotuzumab in Treating Patients with Stage IV Pancreatic Cancer | M D Anderson Cancer Center | I_II | TREATMENT | Closed to Accrual |
| NCT00806611 | Celiac Plexus Neurolysis in Reducing Pain in Patients with Pancreatic or Periampullary Cancer during Surgery | Thomas Jefferson University Hospital | III | SUPPORTIVE _CARE | Complete |
| NCT00816179 | Diagnostic Transgastric Endoscopic Peritoneoscopy in Measuring Tumors in Patients With Pancreatic Cancer | Ohio State University Comprehensive Cancer Center | NA | DIAGNOSTIC | Administratively Complete |
| NCT00882310 | Gemcitabine Hydrochloride, Docetaxel, and Capecitabine in Treating Patients With Pancreatic Cancer | Columbia University/Herbert Irving Cancer Center | II | TREATMENT | Complete |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| | Previously Treated With Surgery | | | | |
| NCT00968604 | Gene Therapy in Treating Patients with Pancreatic Cancer That Is Metastatic or Cannot Be Removed by Surgery | M D Anderson Cancer Center | I | TREATMENT | Withdrawn |
| NCT00985777 | Vitamin E in Treating Patients with Pancreatic Cancer That Can Be Removed by Surgery | Moffitt Cancer Center | I | TREATMENT | Complete |
| NCT01013649 | Gemcitabine Hydrochloride with or without Erlotinib Hydrochloride Followed by the Same Chemotherapy Regimen with or without Radiation Therapy and Capecitabine or Fluorouracil in Treating Patients with Pancreatic Cancer That Has Been Removed by Surgery | NRG Oncology | III | TREATMENT | Closed to Accrual |
| NCT01065870 | Capecitabine, Gemcitabine Hydrochloride, Docetaxel, and Radiation Therapy in Treating Patients With Stage II-III Pancreatic Cancer | Columbia University/Herbert Irving Cancer Center | II | TREATMENT | Closed to Accrual |
| NCT01088789 | Vaccine Therapy and Cyclophosphamide in Treating Patients with Pancreatic Cancer | Johns Hopkins University/Sidney Kimmel Cancer Center | II | TREATMENT | Active |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT01088815 | Gemcitabine Hydrochloride, Nab-paclitaxel, and Vismodegib in Treating Patients with Previously Untreated Metastatic Pancreatic Cancer | Johns Hopkins University/Sidney Kimmel Cancer Center | II | TREATMENT | Closed to Accrual |
| NCT01146054 | Gemcitabine Hydrochloride and Stereotactic Radiation Therapy in Treating Patients with Pancreatic Cancer That Cannot Be Removed By Surgery | Stanford Cancer Institute Palo Alto | II | TREATMENT | Closed to Accrual |
| NCT01155882 | Whipple at the Splenic Artery (WATSA) | Siteman Cancer Center at Washington University | NA | TREATMENT | Active |
| NCT01188109 | Gemcitabine Hydrochloride and Cisplatin in Treating Patients with Pancreatic Cancer That Can Be Removed by Surgery | Emory University Hospital/Winship Cancer Institute | II | TREATMENT | Complete |
| NCT01233505 | Veliparib, Oxaliplatin, and Capecitabine in Treating Patients With Advanced Solid Tumors | University of Wisconsin Hospital and Clinics | I | TREATMENT | Administratively Complete |
| NCT01276613 | Gemcitabine Hydrochloride During Surgery in Treating Patients with Pancreatic Cancer That Can Be Removed by Surgery | M D Anderson Cancer Center | NA | TREATMENT | Closed to Accrual |
| NCT01280058 | Carboplatin and Paclitaxel with or without Viral Therapy in Treating Patients with Recurrent or Metastatic Pancreatic Cancer | Ohio State University Comprehensive Cancer Center | II | TREATMENT | Complete |
| NCT01294358 | Gemcitabine Hydrochloride in Treating Patients With Locally Advanced Pancreatic Cancer | NCI - Center for Cancer Research | I | TREATMENT | Complete |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT01296763 | Irinotecan Hydrochloride and Cisplatin With or Without Mitomycin C and Olaparib in Treating Patients With Pancreatic Cancer That is Metastatic or Cannot be Removed by Surgery | Johns Hopkins University/Sidney Kimmel Cancer Center | I_II | TREATMENT | Complete |
| NCT01342354 | Stereotactic Body Radiation Therapy in Treating Patients with Pancreatic or Ampulla of Vater Cancer That Cannot Be Removed by Surgery | University of Chicago Comprehensive Cancer Center | I_II | TREATMENT | Closed to Accrual |
| NCT01357525 | Stereotactic Radiosurgery in Treating Patients with Pancreatic Cancer That Has Been Removed by Surgery | UPMC-Shadyside Hospital | II | TREATMENT | Active |
| NCT01360593 | Gemcitabine Hydrochloride and Capecitabine Followed by Stereotactic Radiosurgery in Treating Patients with Locally Advanced Pancreatic Cancer | UPMC-Shadyside Hospital | II | TREATMENT | Closed to Accrual |
| NCT01362790 | Pentostatin, Cyclophosphamide, and SS1(dsFv)-PE38 Immunotoxin in Treating Patients with Mesothelioma, Lung Cancer, or Pancreatic Cancer | NCI - Center for Cancer Research | II | TREATMENT | Administratively Complete |
| NCT01365169 | Post-op Wellness Program for Pancreatic Cancer Patients That Uses Patient feedback and real-time provider monitoring | M D Anderson Cancer Center | NA | HEALTH_SERVICES_RESEARCH | Active |
| NCT01413022 | FOLFIRINOX plus PF-04136309 in Patients with Borderline Resectable and Locally Advanced Pancreatic Adenocarcinoma | Siteman Cancer Center at Washington University | I | TREATMENT | Complete |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT01413451 | Amatuximab in Treating Patients with Advanced Pancreatic, Mesothelioma, Ovarian, or Non-Small Cell Lung Cancer | NCI - Center for Cancer Research | O | BASIC_SCIENCE | Active |
| NCT01419483 | Ketogenic Diet in Treating Patients with Stage II-III Pancreatic Cancer Undergoing Chemoradiation Therapy | University of Iowa/Holden Comprehensive Cancer Center | I | TREATMENT | Complete |
| NCT01420874 | Therapeutic Autologous Lymphocytes in Treating Patients with Metastatic Colon, Rectal, or Pancreatic Cancer | Wayne State University/Karmanos Cancer Institute | I | TREATMENT | Closed to Accrual |
| NCT01431794 | Gemcitabine Hydrochloride, Paclitaxel Albumin-Stabilized Nanoparticle Formulation, and Erismodegib before Surgery in Treating Patients with Borderline Resectable Pancreatic Cancer | Johns Hopkins University/Sidney Kimmel Cancer Center | I_II | TREATMENT | Closed to Accrual |
| NCT01446458 | Combination Chemotherapy and Stereotactic Body Radiation Therapy in Treating Patients With Pancreatic Cancer | Emory University Hospital/Winship Cancer Institute | I | TREATMENT | Complete |
| NCT01449864 | Proton Beam Radiation Therapy and Fluorouracil or Capecitabine in Treating Patients With Upper Gastrointestinal Cancer | University of Pennsylvania/Abramson Cancer Center | NA | TREATMENT | Closed to Accrual |
| NCT01459614 | Capecitabine, Gemcitabine Hydrochloride, Docetaxel, and Cisplatin in Treating Patients With Metastatic Pancreatic Cancer | Johns Hopkins University/Sidney Kimmel Cancer Center | II | TREATMENT | Closed to Accrual and Intervention |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT01473940 | Ipilimumab and Gemcitabine Hydrochloride in Treating Patients with Stage III-IV or Recurrent Pancreatic Cancer that Cannot be Removed by Surgery | Northwestern University | I | TREATMENT | Closed to Accrual |
| NCT01485744 | Erismodegib, Leucovorin Calcium, Fluorouracil, Irinotecan Hydrochloride, and Oxaliplatin Hydrochloride in Treating Patients with Previously Untreated, Locally Advanced, or Metastatic Pancreatic Cancer | Dana-Farber Harvard Cancer Center | I | TREATMENT | Closed to Accrual |
| NCT01489865 | Veliparib and Combination Chemotherapy in Treating Patients with Metastatic Pancreatic Cancer | MedStar Georgetown University Hospital | I_II | TREATMENT | Active |
| NCT01494155 | Proton or Photon Beam Radiation Therapy, Capecitabine, and Hydroxychloroquine in Treating Patients with Pancreatic Cancer That Can Be Removed by Surgery | Dana-Farber Harvard Cancer Center | II | TREATMENT | Closed to Accrual |
| NCT01497392 | Dovitinib Lactate, Gemcitabine Hydrochloride, and Capecitabine in Treating Patients with Advanced or Metastatic Solid Tumors, Pancreatic Cancer, or Biliary Cancer | Roswell Park Cancer Institute | I | TREATMENT | Complete |
| NCT01506973 | A Phase I/II/Pharmacodynamic Study of Hydroxychloroquine in Combination With Gemcitabine/Abraxane to Inhibit Autophagy in Pancreatic Cancer | University of Pennsylvania/Abramson Cancer Center | I_II | TREATMENT | Active |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT01515046 | Gemcitabine Hydrochloride and Ascorbic Acid in Treating Patients With Metastatic Pancreatic Cancer | University of Iowa/Holden Comprehensive Cancer Center | II | TREATMENT | Complete |
| NCT01523457 | Combination Chemotherapy in Treating Patients With Advanced or Metastatic Pancreatic Cancer | Yale University | II | TREATMENT | Closed to Accrual |
| NCT01537107 | Sirolimus and Vismodegib in Treatment of Patients with Solid Tumors or Pancreatic Cancer That is Metastatic or Cannot Be Removed by Surgery | Mayo Clinic | I | TREATMENT | Temporarily Closed to Accrual |
| NCT01555489 | Ascorbic Acid, Gemcitabine Hydrochloride, and Erlotinib Hydrochloride in Treating Patients With Metastatic Pancreatic Cancer | Thomas Jefferson University Hospital | II | TREATMENT | Administratively Complete |
| NCT01560949 | Combination Chemotherapy Followed by Radiation Therapy and Surgery in Treating Patients with High-Risk Pancreatic Cancer That Can Be Removed by Surgery | M D Anderson Cancer Center | II | TREATMENT | Closed to Accrual |
| NCT01573780 | Gemcitabine Hydrochloride and Smac Mimetic TL32711 in Treating Patients With Advanced Solid Tumors | Roswell Park Cancer Institute | I | TREATMENT | Administratively Complete |
| NCT01585805 | Gemcitabine Hydrochloride and Cisplatin with or without Veliparib or Veliparib Alone in Treating Patients with Locally Advanced or Metastatic Pancreatic Cancer | Memorial Sloan Kettering Cancer Center | II | TREATMENT | Active |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT01591733 | Combination Chemotherapy and Radiation Therapy before Surgery in Treating Patients with Pancreatic Cancer That May Be Removed by Surgery | Dana-Farber Harvard Cancer Center | II | TREATMENT | Closed to Accrual |
| NCT01595321 | Vaccine Therapy, Cyclophosphamide, Stereotactic Body Radiation Therapy, and Combination Chemotherapy in Treating Patients with Pancreatic Cancer That Has Been Removed by Surgery | Johns Hopkins University/Sidney Kimmel Cancer Center | NA | TREATMENT | Closed to Accrual |
| NCT01643499 | Combination Chemotherapy in Treating Patients with Previously Untreated Locally Advanced or Metastatic Gastrointestinal Malignancies | University of Chicago Comprehensive Cancer Center | I | TREATMENT | Closed to Accrual |
| NCT01658943 | Selumetinib and Akt Inhibitor MK2206 or mFOLFOX Therapy Comprising Oxaliplatin and Fluorouracil in Treating Patients with Metastatic Pancreatic Cancer Previously Treated with Chemotherapy | SWOG | II | TREATMENT | Complete |
| NCT01660971 | Gemcitabine Hydrochloride, Dasatinib, and Erlotinib Hydrochloride in Treating Patients with Pancreatic Cancer That Is Metastatic or Cannot Be Removed by Surgery | Vanderbilt University/Ingram Cancer Center | I | TREATMENT | Closed to Accrual and Intervention |
| NCT01661114 | Gemcitabine Hydrochloride, Fluorouracil, and Cisplatin in Treating Patients With Advanced Pancreatic or Biliary Cancer | University of Michigan Comprehensive Cancer Center | II | TREATMENT | Complete |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT01664169 | Biomarkers in Plasma Specimens From Patients Treated on Study CALGB-80303 | Cancer and Leukemia Group B | NA | OTHER | Approved |
| NCT01666730 | Metformin Hydrochloride, Leucovorin Calcium, Fluorouracil, and Oxaliplatin in Treating Patients with Metastatic Pancreatic Cancer | Case Comprehensive Cancer Center | II | TREATMENT | Closed to Accrual |
| NCT01677962 | Vaccine Therapy and Poly ICLC in Treating Patients with Locally Advanced Pancreatic Cancer That Cannot Be Removed by Surgery | Medical University of South Carolina | I | TREATMENT | Closed to Accrual and Intervention |
| NCT01677988 | Combination Chemotherapy Followed by Capecitabine and Radiation Therapy before Surgery in Treating Patients with Localized Pancreatic Cancer | Medical University of South Carolina | II | TREATMENT | Administratively Complete |
| NCT01688336 | Combination Chemotherapy in Treating Patients With Locally Advanced Pancreatic Cancer | UNC Lineberger Comprehensive Cancer Center | II | TREATMENT | Administratively Complete |
| NCT01739439 | Chemoradiation and Radiosurgery Boost in Treating Patients with Locally Advanced Pancreatic Cancer That May or May Not Be Removed by Surgery | Fox Chase Cancer Center | I | TREATMENT | Closed to Accrual and Intervention |
| NCT01741597 | Dynamic Contrast Enhanced MRI in Patients With Advanced Breast or Pancreatic Cancer With Metastases to the Liver or Lung | City of Hope Comprehensive Cancer Center | I | DIAGNOSTIC | Withdrawn |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT01754623 | Validation of Gene Signature in Measuring Response in Patients with Pancreatic Cancer That Can Be Removed by Surgery Undergoing Chemotherapy and Radiation Therapy | Moffitt Cancer Center | II | BASIC_SCIENCE | Administratively Complete |
| NCT01770132 | Ultrasound-Guided Photodynamic Therapy with Porfimer Sodium, Gemcitabine Hydrochloride, and Nab-Paclitaxel in Treating Patients with Locally Advanced Pancreatic Cancer | Indiana University/Melvin and Bren Simon Cancer Center | I | TREATMENT | Closed to Accrual |
| NCT01781728 | Stereotactic Body Radiation Therapy in Treating Patients with Pancreatic or Periampullary Cancer That Cannot Be Removed by Surgery or Is Recurrent | Johns Hopkins University/Sidney Kimmel Cancer Center | II | TREATMENT | Closed to Accrual |
| NCT01783054 | Gemcitabine Hydrochloride and Paclitaxel Albumin-Stabilized Nanoparticle Formulation before Surgery in Treating Patients with Localized Pancreatic Cancer | Medical University of South Carolina | NA | TREATMENT | Administratively Complete |
| NCT01783171 | Dinaciclib and Akt Inhibitor MK2206 in Treating Patients with Pancreatic Cancer That Cannot Be Removed by Surgery | Johns Hopkins University/Sidney Kimmel Cancer Center | I | TREATMENT | Complete |
| NCT01821612 | Combination Chemotherapy and Radiation Therapy before Surgery Followed by Gemcitabine Hydrochloride in Treating Patients with Pancreatic Cancer | Alliance for Clinical Trials in Oncology | NA | TREATMENT | Complete |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT01821729 | Combination Chemotherapy and Losartan Potassium Followed by Radiation Therapy and Capecitabine in Treating Patients with Locally Advanced Pancreatic Cancer That Cannot Be Removed by Surgery | Dana-Farber Harvard Cancer Center | II | TREATMENT | Closed to Accrual |
| NCT01825603 | ADH-1, Gemcitabine Hydrochloride and Cisplatin in Treating Patients with Locally Advanced or Metastatic Pancreatic or Biliary Tract Cancer That Cannot Be Removed by Surgery | University of Nebraska Medical Center | I | TREATMENT | Closed to Accrual |
| NCT01835041 | 6,8-Bis(benzylthio)octanoic Acid and Combination Chemotherapy in Treating Patients with Metastatic Pancreatic Cancer | Comprehensive Cancer Center of Wake Forest University | I | TREATMENT | Closed to Accrual |
| NCT01838317 | Pioglitazone Hydrochloride in Treating Patients with Pancreatic Cancer | UT Southwestern/Simmons Cancer Center-Dallas | II | TREATMENT | Active |
| NCT01839799 | Comparison of Two Combination Chemotherapy Regimens before and after Chemoradiation Therapy in Treating Patients with Stage IB-III Pancreatic Cancer Removed by Surgery | University of Pennsylvania/Abramson Cancer Center | II | TREATMENT | Closed to Accrual |
| NCT01839981 | 6,8-bis(Benzylthio)octanoic Acid in Treating Patients with Locally Advanced or Metastatic Pancreatic Cancer | Comprehensive Cancer Center of Wake Forest University | NA | TREATMENT | Closed to Accrual |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT01845805 | Azacitidine in Treating Patients with Pancreatic Cancer That Has Been Removed by Surgery | Johns Hopkins University/Sidney Kimmel Cancer Center | II | TREATMENT | Active |
| NCT01852890 | Gemcitabine Hydrochloride, Ascorbic Acid, and Radiation Therapy in Treating Patients with Pancreatic Cancer That Cannot Be Removed by Surgery | University of Iowa/Holden Comprehensive Cancer Center | I | TREATMENT | Closed to Accrual |
| NCT01888978 | Targeted Therapy in Treating Patients With Metastatic Pancreatic Cancer | MedStar Georgetown University Hospital | NA | TREATMENT | Complete |
| NCT01893294 | Gemcitabine Hydrochloride Therapy in Treating Patients With Locally Advanced Pancreatic Cancer | Mayo Clinic | I | TREATMENT | Administratively Complete |
| NCT01896869 | Combination Chemotherapy Followed by Ipilimumab and Vaccine Therapy in Treating Patients with Metastatic Pancreatic Cancer | Johns Hopkins University/Sidney Kimmel Cancer Center | II | TREATMENT | Closed to Accrual and Intervention |
| NCT01897415 | Laboratory Treated T Cells in Treating Patients With Chemotherapy Refractory Metastatic Pancreatic Cancer | University of Pennsylvania/Abramson Cancer Center | I | TREATMENT | Closed to Accrual and Intervention |
| NCT01897454 | Combination Chemotherapy, Gemcitabine Hydrochloride, and Radiation Therapy before Surgery in Treating Patients with Borderline Resectable Pancreatic Cancer | Montefiore Medical Center-Weiler Hospital | II | TREATMENT | Active |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT01911416 | Erismodegib Before Surgery Followed By Erismodegib and Gemcitabine Hydrochloride in Treating Patients With Pancreatic Cancer That Can Be Removed By Surgery | Huntsman Cancer Institute/University of Utah | I | TREATMENT | Administratively Complete |
| NCT01921751 | High or Standard Intensity Radiation Therapy after Gemcitabine Hydrochloride and Nab-paclitaxel in Treating Patients with Pancreatic Cancer That Cannot Be Removed by Surgery | NRG Oncology | II | TREATMENT | Closed to Accrual and Intervention |
| NCT01924260 | Alisertib and Gemcitabine Hydrochloride in Treating Patients With Solid Tumors or Pancreatic Cancer That is Metastatic or Cannot Be Removed By Surgery | University of California Davis Comprehensive Cancer Center | I | TREATMENT | Closed to Accrual |
| NCT01926197 | Combination Chemotherapy with or without Stereotactic Body Radiation Therapy in Treating Patients with Locally Advanced Pancreatic Cancer That Cannot Be Removed by Surgery | Stanford Cancer Institute Palo Alto | III | TREATMENT | Active |
| NCT01938716 | Gemcitabine Hydrochloride Uptake during Surgery in Patients with Pancreatic Cancer after Preoperative Chemoradiation Therapy | M D Anderson Cancer Center | NA | BASIC_SCIENCE | Closed to Accrual |
| NCT01950572 | Sample Collection and Natural History Study of Patients with Malignant Mesothelioma or Other Mesothelin-Expressing Cancers | NCI - Center for Cancer Research | NA | BASIC_SCIENCE | Active |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT01959139 | S1313, Combination Chemotherapy with or without PEGPH20 in Treating Patients with Newly Diagnosed Metastatic Pancreatic Cancer | SWOG | I_II | TREATMENT | Closed to Accrual |
| NCT01959672 | Combination Chemotherapy with or without Oregovomab Followed by Stereotactic Body Radiation Therapy and Nelfinavir Mesylate in Treating Patients with Locally Advanced Pancreatic Cancer | University of Nebraska Medical Center | II | TREATMENT | Closed to Accrual |
| NCT01962909 | PTP-01 in Diagnosing Pancreatic Cancer in Patients With Pancreatic Ductal Cancer That Can Be Removed by Surgery | University of Virginia Cancer Center | O | DIAGNOSTIC | Complete |
| NCT01978184 | Gemcitabine Hydrochloride and Paclitaxel Albumin-Stabilized Nanoparticle Formulation With or Without Hydroxychloroquine Before Surgery in Treating Patients With Pancreatic Cancer | University of Pittsburgh Cancer Institute (UPCI) | II | TREATMENT | Active |
| NCT01992705 | Combination Chemotherapy and Radiation Therapy Before Surgery in Treating Patients With Pancreatic Cancer | University of Maryland/Greenebaum Cancer Center | NA | TREATMENT | Active |
| NCT02000089 | Biomarker Analysis in Improving Screening in Patients with or at High Risk of Developing Pancreatic Cancer | Johns Hopkins University/Sidney Kimmel Cancer Center | NA | SCREENING | Active |
| NCT02028377 | PET/MRI in Identifying Surgical Candidates with Pancreatic Cancer | Siteman Cancer Center at Washington University | NA | DIAGNOSTIC | Closed to Accrual |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT02030860 | Paclitaxel Albumin-Stabilized Nanoparticle Formulation, Gemcitabine Hydrochloride, and Paricalcitol Before and After Surgery in Treating Patients With Pancreatic Cancer That Can be Removed by Surgery | University of Pennsylvania/Abramson Cancer Center | NA | TREATMENT | Closed to Accrual |
| NCT02037230 | WEE1 Inhibitor AZD1775, Gemcitabine Hydrochloride, and Radiation Therapy in Treating Patients with Pancreatic Cancer That Cannot Be Removed by Surgery | University of Michigan Comprehensive Cancer Center | I_II | TREATMENT | Active |
| NCT02047474 | Combination Chemotherapy before and after Surgery in Treating Patients with Pancreatic Cancer That Can Be Removed by Surgery | Yale University | II | TREATMENT | Active |
| NCT02048384 | Metformin Hydrochloride with or without Sirolimus after Induction Chemotherapy Therapy in Treating Patients with Metastatic Pancreatic Cancer | Johns Hopkins University/Sidney Kimmel Cancer Center | I | TREATMENT | Closed to Accrual |
| NCT02048943 | Dovitinib Lactate, Gemcitabine Hydrochloride, and Paclitaxel Albumin-Stabilized Nanoparticle Formulation in Treating Patients With Advanced Solid Tumors or Pancreatic Cancer | Roswell Park Cancer Institute | I | TREATMENT | Withdrawn |
| NCT02070705 | DCE MRI in Patients with Pancreatic Cancer | OHSU Knight Cancer Institute | NA | DIAGNOSTIC | Active |
| NCT02080650 | Circulating Tumor Cells Analysis in Tissue and Blood Samples from Patients with Cancer | Duke University Medical Center | NA | OTHER | Complete |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT02138383 | Enzalutamide in Combination with Gemcitabine and Nab-Paclitaxel for the Treatment of Advanced Pancreatic Cancer | Moffitt Cancer Center | I | TREATMENT | Closed to Accrual and Intervention |
| NCT02153450 | Stereotactic Body Radiation Therapy and Metformin Hydrochloride in Treating Patients with Borderline-Resectable or Locally-Advanced Pancreatic Cancer | Case Comprehensive Cancer Center | NA | TREATMENT | Active |
| NCT02155088 | Alpelisib, Gemcitabine Hydrochloride, and Nab-paclitaxel in Treating Patients with Locally Advanced or Metastatic Pancreatic Cancer | Moffitt Cancer Center | I | TREATMENT | Closed to Accrual and Intervention |
| NCT02159716 | Genetically Modified T Cells with or without Cyclophosphamide in Treating Patients with Recurrent Mesothelin-Expressing Cancers That Cannot Be Removed by Surgery | University of Pennsylvania/Abramson Cancer Center | I | TREATMENT | Closed to Accrual |
| NCT02178436 | Selinexor, Gemcitabine Hydrochloride, and Paclitaxel Albumin-Stabilized Nanoparticle Formulation in Treating Patients with Metastatic Pancreatic Cancer | Wayne State University/Karmanos Cancer Institute | I_II | TREATMENT | Closed to Accrual |
| NCT02178709 | Leucovorin Calcium, Irinotecan Hydrochloride, Fluorouracil, and Oxaliplatin Before Surgery in Treating Patients with Pancreatic Cancer That Can Be Removed By Surgery | Indiana University/Melvin and Bren Simon Cancer Center | II | TREATMENT | Closed to Accrual |

Appendix 4
Open NCI PDAC Supported Clinical Trials as of February 2018

| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT02194829 | Paclitaxel Albumin-Stabilized Nanoparticle Formulation and Gemcitabine Hydrochloride with or without WEE1 Inhibitor MK-1775 in Treating Patients with Previously Untreated Pancreatic Cancer That Is Metastatic or Cannot Be Removed by Surgery | ECOG-ACRIN Cancer Research Group | I_II | TREATMENT | Closed to Accrual and Intervention |
| NCT02195232 | Isoquercetin in Preventing Venous Thromboembolic Events in Patients with Metastatic or Unresectable Pancreatic Cancer, Stage III-IV Non-small Cell Lung Cancer, or Stage IV Colorectal Cancer | Dana-Farber Harvard Cancer Center | II_III | PREVENTION | Active |
| NCT02207465 | Radiation Therapy and Paclitaxel Albumin-Stabilized Nanoparticle Formulation in Treating Patients with Pancreatic Cancer | University of Pennsylvania/Abramson Cancer Center | I | TREATMENT | Active |
| NCT02241187 | PEGPH20 and Cetuximab before Surgery in Treating Patients with Pancreatic Cancer That Can Be Removed by Surgery | Memorial Sloan Kettering Cancer Center | NA | BASIC_SCIENCE | Active |
| NCT02241551 | Gemcitabine Hydrochloride and Nab-Paclitaxel or mFOLFIRINOX with Stereotactic Body Radiation Therapy before Surgery in Treating Patients with Pancreatic Cancer | University of Pittsburgh Cancer Institute (UPCI) | II | TREATMENT | Complete |
| NCT02242409 | Gemcitabine Hydrochloride and Nab-Paclitaxel as Second Line Therapy in Treating Patients with Metastatic Pancreatic Cancer | MedStar Georgetown University Hospital | II | TREATMENT | Administratively Complete |

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Open NCI PDAC Supported Clinical Trials as of February 2018

| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT02243007 | Combination Chemotherapy or Gemcitabine Hydrochloride and Paclitaxel Albumin-Stabilized Nanoparticle Formulation Followed by Radiation Therapy and Capecitabine in Treating Patients with Pancreatic Cancer That Can Be Removed by Surgery or Borderline Resect | Dana-Farber Harvard Cancer Center | II | TREATMENT | Complete |
| NCT02243371 | Vaccine Therapy and Cyclophosphamide with or without Nivolumab in Treating Patients with Previously Treated Metastatic Pancreatic Cancer | Johns Hopkins University/Sidney Kimmel Cancer Center | II | TREATMENT | Closed to Accrual |
| NCT02283372 | Nab-Paclitaxel plus Gemcitabine Hydrochloride with Concurrent MR-Guided IMRT in Patients with Locally Advanced and Borderline Resectable Pancreatic Cancer | Siteman Cancer Center at Washington University | I | TREATMENT | Active |
| NCT02295956 | Preoperative Rehabilitation Program in Reducing Frailty in Patients Undergoing Chemotherapy and Surgery for Pancreatic Cancer | M D Anderson Cancer Center | NA | SUPPORTIVE_CARE | Closed to Accrual |
| NCT02305186 | Capecitabine and Radiation Therapy with or without Pembrolizumab in Treating Participants with Resectable or Borderline Resectable Pancreatic Cancer | University of Virginia Cancer Center | I_II | TREATMENT | Active |
| NCT02311361 | Tremelimumab with or without Durvalumab and Radiation Therapy in Treating Patients with Pancreatic Cancer That | NCI - Center for Cancer Research | I | TREATMENT | Active |

Appendix 4
Open NCI PDAC Supported Clinical Trials as of February 2018

| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| | Cannot Be Removed by Surgery | | | | |
| NCT02318095 | Gemcitabine Hydrochloride, Nab-paclitaxel, and Hypofractionated, Image-Guided, Intensity Modulated Radiation Therapy before Surgery in Treating Patients with Newly Diagnosed Pancreatic Cancer That Can Be Removed by Surgery | Duke University Medical Center | II | TREATMENT | Active |
| NCT02324543 | Gemcitabine Hydrochloride, Docetaxel, Capecitabine, Cisplatin, and Irinotecan Hydrochloride in Treating Patients with Metastatic Pancreatic Cancer | Johns Hopkins University/Sidney Kimmel Cancer Center | I_II | TREATMENT | Closed to Accrual |
| NCT02333188 | Genetic Analysis-Guided Dosing of FOLFIRABAX in Treating Patients with Advanced Gastrointestinal Cancer | University of Chicago Comprehensive Cancer Center | I_II | TREATMENT | Closed to Accrual |
| NCT02336087 | Gemcitabine Hydrochloride, Nab-paclitaxel, Metformin Hydrochloride, and a Standardized Dietary Supplement in Treating Patients with Pancreatic Cancer That Cannot Be Removed by Surgery | City of Hope Comprehensive Cancer Center | I | TREATMENT | Active |
| NCT02345460 | Combination Chemotherapy in Treating Patients with Pancreatic Cancer before Undergoing Surgery | Case Comprehensive Cancer Center | II | TREATMENT | Administratively Complete |

Appendix 4
Open NCI PDAC Supported Clinical Trials as of February 2018

| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT02349867 | Sorafenib Tosylate, Vorinostat, Gemcitabine Hydrochloride, and Radiation Therapy in Treating Patients with Pancreatic Cancer | Virginia Commonwealth University/Massey Cancer Center | I | TREATMENT | Active |
| NCT02352831 | Tosedostat and Capecitabine in Treating Patients with Pancreatic Cancer That Is Advanced, Metastatic, or Cannot Be Removed by Surgery | Siteman Cancer Center at Washington University | I_II | TREATMENT | Closed to Accrual |
| NCT02383433 | Regorafenib and Gemcitabine Hydrochloride as Second-Line Therapy in Treating Patients with Metastatic Pancreatic Cancer | Case Comprehensive Cancer Center | II | TREATMENT | Closed to Accrual |
| NCT02393703 | Exosome Biomarkers in Blood, Pancreatic Fluid, and Tissue Samples from Patients with Pancreatic Cancer Undergoing Surgery | Memorial Sloan Kettering Cancer Center | NA | OTHER | Active |
| NCT02394535 | Nab-Paclitaxel, Capecitabine, and Radiation Therapy following Induction Chemotherapy in Treating Patients with Locally Advanced Pancreatic Cancer | M D Anderson Cancer Center | I | TREATMENT | Active |
| NCT02414100 | Patient Derived Cancer Cell Lines in Identifying Molecular Changes in Patients with Previously Untreated Pancreatic Cancer Receiving Gemcitabine Hydrochloride-Based Chemotherapy | Thomas Jefferson University Hospital | NA | OTHER | Active |

Appendix 4
Open NCI PDAC Supported Clinical Trials as of February 2018

| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT02427841 | Nab-paclitaxel and Gemcitabine Hydrochloride Followed by Radiation Therapy before Surgery in Treating Patients with Pancreatic Cancer That Can Be Removed by Surgery | OHSU Knight Cancer Institute | II | TREATMENT | Active |
| NCT02442323 | Home-Based Walking Program in Improving Quality of Life in Patients with Locally Advanced or Metastatic Pancreatic Cancer | Fox Chase Cancer Center | NA | SUPPORTIVE _CARE | Active |
| NCT02451982 | Vaccine Therapy with or without Nivolumab or Urelumab before and after Surgery in Treating Patients with Stage I-IIB Pancreatic Cancer That Can Be Removed by Surgery | Johns Hopkins University/Sidney Kimmel Cancer Center | I_II | TREATMENT | Active |
| NCT02454140 | Stereotactic Body Radiation Therapy in Treating Patients with Pancreatic Cancer That Cannot Be Removed by Surgery | University of California San Diego | I | TREATMENT | Active |
| NCT02471170 | Circulating Tumor Material in Blood Samples from Patients with Pancreatic Diseases | University of Pennsylvania/Abramson Cancer Center | NA | OTHER | Active |
| NCT02487277 | PEGPH20, Gemcitabine Hydrochloride, and Nab-Paclitaxel in Treating Patients with Borderline Resectable Pancreatic Cancer | UCSF Medical Center-Mount Zion | II | TREATMENT | Closed to Accrual |
| NCT02495896 | Recombinant EphB4-HSA Fusion Protein with Standard Chemotherapy Regimens in Treating Patients with Advanced or Metastatic Solid Tumors | USC / Norris Comprehensive Cancer Center | I | TREATMENT | Active |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT02498613 | A Phase 2 Study of Cediranib in Combination with Olaparib in Advanced Solid Tumors | Yale University Cancer Center LAO | II | TREATMENT | Active |
| NCT02514031 | Beta-lapachone Prodrug ARQ 761 and Combination Chemotherapy in Treating Patients with Pancreatic Cancer That Is Metastatic, Recurrent, or Cannot Be Removed by Surgery | UT Southwestern/Simmons Cancer Center-Dallas | I | TREATMENT | Active |
| NCT02534675 | Personalized Cancer Therapy in Treating Participants with Metastatic or Unresectable Cancers | University of California San Diego | NA | TREATMENT | Active |
| NCT02546531 | Defactinib, Pembrolizumab, and Gemcitabine Hydrochloride in Treating Patients with Advanced Pancreatic Cancer or Solid Tumors | Siteman Cancer Center at Washington University | I | TREATMENT | Active |
| NCT02562716 | S1505: Combination Chemotherapy or Gemcitabine Hydrochloride and Paclitaxel Albumin-Stabilized Nanoparticle Formulation before Surgery in Treating Patients with Pancreatic Cancer That Can Be Removed by Surgery | SWOG | II | TREATMENT | Closed to Accrual |
| NCT02562898 | Ibrutinib, Gemcitabine Hydrochloride, and Nab-paclitaxel in Treating Patients with Metastatic Pancreatic Cancer | UCSF Medical Center-Mount Zion | I | TREATMENT | Closed to Accrual |

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Open NCI PDAC Supported Clinical Trials as of February 2018

| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT02567396 | Talazoparib in Treating Patients with Advanced or Metastatic Solid Tumors That Cannot Be Removed by Surgery and Liver or Kidney Dysfunction | University Health Network Princess Margaret Cancer Center LAO | I | TREATMENT | Withdrawn |
| NCT02569723 | Carbon C 14 Oxaliplatin Microdosing Assay in Predicting Exposure and Sensitivity to Oxaliplatin-Based Chemotherapy in Patients with Colon, Rectal, Pancreatic, Gastroesophageal, Appendix, or Small Intestine Cancer | University of California Davis Comprehensive Cancer Center | NA | TREATMENT | Closed to Accrual |
| NCT02575508 | Pan FGFR Kinase Inhibitor BGJ398 and Combination Chemotherapy in Treating Patients with Untreated Metastatic Pancreatic Cancer | Roswell Park Cancer Institute | I_II | TREATMENT | Withdrawn |
| NCT02581215 | Combination Chemotherapy with or without Ramucirumab in Treating Patients with Metastatic or Recurrent Pancreatic Cancer | Emory University Hospital/Winship Cancer Institute | II | TREATMENT | Active |
| NCT02588443 | RO7009789 with or without Nab-paclitaxel and Gemcitabine Hydrochloride before and after Surgery in Treating Patients with Newly Diagnosed Pancreatic Cancer That Can Be Removed by Surgery | Cancer Immunotherapy Trials Network | I | TREATMENT | Closed to Accrual |
| NCT02600949 | Personalized Peptide Vaccine in Treating Patients with Advanced Pancreatic Cancer or Colorectal Cancer | M D Anderson Cancer Center | I | TREATMENT | Active |

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Open NCI PDAC Supported Clinical Trials as of February 2018

| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT02608229 | Ulixertinib with Nab-Paclitaxel and Gemcitabine Hydrochloride in Treating Patients with Metastatic Pancreatic Cancer | Siteman Cancer Center at Washington University | I | TREATMENT | Active |
| NCT02620865 | Bispecific Antibody Armed Activated T-cells with Aldesleukin and Sargramostim in Treating Patients with Locally Advanced or Metastatic Pancreatic Cancer | Wayne State University/Karmanos Cancer Institute | I_II | TREATMENT | Temporarily Closed to Accrual |
| NCT02638909 | Ceritinib in Treating Patients with Activated Gastrointestinal Malignancies That Cannot Be Removed by Surgery | University of Colorado Hospital | II | TREATMENT | Closed to Accrual and Intervention |
| NCT02639026 | Hypofractionated Radiation Therapy, Durvalumab, and Tremelimumab in Treating Patients with Metastatic Relapsed or Refractory Melanoma, Non-small Cell Lung Cancer, Breast Cancer, or Pancreatic Cancer | University of Pennsylvania/Abramson Cancer Center | I | TREATMENT | Active |
| NCT02643498 | Stereotactic Body Radiation Therapy after Induction Chemotherapy in Treating Patients with Locally Advanced Pancreatic Cancer | Memorial Sloan Kettering Cancer Center | I | TREATMENT | Active |
| NCT02648282 | GVAX Pancreatic Cancer Vaccine, Pembrolizumab, and Stereotactic Body Radiation Therapy in Treating Patients with Locally Advanced Pancreatic Cancer That Cannot Be Removed by Surgery | Johns Hopkins University/Sidney Kimmel Cancer Center | II | TREATMENT | Active |

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Open NCI PDAC Supported Clinical Trials as of February 2018

| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT02648880 | Exercise during Neoadjuvant Therapy before Surgery in Improving the Health of Patients with Newly Diagnosed Pancreatic Cancer | University of Colorado Hospital | NA | SUPPORTIVE _CARE | Closed to Accrual and Intervention |
| NCT02650635 | TLR8 Agonist VTX-2337 and Cyclophosphamide in Treating Patients with Metastatic, Persistent, Recurrent, or Progressive Solid Tumors | Mayo Clinic in Arizona | I | TREATMENT | Complete |
| NCT02671890 | Disulfiram and Gemcitabine Hydrochloride in Treating Patients with Unresectable Solid Tumors or Metastatic Pancreatic Cancer | Mayo Clinic | I | TREATMENT | Temporarily Closed to Accrual |
| NCT02677038 | Olaparib in Treating Patients with Stage IV Pancreatic Cancer | M D Anderson Cancer Center | II | TREATMENT | Active |
| NCT02681601 | Nutrition Supplementation in Improving Outcomes in Patients with Pancreatic Cancer That Cannot Be Removed by Surgery | UCLA / Jonsson Comprehensive Cancer Center | NA | SUPPORTIVE _CARE | Active |
| NCT02714374 | GL-ONC1 with or without Eculizumab in Treating Patients with Solid Organ Cancers before Surgery | University of California San Diego | I | TREATMENT | Active |
| NCT02719691 | Sapanisertib and Alisertib in Treating Patients with Incurable Refractory Solid Tumors or Metastatic Triple-Negative Breast Cancer | University of Colorado Hospital | I | TREATMENT | Active |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT02723331 | Combination Chemotherapy and Stereotactic Body Radiation Therapy before Surgery Followed by Combination Chemotherapy in Treating Patients with Pancreatic Cancer That Can Be Removed by Surgery | University of Colorado Hospital | II | TREATMENT | Active |
| NCT02736578 | Cetuximab-IRDye 800CW and Intraoperative Imaging in Finding Pancreatic Cancer in Patients Undergoing Surgery | Stanford Cancer Institute Palo Alto | I_II | DIAGNOSTIC | Closed to Accrual |
| NCT02757859 | High Volume Washing of the Abdomen in Increasing Survival After Surgery in Patients with Pancreatic Cancer That Can Be Removed by Surgery | Thomas Jefferson University Hospital | NA | SUPPORTIVE _CARE | Active |
| NCT02780648 | Respiratory-Gated Stereotactic Body Radiation Therapy in Treating Patients with Recurrent or Residual Pancreatic or Periampullary Region Cancer | Indiana University/Melvin and Bren Simon Cancer Center | NA | TREATMENT | Active |
| NCT02782182 | Combination Chemotherapy before and after Surgery in Treating Patients with Resectable Pancreatic Cancer | University of Chicago Comprehensive Cancer Center | NA | TREATMENT | Active |
| NCT02810418 | LMB-100 with or without Nab-Paclitaxel in Treating Patients with Mesothelin Positive Solid Tumors or Recurrent, Metastatic, and/or Locally Advanced Pancreatic Cancer | NCI - Center for Cancer Research | I_II | TREATMENT | Active |
| NCT02834013 | Nivolumab and Ipilimumab in Treating Patients with Rare Tumors | SWOG | II | TREATMENT | Active |

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Open NCI PDAC Supported Clinical Trials as of February 2018

| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT02839343 | Combination Chemotherapy with or without Hypofractionated Radiation Therapy before Surgery in Treating Patients with Pancreatic Cancer | Alliance for Clinical Trials in Oncology | II | TREATMENT | Temporarily Closed to Accrual |
| NCT02847000 | Decitabine and Tetrahydrouridine in Treating Patients with Advanced Pancreatic Cancer That Has Progressed Through One or More Lines of Therapy | Case Comprehensive Cancer Center | O | TREATMENT | Complete |
| NCT02868632 | Tremelimumab and/or Durvalumab with Radiation Therapy in Treating Patients with Non-metastatic Pancreatic Cancer That Cannot Be Removed by Surgery | Laura and Isaac Perlmutter Cancer Center at NYU Langone | I | TREATMENT | Closed to Accrual |
| NCT02873598 | Stereotactic Body Radiation Therapy after Induction Chemotherapy in Treating Patients with Locally Advanced Pancreatic Cancer That Cannot Be Removed by Surgery | University of Colorado Hospital | I | TREATMENT | Active |
| NCT02890355 | FOLFIRI or Modified FOLFIRI and Veliparib as Second Line Therapy in Treating Patients with Metastatic Pancreatic Cancer | SWOG | II | TREATMENT | Closed to Accrual |
| NCT02896907 | Ascorbic Acid and Combination Chemotherapy in Treating Patients with Locally Advanced or Recurrent Pancreatic Cancer That Cannot Be Removed by Surgery | Thomas Jefferson University Hospital | NA | TREATMENT | Closed to Accrual |
| NCT02907099 | Pembrolizumab and CXCR4 Antagonist BL-8040 in Treating Patients with | M D Anderson Cancer Center | II | TREATMENT | Active |

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Open NCI PDAC Supported Clinical Trials as of February 2018

| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| | Metastatic Pancreatic Cancer | | | | |
| NCT02921022 | Gemcitabine Hydrochloride, Nab-paclitaxel, PEGPH20, and Rivaroxaban in Treating Patients with Stage III-IV Pancreatic Cancer That Cannot Be Removed by Surgery | Memorial Sloan Kettering Cancer Center | II | TREATMENT | Active |
| NCT02942095 | Ixazomib Citrate and Erlotinib Hydrochloride in Treating Patients with Advanced, Metastatic, Relapsed, or Refractory Solid Tumors | M D Anderson Cancer Center | I | TREATMENT | Active |
| NCT02959164 | Decitabine and Gemcitabine Hydrochloride in Treating Patients with Metastatic Pancreatic Cancer, Soft Tissue Sarcoma, or Bone Sarcoma | University of Iowa/Holden Comprehensive Cancer Center | I | TREATMENT | Active |
| NCT02967770 | Molecularly Tailored Therapy or Standard of Care Second-Line Therapy in Treating Patients with Metastatic Pancreatic Cancer | MedStar Georgetown University Hospital | II | TREATMENT | Active |
| NCT02985125 | Ribociclib and Everolimus in Treating Patients with Metastatic Pancreatic Cancer That is Refractory to Chemotherapy | MedStar Georgetown University Hospital | I_II | TREATMENT | Active |
| NCT03001518 | Immunologic Biomarkers in Blood Samples from Patients with Pancreatic Cancer Undergoing Surgery | Duke University Medical Center | NA | OTHER | Active |

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Open NCI PDAC Supported Clinical Trials as of February 2018

| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT03012282 | CT Perfusion Images in Assessing Treatment Response in Patients with Pancreatic Cancer | Fred Hutch/University of Washington Cancer Consortium | NA | OTHER | Enrolling by Invitation |
| NCT03021668 | Prevena Peel & Place Dressing versus Standard Closure in Reducing Surgical Site Infection in Patients with Pancreatic Cancer Undergoing Pancreaticoduodenectomy | Johns Hopkins University/Sidney Kimmel Cancer Center | NA | PREVENTION | Active |
| NCT03033927 | Circulating Tumor Cell and Tumor Tissue Models in Blood and Tissue Samples from Patients with Stage IV Pancreatic Cancer Undergoing Chemotherapy | Memorial Sloan Kettering Cancer Center | NA | OTHER | Active |
| NCT03038477 | Durvalumab in Treating Patients with Pancreatic Cancer That Can Be Removed by Surgery after Chemotherapy | University of Colorado Hospital | II | TREATMENT | Temporarily Closed to Accrual |
| NCT03060720 | Clinical Factors in Predicting Genetic Mutations in Patients with Pancreatic Cancer | Dana-Farber Harvard Cancer Center | NA | OTHER | Active |
| NCT03073785 | Hypofractionated Stereotactic Body Radiation Therapy and Fluorouracil or Capecitabine with or without Zoledronic Acid in Treating Patients with Locally Advanced Pancreatic Cancer | University of Nebraska Medical Center | II | TREATMENT | Active |

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Open NCI PDAC Supported Clinical Trials as of February 2018

| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT03086642 | Talimogene Laherparepvec in Treating Patients with Locally Advanced, Metastatic, or Refractory Pancreatic Cancer That Cannot Be Removed by Surgery | Columbia University/Herbert Irving Cancer Center | I | TREATMENT | Active |
| NCT03095781 | Pembrolizumab and Hsp90 inhibitor XL888 in Treating Patients with Advanced Gastrointestinal Cancer | Emory University Hospital/Winship Cancer Institute | I | TREATMENT | Active |
| NCT03104439 | Nivolumab, Ipilimumab, and Radiation Therapy in Treating Patients with Colorectal or Pancreatic Cancer | Dana-Farber Harvard Cancer Center | II | TREATMENT | Active |
| NCT03122106 | Personalized DNA Vaccine in Treating Patients with Pancreatic Cancer Who Have Undergone Surgery and Received Chemotherapy | Siteman Cancer Center at Washington University | I | TREATMENT | Active |
| NCT03140670 | Rucaparib Phosphate in Treating Patients with Advanced Pancreatic Cancer and a Known Deleterious BRCA1/2 or PALB2 Mutation | University of Pennsylvania/Abramson Cancer Center | II | TREATMENT | Approved |
| NCT03192462 | Tumor-Associated Antigen-Specific Cytotoxic T Lymphocytes in Treating Participants with Locally Advanced, Advanced, Metastatic, or Resectable Pancreatic Cancer | Baylor College of Medicine/Dan L Duncan Comprehensive Cancer Center | I_II | TREATMENT | Active |
| NCT03213626 | Cabozantinib S-Malate and Erlotinib Hydrochloride for Patients with EGFR and C-Met Co-expressing Metastatic Pancreatic Cancer | Indiana University/Melvin and Bren Simon Cancer Center | II | TREATMENT | Active |

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| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT03257761 | Guadecitabine and Durvalumab in Treating Patients with Advanced Liver, Pancreatic, Bile Duct, or Gallbladder Cancer | USC / Norris Comprehensive Cancer Center | I | TREATMENT | Active |
| NCT03264404 | Pembrolizumab and Azacitidine in Treating Patients with Advanced Pancreatic Cancer after Failure of First-Line Therapy | Columbia University/Herbert Irving Cancer Center | II | TREATMENT | Active |
| NCT03269526 | EGFR-BATs in Treating Participants with Locally Advanced or Metastatic Pancreatic Cancer | University of Virginia Cancer Center | I_II | TREATMENT | Active |
| NCT03291938 | IACS-010759 in Treating Participants with Relapsed or Refractory Lymphoma or Solid Tumors That Are Advanced, Metastatic, or Unresectable | M D Anderson Cancer Center | I | TREATMENT | Active |
| NCT03316599 | Gemcitabine Hydrochloride, Nab-Paclitaxel, and Ficlatuzumab in Treating Patients with Advanced Pancreatic Cancer | Dana-Farber Harvard Cancer Center | I | TREATMENT | Active |
| NCT03318497 | Fluorothymidine F-18 PET/CT in Predicting Outcome in Participants with Locally Advanced Pancreatic Cancer | UT Southwestern/Simmons Cancer Center-Dallas | II | DIAGNOSTIC | Active |
| NCT03334708 | Biomarkers for the Early Detection, Surveillance, and Monitoring in Patients with Locally Advanced or Metastatic Pancreatic Cancer | Memorial Sloan Kettering Cancer Center | NA | DIAGNOSTIC | Active |

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Open NCI PDAC Supported Clinical Trials as of February 2018

| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT03337087 | Liposomal Irinotecan, Fluorouracil, Leucovorin Calcium, and Rucaparib in Treating Patients with Metastatic Pancreatic, Colorectal, Gastroesophageal, or Biliary Cancer | Academic and Community Cancer Research United | I_II | TREATMENT | Approved |
| NCT03344172 | Gemcitabine Hydrochloride, Nab-Paclitaxel, and Hydroxychloroquine Sulfate with or without Avelumab in Treating Participants with Resectable Pancreatic Cancer Before Surgery | University of Pittsburgh Cancer Institute (UPCI) | II | TREATMENT | Active |
| NCT03368963 | TAS102 and Liposomal Irinotecan in Treating Patients with Gastrointestinal Cancers That Are Locally Advanced, Metastatic, or Cannot Be Removed by Surgery | Emory University Hospital/Winship Cancer Institute | I_II | TREATMENT | Active |
| NCT03373188 | Anti-SEMA4D Monoclonal Antibody VX15/2503 with or without Ipilimumab or Nivolumab in Treating Patients with Stage I-III Pancreatic Cancer That Can Be Removed by Surgery or Stage IV Colorectal Cancer with Liver Metastasis That Can Be Removed by Surgery | Emory University Hospital/Winship Cancer Institute | I | TREATMENT | Active |
| NCT03374852 | CPI-613 and Combination Chemotherapy in Treating Participants with Locally Advanced Pancreatic Cancer | Thomas Jefferson University Hospital | II | TREATMENT | Withdrawn |

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Open NCI PDAC Supported Clinical Trials as of February 2018

| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT03376659 | Durvalumab, MVA-BN-CV301, FPV Vaccine CV301, and Capecitabine with or without Bevacizumab in Treating Patients with Metastatic Colorectal or Pancreatic Cancer | MedStar Georgetown University Hospital | I_II | TREATMENT | Approved |
| NCT03384238 | Panitumumab-IRDye800 in Finding Cancer in Patients with Pancreatic Cancer Undergoing Surgery | Stanford Cancer Institute Palo Alto | I_II | DIAGNOSTIC | Active |
| NCT03432676 | Epacadostat and Pembrolizumab in Treating Participants with Advanced Pancreatic Cancer | M D Anderson Cancer Center | II | TREATMENT | Approved |
| NCT03434678 | Epidural-General Anesthesia or General Anesthesia in Reducing Complications and Improving Survival in Participants Undergoing Pancreaticoduodenectomy | Memorial Sloan Kettering Cancer Center | III | TREATMENT | Active |
| NCT03451773 | M7824 and Gemcitabine Hydrochloride in Treating Participants with Previously Treated Advanced Pancreatic Cancer | NCI - Center for Cancer Research | I_II | TREATMENT | Temporarily Closed to Accrual and Intervention |
| NCT03469258 | Pancrelipase in Treating Pancreatic Exocrine Insufficiency in Participants with Resected Pancreatic Cancer | Dana-Farber Harvard Cancer Center | II | SUPPORTIVE_CARE | Active |
| NCT03496662 | CCR2/CCR5 Antagonist BMS-813160, Nivolumab, Gemcitabine Hydrochloride, and Nab-Paclitaxel in Treating Participants with Borderline Resectable or Locally Advanced Pancreatic Cancer | Siteman Cancer Center at Washington University | I_II | TREATMENT | Active |

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Open NCI PDAC Supported Clinical Trials as of February 2018

| NCT Number | Title | Sponsor | Phase | Primary Purpose | Current Trial Status |
|---|---|---|---|---|---|
| NCT03608631 | iExosomes in Treating Participants with Metastatic Pancreas Cancer with KrasG12D Mutation | M D Anderson Cancer Center | I | TREATMENT | Approved |
| NCT03610490 | Autologous Tumor Infiltrating Lymphocytes MDA-TIL in Treating Participants with Recurrent or Refractory Ovarian Cancer, Osteosarcoma, or Pancreatic Ductal Adenocarcinoma | M D Anderson Cancer Center | II | TREATMENT | Approved |

Appendix 5
Meeting Agenda
Wednesday, October 17, 2018

**NCI CLINICAL TRIALS AND TRANSLATIONAL RESEARCH ADVISORY COMMITTEE (CTAC)**
**PROGRESS IN PANCREATIC DUCTAL ADENOCARCINOMA RESEARCH WORKING GROUP**
**(PDAC PROGRESS WG)**

**MEETING AGENDA**
**WEDNESDAY, OCTOBER 17, 2018**
**9:00 AM – 3:00 PM**
**NATIONAL INSTITUTES OF HEALTH**
**NATCHER CONFERENCE CENTER (BUILDING 45)**
**CONFERENCE ROOM D**

**To access meeting via WebEx, click here: Join Webex meeting**
Enter meeting access code: **731 576 078**/ Meeting password: DpK4Hp8?
For Audio Only Access: Dial **1-650-479-3207** and follow the instructions that you hear on the phone

| | | | |
|---|---|---|---|
| **9:00 AM – 9:05 AM** | **I.** | **WELCOME AND INTRODUCTIONS** | James Doroshow (NCI) |
| **9:05 AM – 9:15 AM** | **II.** | **OVERVIEW AND CHARGE** | Tony Hollingsworth (U. NE) |
| **9:15 AM – 10:45 AM** | **III.** | **SESSION 1: NIH UPDATES** | |
| 9:15 AM – 9:30 AM | | Biomarkers, Early Detection, Screening | Sudhir Srivastava (NCI) |
| 9:30 AM – 9:45 AM | | Consortium for the Study of Pancreatitis, Diabetes and Pancreatic Cancer (CPDPC) | Dana Anderson (NIDDK) |
| 9:45 AM – 10:00 AM | | Moonshot (Immunotherapy and Microenvironment) | Peter Ujhazy (NCI) |
| 10:00 AM – 10:15 AM | | RAS Initiative | Dwight Nissley (FNLCRC) |
| 10:15 AM – 10:45 AM | | Q/A Discussion | All |
| **10:45 AM – 11:00 AM** | | **BREAK** | |
| **11:00 AM – 2:30 PM** | **IV.** | **SESSIONS 2 – 5: HIGHLIGHTS FROM WEBINARS, SCIENTIFIC PROGRESS, GAPS/NEW OPPORTUNITIES** | |
| | | 2014 Scientific Initiatives<br>○ Are they still scientifically relevant? | |

Appendix 5
Meeting Agenda
Wednesday, October 17, 2018

- Do they need to be modified?
- Is the NCI on target in terms of research direction?
- New Opportunities

| | | |
|---|---|---|
| **SESSION 2** | **PDAC Biology** | |
| **11:00 AM – 11:45 AM** | **Moderator** | **Tony Hollingsworth (U. Nebraska)** |
| 11:00 AM – 11:20 AM | Moderator Presentation | Tony Hollingsworth |
| 11:20 AM – 11:45 AM | Moderator-Led Discussion | |
| Panel | Sunil Hingorani, Andrew Lowy, Anirban Maitra, Lynn Matrisian | |
| **SESSION 3** | **Animal and Human Tissue Model Systems** | |
| **11:45 AM – 12:30 PM** | **Moderator** | **David Tuveson (Cold Spring Harbor)** |
| 11:45 AM – 12:05 PM | Moderator Presentation | David Tuveson |
| 12:05 PM – 12:30 PM | Moderator-Led Discussion | |
| Panel | Sunil Hingorani, Tony Hollingsworth, Anirban Maitra, Lynn Matrisian | |
| **12:30 PM – 1:00 PM** | **WORKING LUNCH** | |
| **SESSION 4** | **Risk, Prevention, Screening, Diagnosis** | |
| **1:00 PM – 1:45 PM** | **Moderator** | **Alison Klein (JHU)** |
| 1:00 PM – 1:20 PM | Moderator Presentation | Alison Klein |
| 1:20 PM – 1:45 PM | Moderator-Led Discussion | |
| Panel | Jane Holt, Murry Korc, David Mankoff, Gloria Petersen, Rachael Stolzenberg-Solomon | |
| **SESSION 5** | **Treatment** | |
| **1:45 PM – 2:30 PM** | **Moderator** | **James Abbruzzese (Duke)** |
| 1:45 – 2:05 PM | Moderator Presentation | James Abbruzzese |
| 2:05 – 2:30 PM | Moderator-Led Discussion | |
| Panel | Christine Alewine, Jane Holt, Ted Lawrence | |
| **2:30 PM – 3:00 PM** **V.** | **SESSIONS 6: CONCLUSIONS** | |
| 2:30 PM – 3:00 | General Discussion, Additional Items Not Previously Discussed, Summary, Action Items | Tony Hollingsworth |

Appendix 5
Meeting Agenda
Wednesday, October 17, 2018

**2014 Scientific Initiatives**

- Development of an in-depth understanding of the biological and clinical relationship between PDAC and diabetes mellitus (DM) of recent onset
- Evaluate longitudinal screening protocols for biomarkers for early detection of PDAC and its Precursors
- New therapeutic approaches in immunotherapy
- Developing new treatment approaches that interfere with RAS oncogene-dependent signaling pathways