National Cancer Institute Investment in Pancreatic Cancer Research

Action Plan for Fiscal Year 2011

September 2010

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Overview

While declining mortality rates have been observed for many types of cancers in recent years, mortality and survival rates for pancreatic cancer have changed little over the past several decades.[1] Many, including patients and their families, physicians, and members of the U.S. Congress, have expressed grave concern about the pace of progress in this area and have inquired about National Cancer Institute (NCI) plans and efforts towards reducing the burden of pancreatic cancer. NCI shares these concerns and appreciates the opportunity to report on its ongoing and continued commitment to improving outcomes for pancreatic cancer patients.

This report is the Action Plan, which describes projects and initiatives that NCI has committed to support in FY2011. Additional initiatives and projects related to pancreatic cancer may be funded in FY2011 if high-quality proposals are received and funding is available. The Action Plan also identifies research gaps, proposes strategies to address various aspects of disease management (e.g., screening, early detection, treatment, and symptom management), and identifies opportunities for collaboration with other members of the National Cancer Program that can enhance progress in this area. In developing this Action Plan, NCI conducted a review of its investment in pancreatic cancer research over the past several years and identified several scientific advances that have been supported by NCI funding. The results of this review are not included in the Action Plan but can be found in *Pancreatic Cancer: A Summary of NCI's Portfolio and Highlights of Recent Research Progress*, also referred to as the Progress Report.[2]

Background

Pancreatic Cancer

Although it accounts for only 3 percent of new cancer cases, pancreatic cancer is the fourth leading cause of cancer-related death in the United States. It is estimated that there will be approximately 43,000 new cases of pancreatic cancer diagnosed and 36,800 deaths from the disease in 2010.[1]

The pancreas is a gland located between the stomach and the spine (Figure 1). The gland produces digestive enzymes and regulatory hormones, such as insulin, that help regulate blood sugar. Pancreatic cancer arises when cells in the pancreas start growing uncontrollably. Most often, pancreatic cancer starts in the ducts that carry digestive enzymes to the small intestine; this type of cancer, which includes pancreatic adenocarcinomas, is called exocrine pancreatic cancer. Much less often, pancreatic cancer begins in the cells that make hormones; these tumors are called endocrine pancreatic cancer or islet cell cancer.[3] Risk factors for pancreatic cancer include older age; male gender; black race; smoking; obesity; a diet high in fat and meat; longstanding diabetes; chronic and hereditary pancreatitis; various occupational exposures including to pesticides and petrochemicals; and family history of pancreatic cancer (about 5% of cases are familial type).

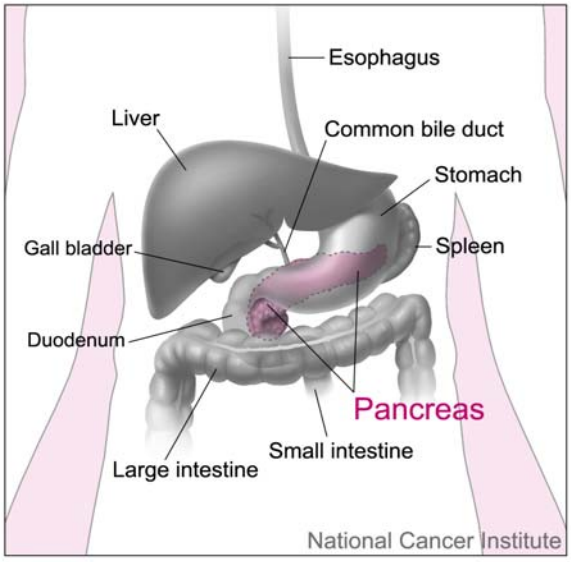

Figure 1. The Pancreas and Nearby Organs
(Dan Bliss, artist)

While significant strides have been made towards understanding the complex biology of pancreatic cancer in the past two decades, there has been little change in the mortality rate. This is in part because of lack of symptoms in the early stages of the disease and because there are no tests recommended for screening the general population.

As a result, approximately half of patients are diagnosed at a late stage. Staging is a way of describing the advancement of the growth of the cancer. Healthcare providers look at size of tumor and where it has spread to make a determination of stage. At an advanced stage, the disease is inoperable or has already spread to other organs. The median survival time for advanced-stage patients is six months, compared with two years for patients who are able to undergo surgery.[4] Conventional and targeted treatments that are effective in other cancers often fail in pancreatic cancer due to the large number of genetic mutations involved, which enable continued growth of cancer cells resulting in rapid progression of the disease.[4] Pancreatic cancer is distinct from other cancers due to its complex biology, the lack of early screening tools, and the absence of effective targeted therapeutic agents. In addition, due to its location deep in the pancreas, drugs sometimes cannot reach the tumor and it is difficult to remove it surgically.

NCI Pancreatic Cancer Action Planning Group

Recent Congressional language and concern about the persistently high mortality rates associated with pancreatic cancer prompted NCI to convene an internal group to develop an action plan for pancreatic cancer research and training. NCI brought together pancreatic cancer researchers and program staff from within the Institute to form the Pancreatic Cancer Action Planning Group (see Appendix A for a roster of Planning Group members). The Planning Group was charged with developing an Action Plan that summarizes the FY2011 research and training portfolio and identifies research gaps and opportunities for collaboration within NCI and with other members of the National Cancer Program, including advocacy groups, academia, and industry. This Action Plan was developed based on discussions at a Planning Group meeting held in July 2010 and continued interactions following the meeting.

Past Assessments of NCI Pancreatic Cancer Research Activities

In preparing the Action Plan, the Planning Group reviewed previous efforts related to pancreatic cancer and conducted a portfolio analysis of recent NCI investments in this area.

Pancreatic Cancer Progress Review Group

In 2000, NCI convened the Pancreatic Cancer Progress Review Group (PRG), a multidisciplinary committee of scientists, clinicians, and advocates to review the field of pancreatic cancer research and make prioritized recommendations concerning the most urgent needs and promising directions for future investment of the National Cancer Program.[5] Following the release of the PRG report, NCI developed a strategic plan for addressing the recommendations of the PRG, but emphasized that the report was a call to action for the entire cancer community, with progress depending on partnerships and collaborations among all stakeholders.[6]

Clinical Trials Planning Meeting on Pancreas Cancer Treatment

In 2007, a Clinical Trials Planning Meeting on Pancreas Cancer Treatment was convened by the NCI Gastrointestinal Cancer Steering Committee to discuss the integration of basic and clinical knowledge in design of clinical trials in pancreatic adenocarcinoma. Participants included clinical, translational, and basic science investigators in pancreatic cancer, as well as representatives from the patient advocacy community, pharmaceutical industry, and government agencies. The major focus of the meeting was to define the direction for clinical trial investigation for treatment of pancreatic cancer over the next three to five years. A *Consensus Report* of the meeting was published in November 2009.[4]

National Commission on Digestive Diseases

In 2005, the National Institutes of Health (NIH) chartered the National Commission on Digestive Diseases and tasked it with reviewing the state of the science in and developing a ten-year plan for digestive diseases research. The National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) provided leadership for the Commission, which included representation from NCI. The Commission's final report, *Opportunities and Challenges in Digestive Diseases Research:*

Recommendations of the National Commission on Digestive Diseases,[7] includes a chapter on cancers of the digestive system, which addresses pancreatic cancer.

Pancreatic Cancer Research Progress Report

In preparation for its July 2010 meeting, the Pancreatic Cancer Action Planning Group conducted an analysis of NCI's investment in pancreatic cancer research over the past decade. The resulting progress report, *Pancreatic Cancer: A Summary of NCI's Portfolio and Highlights of Recent Research Progress*,[2] shows that NCI pancreatic cancer research funding increased 311 percent between FY2001 and FY2009, while the total NCI budget increased by only 32 percent over the same timeframe. The numbers of projects related to each of the research areas defined by the PRG also increased considerably. This investment led to a number of advances in pancreatic cancer research, many of which are summarized in the progress report. These advances form the foundation for many of the future opportunities described in the Action Plan.

Action Plan Framework

The recommendations set forth by the PRG have guided NCI's investments in pancreatic cancer research over the past decade and serve as an organizational framework for this Action Plan. The PRG discussed health of the field and overarching issues, which emphasized the importance of continuing funding for pancreatic cancer research as well as developing capacity to increase the number of scientists engaged in pancreatic cancer research. Four principal areas of pancreatic cancer research were also defined: tumor biology; risk, prevention, screening, and diagnosis; therapy; and health services research. Finally, the PRG recognized the importance of tools and technologies to pancreatic cancer research and thus defined items critical to the pancreatic cancer scientific toolkit.

Pancreatic Cancer Research Activities Planned for FY2011

Many of the research activities sponsored by NCI involve commitment of resources over several years. Thus, ongoing initiatives and grants awarded in previous years will constitute a large portion of the pancreatic cancer research portfolio for FY2011. In order to identify gaps and potential areas of opportunity, the Planning Group conducted a portfolio analysis of funded grants and initiatives relevant to pancreatic cancer that will be active in FY2011.[i] Currently active clinical trials expected to remain open into FY2011 were also identified.[ii] These activities are listed in detail in Appendix C and are summarized in the following sections. The figures in the sections related to the four areas of pancreatic cancer research and the scientific toolkit reflect the number of grants in the current NCI portfolio that will still be active in FY2011. Some relevant initiatives as well as some clinical trials may not be included in these figures; however, in many cases, relevant activities are highlighted in the text.

Health of the Field and Overarching Issues

Training

A well-trained and dedicated workforce is needed to conduct pancreatic cancer research across the cancer care continuum. The workforce should include basic, translational, and clinical researchers as well as scientists capable of developing the tools and technologies needed to advance pancreatic cancer research.

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[i] Current grants and contracts that will be active in FY2011 were identified using two approaches: (1) the NCI Funded Research Portfolio (http://fundedresearch.cancer.gov/) was queried to identify FY2009 grants and contracts that will be active in FY2011 and (2) program staff from each NCI Division were asked to identify FY2010 grants and contracts that will be active in FY2011. Because not all FY2010 funding decisions had been made by the time this report was prepared (August 2010), listings for FY2010 grants do not represent the whole FY2010 portfolio. All grants and contracts listed are at least 25 percent relevant to pancreatic cancer.

[ii] NCI does not currently have a comprehensive database of NCI-sponsored clinical trials, so the list of trials in Appendix C may not be complete.

NCI support for trainees in the area of pancreatic cancer has grown in recent years.[2] The NCI FY2011 portfolio currently includes 42 grants that fund trainees conducting research relevant to pancreatic cancer. NCI funds training using a number of mechanisms (see Figure 2) and provides support for trainees at a variety of career stages, including predoctoral students, postdoctoral fellows, early-career independent investigators, and newly trained clinicians. In FY2011, NCI will be supporting at least three intramural trainees conducting research in pancreatic cancer with approximately $75,150 in salary support. These estimates are the minimum number of trainees that the NCI intramural program will be supporting in FY2011 and beyond.

Trainees supported by NCI conduct research on a broad range of topics. Many grantees are investigating the biology of pancreatic cancer, including the signaling pathways and other cellular factors that contribute to pancreatic cancer onset and progression. Epidemiological research is being conducted on risk factors, including genetic factors associated with pancreatic cancer, with one study focusing on the epidemiology of young-onset pancreatic cancer. Training projects are also investigating potential biomarkers for detection of pancreatic cancer. In addition, there are studies focused on the underutilization of surgical resection of pancreatic tumors and the influence of genetic factors on patient response to gemcitabine, a drug that is part of the standard chemotherapeutic regimen for pancreatic cancer.

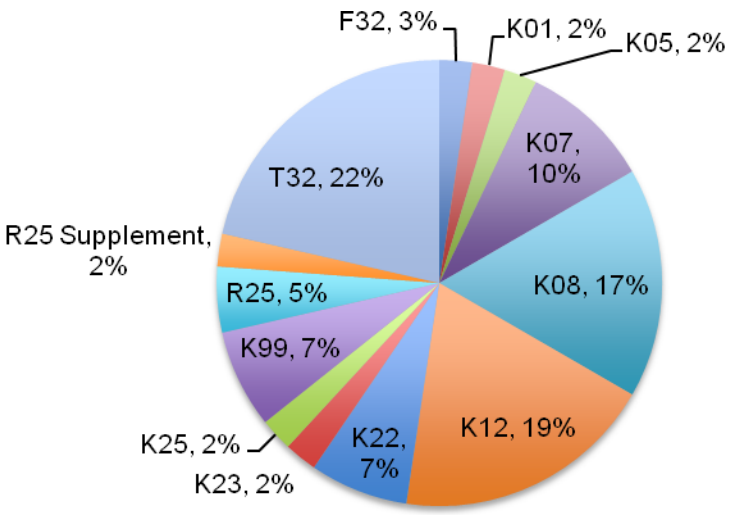

Figure 2. Percent by Mechanism of Extramural Training and Career Development Grants, FY2011 (Total Grants = 42)[iii]

Clinical Trials

Clinical trials are essential for testing new interventions for preventing, detecting, diagnosing, and treating cancer, including pancreatic cancer. As was recognized by the Pancreatic Cancer PRG, a strong infrastructure is critical to the success of cancer clinical trials. NCI has been implementing many changes to its clinical trials enterprise in response to the report of its Clinical Trials Working Group in 2005.[8] Among these is the creation of several Clinical Trials Steering Committees meant to increase information exchange in early stages of trial development; increase the efficiency of clinical trials collaborations; reduce trial redundancy; and develop, evaluate, and prioritize concepts for Phase III and large Phase II trials. The Gastrointestinal Steering Committee includes a Pancreatic Cancer Task Force, which held a meeting on the state of pancreatic cancer clinical science in 2007.

[iii] See Appendix B for more information on training and career development grant mechanisms.

The NCI FY2011 portfolio will include pancreatic cancer clinical trials of all phases. There are 14 Phase I, 5 Phase I/II, 16 Phase II, and 1 Phase III trials that are currently enrolling patients and will remain active in FY2011. The majority of these trials are investigating treatments for pancreatic cancer (see Figure 3). Other types of trials are related to biomarker/laboratory analysis, diagnostic tests, education/counseling/training, health services efficacy, natural history/epidemiology, supportive care, and tissue collection.

Several of the treatment trials are investigating drug combinations, including combinations of molecularly targeted therapies and the standard-of-care chemotherapy drug gemcitabine. For example, one trial is studying whether the addition of erlotinib, a drug that targets the epidermal growth factor, can improve outcomes for patients treated with gemcitabine with or without combined radiotherapy. Trials are also investigating novel approaches such as vaccine therapy for pancreatic cancer patients.

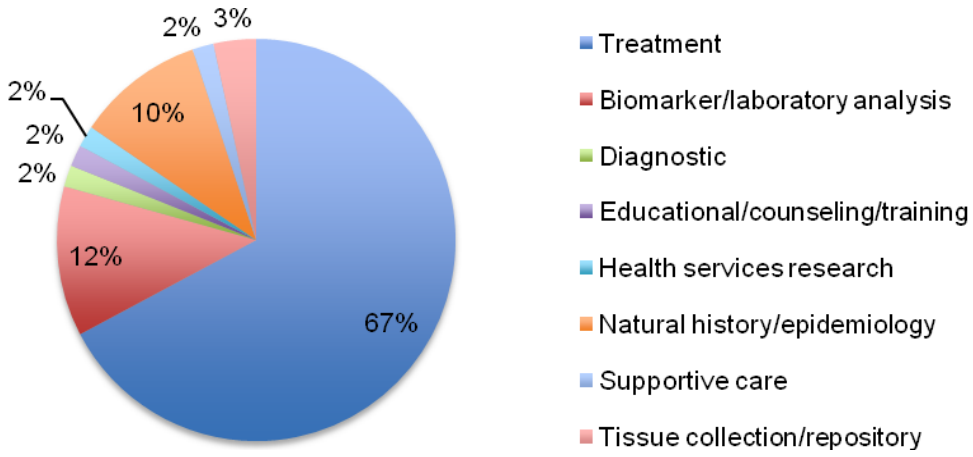

Figure 3. NCI-Sponsored Clinical Trials Related to Pancreatic Cancer by Focus, July 2010

Specialized Programs of Research Excellence (SPOREs)

Specialized Programs of Research Excellence (SPOREs) support specialized centers that promote a bidirectional flow of research between bench and bedside with an impact on cancer prevention, detection, diagnosis, and treatment. In FY2011, the four pancreatic-cancer-specific SPOREs and two gastrointestinal (GI) cancer SPOREs with pancreatic-cancer-related projects currently supported by NCI will be joined by an additional GI SPORE with pancreatic-cancer-related projects at the University of Michigan. The University of Michigan SPORE will be studying potential pancreatic cancer markers, inhibitors, and therapeutic targets.

Tumor Biology

Although investments in basic research over the past decade have resulted in increased knowledge of the biologic and genetic properties of pancreatic tumors, it is necessary to capitalize on this understanding of tumor biology to develop clinical interventions. This knowledge will form the foundation for future research on targeted therapies to prevent and treat pancreatic cancer.

Several current initiatives and projects will continue to investigate the biology of the normal pancreas and pancreatic cancer in FY2011. The Pilot Studies in Pancreatic Cancer initiative supports an array of small research projects, including projects related to tumor biology. As shown in Figure 4, NCI's portfolio related to the tumor biology of pancreatic cancer encompasses a range of areas. A small number of projects focus on elucidation of the biology of the normal pancreas. NCI efforts in this area are complemented by extensive work funded by NIDDK, including the Beta Cell Biology Consortium, which

is facilitating interdisciplinary approaches that will advance understanding of pancreatic islet cell development and function.

A number of NCI-funded researchers are studying development of pancreatic adenocarcinoma, from precursor lesions to metastatic disease. These projects include characterization of numerous signaling pathways suspected to play a role in pancreatic cancer development with the hope of identifying new therapeutic targets, as well as large-scale genetic and genomic studies to identify novel risk factors for this disease. Several research grants are investigating interactions between tumor microenvironment and host factors (e.g., immune system, obesity) and their subsequent influence on pancreatic cancer biology and progression. There are also plans to explore the entire spectrum of genomic changes involved in pancreatic cancer through The Cancer Genome Atlas, which should advance overall understanding of the processes that support this disease. Development of resources needed to facilitate research on tumor biology, including the collection of biospecimens and the creation of experimental model systems, is also being supported. In addition to providing insight into the etiology and progression of pancreatic cancer, studies of tumor biology also explore how this deadly disease develops resistance to therapy.

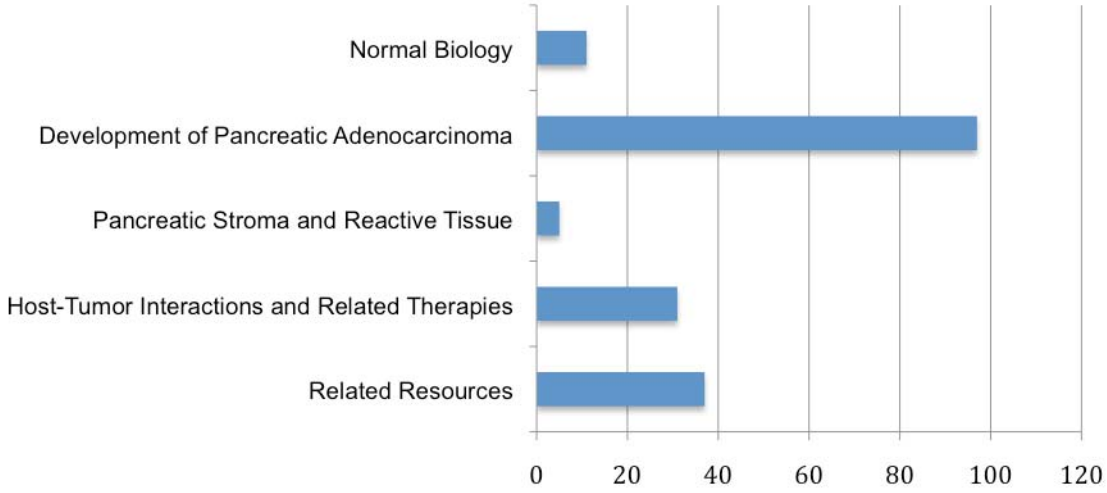

Figure 4. FY2011 Grants Related to Pancreatic Cancer Tumor Biology[iv]

Risk, Prevention, Screening, and Diagnosis

Pancreatic cancer patients often fail to exhibit disease-specific symptoms until their cancers have reached an advanced stage. This is in part because pancreatic tumors often metastasize rapidly (many tumors that are less than 2.5 cm in size spread beyond the pancreas).[9] In addition, the most common symptom of pancreatic cancer, abdominal pain, is sometimes misdiagnosed as gallbladder disorder. Prognosis is particularly poor for patients with metastatic disease, suggesting that early detection could potentially result in improvements in overall survival. Even more desirable would be interventions capable of preventing the disease from developing at all. Both of these strategies depend on understanding the risk factors associated with pancreatic cancer so that high-risk populations can be targeted for intervention. FY2011 projects related to risk, prevention, screening, and diagnosis are summarized in Figure 5.

[iv] Research resources include specimen banks and experimental model systems.

Figure 5. FY2011 Grants Related to Pancreatic Cancer Risk, Prevention, Screening, and Diagnosis[v]

Risk and Prevention

Pooled analyses of epidemiologic studies—including the Pancreatic Cancer Case-Control Consortium and the Pancreatic Cancer Cohort Consortium, and PanScan (a pancreatic cancer genome-wide association study [GWAS])—have formed the basis of NCI's investigation into the genetic and environmental factors that influence risk of pancreatic cancer. FY2011 projects will be examining the influence of factors such as smoking, obesity, diet, and physical activity on pancreatic cancer development. Insights gained through these efforts will inform future research on tumor biology and will also contribute to the development of risk models on which early detection and prevention interventions can be based.

The FY2011 NCI portfolio includes many grants that are supporting research on the potential of various dietary factors to prevent pancreatic cancer initiation and progression. These studies are being conducted in cell culture and animal models of pancreatic cancer.

Screening and Diagnosis

NCI-funded research on early detection and improved diagnosis of pancreatic cancer includes several efforts to identify diagnostic and prognostic biomarkers, including proteins and glycans (i.e., sugar molecules). Researchers are also working to develop imaging agents and improve imaging techniques to enable earlier detection of pancreatic cancer, determine how identified lesions should be treated, and monitor response to treatment. Some imaging agents under development, including some nanomaterials, may have therapeutic potential in addition to enabling disease detection.

Research in the areas of risk, prevention, screening, and diagnosis is ongoing in humans as well as in animal models. NCI is continuing to support the creation of patient registries and appropriate animal models to enable these studies.

Therapy

Survival rates for patients diagnosed with pancreatic cancer have changed little over the past several decades. In recent years, NCI has significantly increased its efforts to facilitate the discovery and development of molecularly targeted therapeutics with the hope that these approaches will complement currently available standard therapies.

[v] Related resources include new and expanded registries, specimen banks, large cohort consortia, education for providers and investigators about risk assessment, Web-based imaging library, technology centers for assessing gene and protein expression, and animal models.

Projects in the FY2011 NCI portfolio are investigating the roles of numerous signaling pathways and molecular processes in pancreatic cancer and assessing whether manipulation of these activities has an effect on pancreatic cancer initiation and/or growth (see Figure 6). There is also a focus on developing assays and techniques to determine whether therapies are having an effect on their intended targets. Many of these studies are being conducted in preclinical models.

NCI is also supporting a range of clinical trials that are testing new therapeutic strategies in pancreatic cancer patients. Several of these are testing targeted agents in combination with gemcitabine and/or other standard pancreatic cancer therapies, while others are breaking with this incremental development strategy and seeking new chemotherapy backbones and/or agent combinations (see *Clinical Trials* on page 4).

Debilitating symptoms associated with pancreatic cancer—such as pain, fatigue, and cachexia (i.e., unintentional weight loss)—severely diminish quality of life and can prevent patients from receiving treatment and/or participating in clinical trials. The FY2011 portfolio does not currently include any grants specifically focused on symptom management in pancreatic cancer, although NCI is supporting pancreatic cancer clinical trials that involve assessment of symptoms and quality of life, as well as funding research on cachexia caused by other cancers, the results of which will likely be relevant to pancreatic cancer. Opportunities for enhancing research on pancreatic cancer symptom management are presented in the *Emerging Areas of Focus* section on page 10.

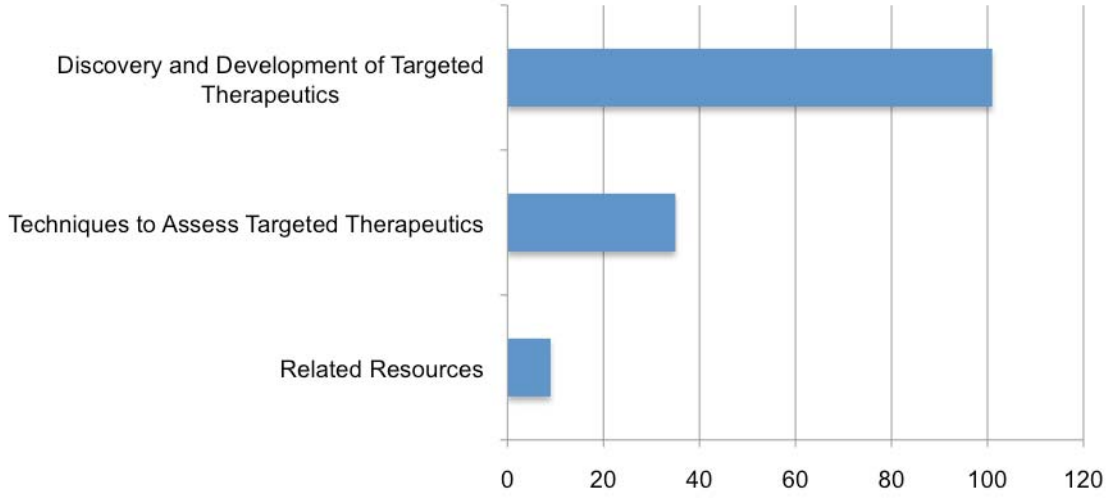

Figure 6. FY2011 Grants Related to Pancreatic Cancer Therapy[vi]

Health Services Research

Health services research assesses the dissemination of patterns of care into community practice and analyzes the factors that influence this process, with the goal of improving outcomes. The NCI FY2011 portfolio currently includes a small number of grants that are investigating ways to improve diagnosis and care for patients with pancreatic cancer (see Figure 7). One project in this area is assessing the applicability of clinical trial results to elderly patients, who are currently underrepresented on oncology trials. In addition, other NCI-funded entities engaged in pancreatic cancer research are developing tools for education, training, and communication.

[vi] Related resources include efforts to enhance investigator access to targeted therapeutic agents for research, molecular target assessment infrastructure, and multidisciplinary clinical trial infrastructure.

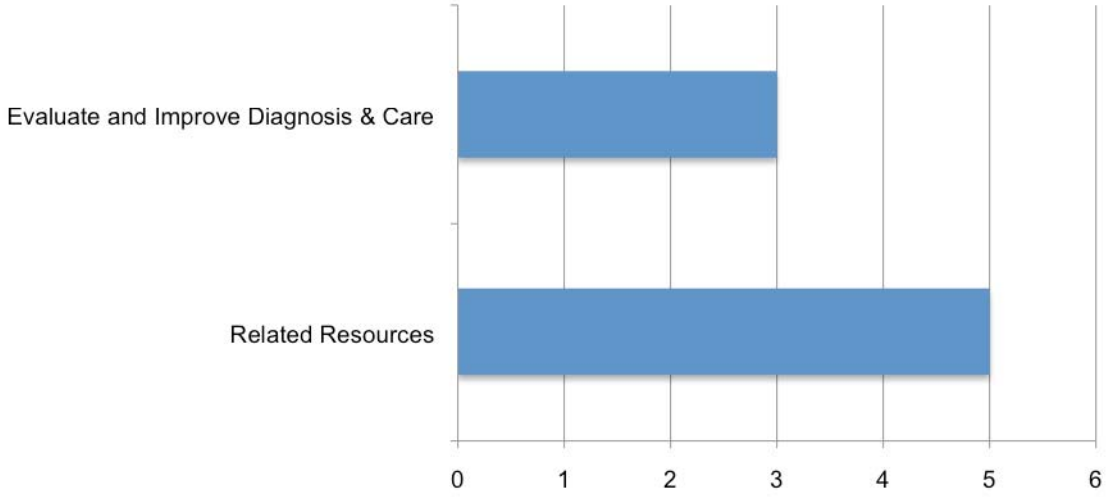

Figure 7. FY2011 Grants Related to Pancreatic Cancer Health Services Research[vii]

The PRG also emphasized the importance of identifying effective forms of patient-provider communication, investigating ways to aid patients in decision making, and determining the requirements and costs of multidisciplinary trials. The current FY2011 portfolio does not include studies in these areas that are specific to pancreatic cancer, but there are several ongoing activities that should benefit cancer patients regardless of the site of their tumors. The Centers of Excellence in Cancer Communication Research were created with the goal of improving the effectiveness of cancer communication in order to improve health. Projects funded through this initiative focus on decision making, patient-provider communication, and other communication-related topics.[10] Research on these topics is being supported through other mechanisms as well. NCI also conducts the Health Information National Trends Survey (HINTS) to collect information about how the American public utilizes cancer-related information, with the goal of identifying opportunities to overcome barriers to health information usage and develop effective communication strategies.[11]

In addition to these investments in research, NCI has several resources related to communication. An NCI monograph, *Patient-Centered Communication in Cancer Care: Promoting Healing and Reducing Suffering*, presents research on the relationship between patient-centered communication and health outcomes and identifies specific research priorities that will guide NCI in planning future initiatives in this area.[12] There are also several resources that promote patient access to information. The NCI booklet *What You Need to Know About™ Cancer of the Pancreas*[3] provides patients with questions they may want to ask their physicians. Also, NCI's Cancer Information Service (CIS) provides scientifically based, unbiased information to patients and their families and friends, physicians and other health professionals, and the general public about all aspects of cancer.[13]

Scientific Toolkit

As with all research, progress in pancreatic cancer depends on the availability of tools and technologies that enable scientists to conduct rigorous studies. As shown in Figure 8, the NCI FY2011 scientific toolkit portfolio includes several initiatives and grants that support the development of gene-based model systems—including human pancreatic cancer cell lines and mouse models—for investigation of tumor biology; risk, prevention, screening, and diagnosis; and therapy. Some of these models are being developed through the Mouse Models of Human Cancer Consortium (MMHCC). In addition, NCI supports the core facilities at SPOREs and cancer centers that collect and store tissue specimens for research. Several projects are also developing resources and databases to organize and facilitate analysis

[vii] Research resources include survivorship registry, Web-based repository, models, and education and communication tools.

of information on the molecular and biological profiles of pancreatic cancer cells and models of pancreatic cancer. Other efforts in this area are related to improving imaging systems, including use of nanotechnology, for diagnosis and therapy.

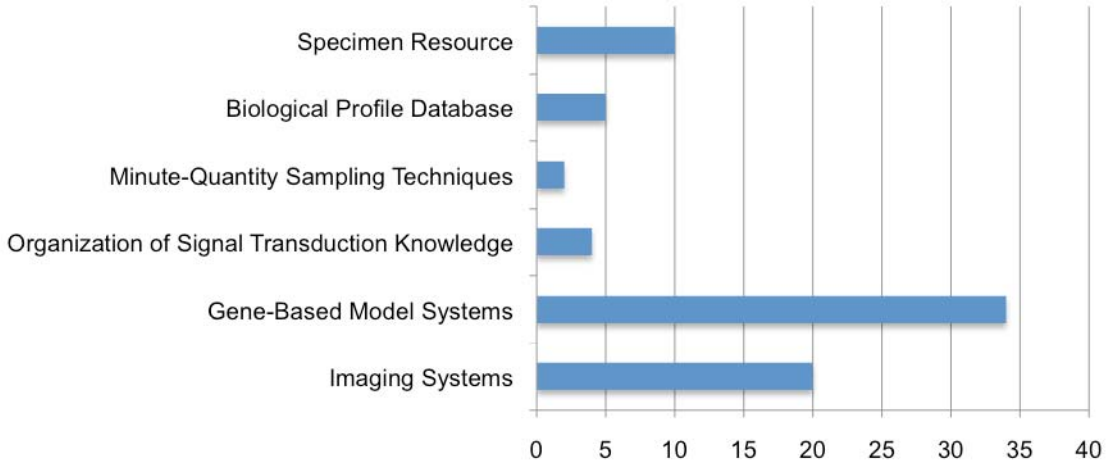

Figure 8. FY2011 Grants Related to the Pancreatic Cancer Scientific Toolkit

Emerging Areas of Focus

In addition to the initiatives and activities already included in the FY2011 portfolio, the Pancreatic Cancer Action Planning Group identified several opportunities for NCI to advance pancreatic cancer research. Emphasis was placed on activities with a high likelihood of improving survival rates, which have remained low despite improvements in many other cancer types. It was recognized that given the range of research conducted within and funded by NCI and the resources developed by NCI, this Institute is uniquely poised to support activities and provide services that other stakeholders are unable or unwilling to do. The Planning Group identified several opportunities for collaboration with advocacy organizations and the private sector to gain momentum in pancreatic cancer research. Some ideas that emerged—such as those related to promoting interaction and increased use of existing resources—will likely involve only modest financial investment while others will require significantly more resources. Efforts will be made to begin implementing these ideas to complement NCI's investment in pancreatic cancer research in FY2011 and build a stronger pancreatic cancer research portfolio for the future.

Collaboration and Use of Research-Based Evidence for Science Planning

- **Conduct transdisciplinary workshops on important topics related to pancreatic cancer.** These meetings would involve NCI staff, cancer researchers, advocates, representatives from other NIH Institutes/Centers, and other stakeholders as appropriate. The goals would be to (1) promote discussion and collaboration in areas of research with potential to have a significant impact on pancreatic cancer incidence and mortality and (2) lay the foundation for future NCI investment. In addition, efforts will be made to ensure that the results of these workshops are communicated to all stakeholders, including advocacy organizations, patients, and industry. Topics of interest include:

    1. **Relationships of diabetes, elevated insulin levels in the blood, and obesity with pancreatic cancer.** The role of hyperinsulinemia, insulin, diabetes, and obesity in pancreatic cancer etiology is an emerging area of research with potential to provide insight into the biology of pancreatic cancer. This topic is particularly relevant in light of rising rates of obesity and diabetes in the United States and around the world. This workshop would be conducted with representation from NIDDK as well as the advocacy community.

2. **Molecular imaging for detection and diagnosis of pancreatic cancer.** The field of molecular imaging has advanced significantly in recent years and may provide opportunity for earlier detection of pancreatic cancer as well as clinically meaningful characterization of pancreatic lesions (i.e., determine which lesions require intervention). There is a growing interest in using molecular markers in cyst fluids for diagnosis of pancreatic cancer.

Opportunities to Leverage Existing Resources to Address Gaps

- **Expand the Transition Career Development Award (K22).** The scope of these awards should be broadened to support the transition to independence of clinical, behavioral, and basic researchers in all cancer-related areas, including pancreatic cancer research.
- **Promote novel drug discovery by utilizing the NIH Chemical Genomics Center (NCGC)**. The NCGC conducts small-molecule screening of over 300,000 compounds using rigorous assay conditions. This resource will be used to identify novel compounds potentially effective against pancreatic cancer. Drug screening will be performed in a genotype-directed fashion using cell lines with well-defined genetic alterations to specifically identify compounds targeting relevant biologic processes and cell functions. Positive "hits" will be further developed in well-established cell and animal models. Chemical optimization will be performed to enhance target inhibition and drug delivery. Animal models already established by NCI will facilitate preclinical drug development of identified compound(s).
- **Facilitate the development of nanoparticle treatments and diagnostic devices specific for pancreatic cancer by utilizing the Nanotechnology Characterization Lab.** NCI established this national resource to perform and standardize the preclinical characterization of nanomaterials in collaboration with researchers from academia, government, and industry.
- **Add pancreatic cancer cell lines to the NCI 60-cell-line panel.** This panel currently includes cell lines from lung, colon, brain, ovary, breast, prostate, and kidney cancers and is designed to screen thousands of compounds each year for potential anticancer activity.
- **Increase utilization of the Mouse Models of Human Cancers Consortium**. The MMHCC develops and characterizes preclinical mouse models of human cancers, including pancreatic cancer. These preclinical mouse models are currently being used to inform the biology, prevention, detection, diagnosis, and treatment of many human cancers and can be similarly used in pancreatic cancer research.
- **Promote pancreatic cancer as a priority for the Small Business Innovation Research (SBIR) Program.** SBIR projects finance small companies working to develop and commercialize novel technologies to prevent, diagnose, and treat cancer.
- **Conduct research on symptom biology and management.** Symptoms experienced by the majority of pancreatic cancer patients (e.g., pain, cachexia [unintentional weight loss], fatigue) may prevent them from receiving treatment and/or participating in clinical trials. A deeper understanding of the physiological processes that underlie these symptoms is needed to inform new management strategies, which could ultimately improve overall quality of life, enhance patient access to therapies, and extend survival. Specific strategies include:
  - Provide supplements to existing SPOREs to support pathophysiologic research on pancreatic-cancer-induced symptoms.
  - Encourage submission of proposals related to pancreatic cancer symptoms in response to the existing RFA related to Reducing Barriers to Symptom Management and Palliative Care (RFA-CA-05-013).

- Promote interaction between pancreatic cancer researchers and researchers in other areas who have been studying symptom biology in other cancers and diseases.

Potential New Initiatives

- **Develop a Program Announcement for R01 grants focused on pancreatic cancer.** The R21 and R03 projects funded through Pilot Studies in Pancreatic Cancer (PA-08-208, PA-08-209) are providing valuable insights into pancreatic cancer, but larger studies are also needed in order to translate knowledge into interventions that will benefit patients. This R01 program would support research on leads resulting from high-throughput screening as well as research on specific pathways thought to be involved in pancreatic cancer, in addition to pancreatic symptom biology. Applicants would be encouraged to build on existing data, utilize novel clinical trial designs (e.g., randomized discontinuation trials), and investigate novel therapies (e.g., regional perfusion).
- **Conduct a large genome-wide association study on pancreatic cancer.** The PanScan I and PanScan II studies led to the discovery of four novel regions in the genome associated with risk for pancreatic cancer. PanScan III would involve a more thorough look at the genome—analysis of one million genetic markers compared with only 600,000 in earlier efforts—and would focus on pancreatic cancer etiology and survival. The insights gained would inform research on pancreatic cancer tumor biology as well as the development of risk models.
- **Initiate a multisite collaboration for collection of specimens (blood, urine, and tissue) from patients with early-stage pancreatic cancer.** The lack of specimens from early-stage cancers is a significant impediment to both the discovery and validation of biomarkers. Establishing a resource that can provide these specimens would be of great value to this research community.

Opportunities for Other Stakeholders

Although NCI has the infrastructure and resources to support a significant portfolio of pancreatic cancer research, it is not possible for any single stakeholder to make progress against this disease on its own. Commitment and action from other members of the National Cancer Program are needed as well. Some opportunities for involvement of advocacy groups and pharmaceutical companies are described below.

Advocacy Groups

- **Promote clinical trial participation**. Increasing the number of pancreatic cancer patients who participate on trials would speed the completion of trials, which would in turn enhance the accumulation of knowledge about pancreatic cancer and development of new drugs for patients. Faster trial completion would also decrease the cost of trials, allowing existing funding to go further.
- **Help recruit people for large prospective cohort studies**. Identification of the genetic and environmental factors that contribute to pancreatic cancer is essential for understanding the disease and reducing illness. Monitoring a representative population over time can provide rigorous information about the causes of the disease.
- **Promote tissue donation and best practices in tissue collection, processing, and storage.** There is currently a paucity of high-quality pancreatic cancer tissue available for research. This problem could be addressed by increasing the number of patients who donate tissue and encouraging institutions to adopt best practices in tissue collection, processing, and storage. The availability of high-quality tissue would benefit future research, including future efforts to characterize genetic changes associated with pancreatic cancer through the tumor sequencing efforts of The Cancer Genome Atlas (TCGA).
- **Facilitate communication, education, and dissemination** by playing an active role in translating scientific findings into language that can be understood by cancer patients and other lay people. In particular, there is a need to communicate information about lifestyle changes that may decrease risk

of developing pancreatic cancer. Dissemination of evidence-based risk models to providers and those at high risk of pancreatic cancer should be facilitated. Patients and families need to be educated to advocate for high-quality pain management and not to accept pain as an inevitable component of pancreatic cancer.

- **Support training.** Funding for NCI's career development awards should be supplemented to engage early-stage investigators in pancreatic cancer research careers.
- **Promote and/or support symptom biology research.** The importance of symptom biology research should be emphasized to researchers and research sponsors and funding of research in this area should be considered.
- **Participate in NCI-sponsored workshops on important topics related to pancreatic cancer.** Active participation by all stakeholders will facilitate the identification of promising areas of research and development of concrete plans for making progress against pancreatic cancer.

Pharmaceutical Companies

- **Partner with NCI to develop imaging agents relevant to pancreatic cancer detection and diagnosis**. Opportunities for partnership include the Innovative Molecular Analysis Technologies (IMAT) and SBIR programs.
- **Design and/or participate in clinical studies testing imaging approaches for diagnosis and early detection of pancreatic cancer**. Imaging represents a major opportunity for improving early detection of pancreatic cancer and should be pursued.
- **Facilitate preclinical studies and clinical trials of drug combinations.** Effective treatment and management of pancreatic cancer will likely require drug combination regimens. Drug developers should enter into agreements that will facilitate investigation of promising combinations.
- **Participate in NCI-sponsored workshops on important topics related to pancreatic cancer.** Active participation by all stakeholders will facilitate the identification of promising areas of research and development of concrete plans for making progress against pancreatic cancer.

Conclusion

NCI's FY2011 portfolio includes a significant number of grants and initiatives focused on pancreatic cancer research in the areas of tumor biology; risk, prevention, screening, and diagnosis; and therapy. In addition, the NCI Gastrointestinal Steering Committee will enhance the efficiency with which clinical trials related to pancreatic cancer are designed, prioritized, and conducted. More research on the biology of debilitating pancreatic cancer symptoms may lead to more patients participating in clinical trials. There is also ongoing investment in projects that will augment the scientific toolkit for pancreatic cancer research. In FY2011, NCI will also continue sponsoring many cross-cutting initiatives and projects, including many in the area of health services and symptoms research, which will benefit all cancer patients. The Planning Group identified numerous ways NCI and other stakeholders can promote progress against pancreatic cancer. In addition to pursuing the opportunities outlined above, members of the Planning Group felt they would benefit from regular interaction with other research and program staff from across NCI and decided to form a Trans-NCI Pancreatic Cancer Planning Group that will meet semi-annually to promote information sharing and collaboration.

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Appendix A: NCI Pancreatic Cancer Action Planning Group

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Appendix B: NCI Training and Career Development Award Mechanisms

F31	Predoctoral Individual National Research Service Award (NRSA)
F32	National Research Service Award for Individual Postdoctoral Fellows
K01	Mentored Research Scientist Development Award
K05	Established Investigator Award in Cancer Prevention, Control, Behavioral, and Population Research
K07	Cancer Prevention, Control, Behavioral, and Population Sciences Career Development Award
K08	Clinical Investigator Award (CIA)
K12	Institutional Clinical Oncology Research Career Development Award
K22	NCI Transition Career Development Award
K23	Mentored Patient-Oriented Research Career Development Award
K24	Midcareer Investigator Award in Patient-Oriented Research
K25	Mentored Quantitative Research Career Development Award
K99	Howard Temin Pathway to Independence Award
R25	Cancer Education Projects
T32	NIH National Research Service Award - Institutional Research Training Grants

Appendix C: NCI FY2011 Initiatives and Projects Related to Pancreatic Cancer

Overview

The projects and initiatives in this appendix will comprise the bulk of NCI's investment in pancreatic cancer research in FY2011. The projects listed include all projects from the NCI FY2009 portfolio that are at least 25 percent relevant[1] to pancreatic cancer and for which NCI has already committed funds for FY2011. Projects supported with funds from the American Recovery and Reinvestment Act of 2009 (ARRA) are listed in italics. A number of projects that were newly funded in FY2010 are also included, although all FY2010 projects are not represented. Parent grants and supplements are listed separately. Projects are sorted by mechanism, investigator name, and project number.

Projects and initiatives are organized according to the framework of recommendations set forth by the Pancreatic Cancer Progress Review Group (PRG).[2] Relevant initiatives are listed under each of the five broad areas defined by the PRG while individual grants and contracts are coded to the more detailed recommendations within each of these areas. A few recommendations do not have any grants or contracts listed beneath them; in some cases, this may represent a gap, but it is also possible that these areas are being addressed through overarching initiatives or other NCI activities. Initiatives and projects may be listed more than once if they are pertinent to multiple areas. Projects relevant to recommendations set forth in the *Clinical Trials Planning Meeting on Pancreas Cancer Treatment Consensus Report* are indicated with footnotes.[3] Common Scientific Outline (CSO) codes are provided for each project; a key for these codes is provided on page 71.

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[1] NCI grants are indexed for a variety of research categories and organ sites. Each category is assigned a "percent relevance" based on the portion of the grant relevant to the category that is used to prorate the total amount of the grant. Percent relevance values are assigned by professional staff based on review of complete grant applications. A grant may be 100 percent relevant to multiple categories and the sum of the percent relevance assignments of a grant may exceed 100 percent.

[2] Pancreatic Cancer Progress Review Group. *Pancreatic cancer: an agenda for action.* NIH Publication No. 01-4940. Bethesda (MD): NCI; 2001. Available from: http://planning.cancer.gov/library/2001pancreatic.pdf.

[3] Philip PA, Mooney M, Jaffe D, Eckhardt G, et al. Consensus report of the National Cancer Institute clinical trials planning meeting on pancreas cancer treatment. *J Clin Oncol*. 2009 Nov 20;27(33):5660-9.

Health of the Field and Overarching Issues

Extramural Training and Career Development Grants Relevant to Pancreatic Cancer[4]

No.	Mech	Project Number	PI	Title
1.	F32	CA136124-02	Kopp, Janel Lynn	Origin of Pancreatic Ductal Adenocarcinoma
2.	K01	CA118722-04	Kang, Ningling	Mechanism of Nitric Oxide Inhibition of Pericyte Recruitment in Liver Tumors
3.	K05	CA136967-01A1	Bernstein, Leslie	Research and Mentoring on Energetic Factors and Cancer: Established Investigator
4.	K07	CA116296-03	Chen, Ru	Protein Biomarkers for Detection of Pancreatic Cancer
5.	K07	CA116303-04	McWilliams, Robert R	Genetic Epidemiology of Young-Onset Pancreatic Cancer
6.	K07	CA130983-02	Riall, Taylor S.	Underutilization of Surgical Resection in Patients With Pancreatic Cancer
7.	K07	CA140790-01	Wolpin, Brian Matthew	Cohort Study of Biochemical and Genetic Risk Factors for Pancreatic Cancer
8.	K08	CA137153-01A2	Collisson, Eric	A Model for Preclinical Biomarker Discovery in Pancreatic Ductal Adenocarcinoma
9.	K08	CA122835-04	Hezel, Aram F	Genomic Instability and the Roles of P53 and P19arf in Pancreatic Cancer
10.	K08	CA114028-04	Hingorani, Sunil R	Molecular and Cellular Origins of Pancreatic Cancer
11.	K08	CA113766-04	Hochwald, Steven N	FAK and IGF-1R Interaction in Pancreatic Cancer Survival
12.	K08	CA138912-01A1	Hwang, Rosa F	Stromal Periostin in Pancreatitis and Pancreas Cancer
13.	K08	CA127518-02	Kendall, Stephan	The Role of RalA in Pancreatic Tumorigenesis
14.	K08	CA129204-02	Zeisberg, Elisabeth M	The Role of Endothelial to Mesenchymal Transition (EndMT) in the Tumor Stroma
15.	K12	CA133250-02	Byrd, John C	Translational Training Grant in Experimental Therapeutics
16.	K12	CA076917-12	Gerson, Stanton L	Clinical Oncology Research Career Development Program (CORP)
17.	K12	CA076931-12	Gewirtz, Alan M	Cellular Molecular Biologics in Clinical Cancer Research
18.	K12	CA090625-09	Hande, Kenneth R	Vanderbilt Clinical Oncology Research Career Development Program
19.	K12	CA090628-09	Hartmann, Lynn C	Paul Calabresi Program in Clinical-Translational Research at Mayo Clinic
20.	K12	CA086913-08	Kane, Madeleine A	Paul Calabresi Award in Clinical Oncology Research

[4] This list reflects currently funded training grants that will be active in FY2011. Some grants that will be awarded in FY2010 are not included. This list includes only extramural training grants.

Health of the Field and Overarching Issues
Extramural Training and Career Development Grants Relevant to Pancreatic Cancer (cont)

No.	Mech	Project Number	PI	Title
21.	K12	CA100639-06	Lyerly, Herbert Kim	Clinical Oncology Research Career Development Program
22.	K12	CA126849-02	Sausville, Edward A	UMGCC Paul Calabresi Clinical Oncology Training Program
23.	K22	CA134637-01A2	Kim, Joseph	CXCL12/CXCR4 Signaling - A Novel Target for Pancreatic Intraepithelial Neoplasia
24.	K22	CA130828-02	Wang, Liewei	Pharmacogenomics of a Cytidine Analogue, Gemcitabine
25.	K22	CA131567-01A2	Zaharoff, David	Chitosan-Based Delivery and Immunopotentiation of Cancer Vaccines
26.	K23	CA148964-01	Zheng, Lei	Dissecting the Mechanisms of Immune Tolerance Within the Pancreatic Tumor's Environment
27.	K25	CA137222-01A2	Pan, Sheng	Quantitative Glycoproteomics for Pancreatic Cancer Studies
28.	K99	CA149182-01	Maher, Christopher A	Characterization of Cancer Transcriptomes Using Next Generation Sequencing
29.	K99	CA139050-01	McNally, Lacey R.	KiSS1 Treatment of Pancreatic Adenocarcinoma
30.	K99	CA149169-01	Singh, Anurag	Defining Lineage-Specific Determinants of K-Ras "Addiction" in Human Cancers
31.	R25	CA056452-18	Chang, Shine	Cancer Prevention Education: Student Research Experiences
32.	*R25*	*CA056452-18S1*	*Chang, Shine*	*Cancer Prevention Education: Student Research Experiences*
33.	R25	CA134285-02	Zeisel, Steven H	Nutrition Education for Practicing Physicians
34.	T32	CA126607-02	Balch, Charles M	Clinical and Laboratory Research Training for Surgical Oncologists
35.	T32	CA091078-09	Bland, Kirby I	Research Training Program in Surgical Oncology
36.	T32	CA009213-32	Bowden, George Timothy	Cancer Biology Training Grant
37.	T32	CA009672-20	Chang, Alfred E	University of Michigan Surgical Oncology Research Training Program
38.	T32	CA009599-21	Ellis, Lee M.	Training of Academic Surgical Oncologists
39.	T32	CA009054-32	Fan, Hung Y	A Training Program in Cancer Biology
40.	T32	CA119925-02	Hann, Stephen Ray	Integrated Biological Systems Training in Oncology
41.	T32	CA009176-32	Hearing, Patrick	Cancer Biochemistry and Cell Biology
42.	T32	CA009476-20	Rizzino, Arnold Angie	Cancer Biology Training Program

Clinical Trials Relevant to Pancreatic Cancer[5]

No.	Phase	Primary ID (ClinicalTrials.gov)	Trial Type	PI Name	Title
1.	Phase I	PMH-PHL-078 (NCT01145456)	Treatment	Bedard, Philippe; Oza, Amit	Phase I Study of Gamma-Secretase Inhibitor RO4929097 and Gemcitabine Hydrochloride in Patients With Advanced Solid Tumors
2.	Phase I	OSU-05011 (NCT00288093)	Treatment	Bekaii-Saab, Tanios	Phase I Study of 3-AP (Triapine®) and Radiotherapy in Patients With Unresectable Stage III Pancreatic Cancer
3.	Phase I	VU-VICC-GI-0934 (NCT00983268)	Treatment	Chan, Emily; Davis, Cathy	Phase I Study of Chemoradiotherapy Comprising Capecitabine and Vorinostat in Patients With Nonmetastatic Pancreatic Cancer
4.	Phase I	MAYO-MC0811 (NCT0087816)	Treatment	Erlichman, Charles	Phase I Study of Hedgehog Antagonist GDC-0449 and Erlotinib Hydrochloride With or Without Gemcitabine Hydrochloride in Patients With Metastatic Pancreatic Cancer or Unresectable Solid Tumors
5.	Phase I	UVACC-SCC-0102 (NCT00031681)	Treatment	Fracasso, Paula; Ma, Cynthia	Phase I Study of UCN-01 and Irinotecan in Patients With Resistant Solid Tumors or Locally Recurrent or Metastatic Triple-Negative Breast Cancer (Part I Closed to Accrual as of 6/8/2007)
6.	Phase I	VU-VICC-GI-0906 (NCT00987766)	Treatment	Goff, Laura	Phase I Study of Gemcitabine Hydrochloride and Oxaliplatin in Combination With Erlotinib Hydrochloride in Patients With Advanced Biliary Tract Cancer, Pancreatic Cancer, Duodenal Cancer, or Ampullary Cancer
7.	Phase I	CAN-OCI-PJC-004 (NCT01131234)	Treatment	Hotte, Sebastien	Phase I Study of Gamma-Secretase Inhibitor RO4929097 and Cediranib Maleate in Patients With Advanced Solid Tumors
8.	Phase I	2007-0762 (NCT00968604)	Treatment	Javle, Milind	A Phase I Open-Label Dose Escalation Study to Assess the Safety and Tolerability of the BikDD Nanoparticle in Patients With Advanced Pancreatic Cancer
9.	Phase I	CDR0000597879 (NCT00703638)	Treatment	Kumar, Priya	Phase I Study of Sorafenib, Pemetrexed, and Cisplatin for the Treatment of Advanced Solid Tumors.

[5] This list includes currently active NCI-sponsored clinical trials that are expected to be active in FY2011. As NCI does not currently have a comprehensive database of NCI-sponsored clinical trials, this list may not be complete.

Health of the Field and Overarching Issues
Clinical Trials Relevant to Pancreatic Cancer (cont)

No.	Phase	Primary ID (ClinicalTrials.gov)	Trial Type	PI Name	Title
10.	Phase I	CINJ-070602 (NCT00669734)	Treatment	Lattime, Edmund; Poplin, Elizabeth	Phase I Study of Intratumoral Recombinant Fowlpox PANVAC Vaccine (PANVAC-F; Falimarev) and Subcutaneous Recombinant Vaccinia PANVAC Vaccine (PANVAC-V; Inalimarev) Followed by Subcutaneous PANVAC-F Vaccine and Sargramostim (GM-CSF) in Patients With Unresectable Locally Advanced or Metastatic Pancreatic Cancer
11.	Phase I	CDR0000598330 (NCT00705393)	Treatment	Lin, Chi	A Phase 1 Study of Hypofractionated Stereotactic Radiotherapy and Concurrent HIV Protease Inhibitor Nelfinavir as Part of a Neoadjuvant Regimen in Patients With Locally Advanced Pancreatic Cancer
12.	Phase I	MAYO-MC064G (NCT00654160)	Treatment	McWilliams, Robert	Phase I Study of Irinotecan Hydrochloride, Fluorouracil, and Leucovorin Calcium in Patients With Advanced Gastrointestinal Cancer
13.	Phase I	UPCI 08-121 (NCT00892736)	Treatment	Puhalla, Shannon	Phase I Study of ABT-888 in Patients With Refractory BRCA1/2-Mutated Malignant Solid Tumors, Platinum-Refractory Ovarian, Fallopian Tube, or Primary Peritoneal Cancer, or Basal-Like Breast Cancer
14.	Phase I	MCC-15630 (NCT00985777)	Treatment	Springett, Gregory	A Phase I Dose-Escalation Study of the Safety, Pharmacokinetics, and Pharmacodynamics of Vitamin E δ-Tocotrienol Administered to Subjects With Resectable Pancreatic Exocrine Neoplasia
15.	Phase I; Phase II	VU-VICC-GI-0622 (NCT00397384)	Treatment	Goff, Laura	Phase I/II Study of Erlotinib Hydrochloride and Cetuximab in Patients With Advanced Gastrointestinal, Head and Neck, Non-Small Cell Lung, or Colorectal Cancer
16.	Phase I; Phase II	06-248 (NCT00438256)	Treatment	Hong, Theodore	Phase I/II of Neoadjuvant Accelerated Short Course Radiation Therapy With Proton Beam and Capecitabine for Resectable Pancreatic Cancer
17.	Phase I; Phase II	CINJ-070805 (NCT00878657)	Treatment	Jabbour, Salma	Phase I/II Study of Intensity-Modulated Radiotherapy and Concurrent Gemcitabine Hydrochloride in Patients With Locally Advanced Pancreatic Cancer
18.	Phase I; Phase II	SWOG-S0727 (NCT00617708)	Treatment	Whitehead, Robert; Takimoto, Chris	Phase I/II Randomized Study of Gemcitabine Hydrochloride and Erlotinib Hydrochloride With Versus Without Anti-IGF-1R Recombinant Monoclonal Antibody IMC-A12 as First-Line Therapy in Patients With Unresectable Metastatic Pancreatic Cancer
19.	Phase I; Phase II	UPCI 09-122 (NCT01128296)	Treatment	Zeh, Herbert	Phase I/II Study of Preoperative Gemcitabine in Combination With Oral Hydroxychloroquine (GcHc) in Subjects With High Risk Stage IIb or III Adenocarcinoma of the Pancreas

Health of the Field and Overarching Issues
Clinical Trials Relevant to Pancreatic Cancer (cont)

No.	Phase	Primary ID (ClinicalTrials.gov)	Trial Type	PI Name	Title
20.	Phase II	VU-VICC-GI-0815 (NCT00837876)	Treatment	Berlin, Jordan	Phase II Study of Sorafenib Tosylate and Erlotinib Hydrochloride in Patients With Unresectable Pancreatic Cancer
21.	Phase II	2006-0948 (NCT00837239)	Treatment	Chang, David	A Randomized, Placebo-controlled, Blinded Phase II Study of Huachansu & Gemcitabine in Pancreatic Cancer
22.	Phase II	CDR0000639616 (NCT00882765)	Treatment	Garon, Edward	A Pre-Surgical, Randomized Clinical Trial of Genistein in Resectable Pancreatic Adenocarcinoma
23.	Phase II	NCCTG-N064A (NCT00601627)	Treatment	Kim, George; Bollinger, John; Petereit, Daniel	Phase II Study of Panitumumab, Chemotherapy, and External-Beam Radiotherapy in Patients With Locally Advanced, Unresectable Pancreatic Cancer
24.	Phase II	NCCTG-N064B (NCT00550836)	Treatment	Kim, George; Salim, Muhammad	Phase II Randomized Study of Erlotinib Hydrochloride and Gemcitabine Hydrochloride With Versus Without Panitumumab in Patients With Previously Untreated, Metastatic Adenocarcinoma of the Pancreas
25.	Phase II	UCCRC-8418 (NCT01064622)	Treatment	Kindler, Hedy	Phase II Randomized Study of Gemcitabine Hydrochloride With Versus Without Hedgehog Antagonist GDC-0449 in Patients With Recurrent or Metastatic Pancreatic Cancer
26.	Phase II	UCD-211 (NCT00810719)	Treatment	Lara, Primo	Phase II Study of Gemcitabine Hydrochloride and Intermittent Erlotinib Hydrochloride in Patients With Metastatic or Recurrent Pancreatic Cancer
27.	Phase II	MAYO-MC0542 (NCT00577889)	Treatment	McWilliams, Robert	Phase II Randomized Study of Gemcitabine Hydrochloride and Tanespimycin (17-AAG) in Patients With Stage IV Pancreatic Adenocarcinoma
28.	Phase II	CDR0000547235 (NCT00482625)	Treatment	Meyskens, Frank L.	Phase IIA Trial Testing Erlotinib as an Intervention Against Intraductal Pancreatic Mucinous Neoplasms
29.	Phase II	CASE5206 (NCT00474812)	Treatment	Nock, Charles J.	A Phase II Study of Dasatinib (BMS-354825) in Patients With Metastatic Adenocarcinoma of the Pancreas
30.	Phase II	UPCC-04206 (NCT00602602)	Treatment	Not Specified	Phase II Study of Neoadjuvant Therapy Comprising Gemcitabine, Oxaliplatin, Fluorouracil, Bevacizumab, and Radiotherapy and Adjuvant Therapy Comprising Gemcitabine and Bevacizumab in Patients Undergoing Surgery for Locally Advanced Pancreatic Cancer
31.	Phase II	MSKCC-07113 (NCT00536874)	Treatment	O'Reilly, Eileen; Allen, Peter	Phase II Study of Neoadjuvant Gemcitabine and Oxaliplatin in Patients With Resectable Pancreatic Adenocarcinoma

Health of the Field and Overarching Issues
Clinical Trials Relevant to Pancreatic Cancer (cont)

No.	Phase	Primary ID (ClinicalTrials.gov)	Trial Type	PI Name	Title
32.	Phase II	ACOSOG-Z5041 (NCT00733746)	Treatment	Pisters, Peter	Phase II Study of Neoadjuvant and Adjuvant Gemcitabine Hydrochloride and Erlotinib Hydrochloride in Patients With Resectable Adenocarcinoma of the Pancreas Undergoing Pancreatectomy
33.	Phase II	CDR0000327752 (NCT00068575)	Treatment	Pisters, Peter W.T.	Phase II Trial of Postoperative Cisplatin, Interferon, 5-FU With XRT for Patients With Resected Pancreatic Adenocarcinoma
34.	Phase II	CINJ-3330 (NCT00161187)	Treatment	Strair, Roger	Phase II Pilot Study of Irradiated Allogeneic Related Donor Lymphocyte Infusion in Patients With Relapsed or Refractory Hematologic Cancer or Solid Tumor
35.	Phase II	CDR0000586450 (NCT00609336)	Treatment	Whiting, Samuel	A Phase II Study of Induction Chemotherapy, Neoadjuvant Chemoradiotherapy, Surgical Resection and Adjuvant Chemotherapy for Patients With Locally Advanced, Resectable Pancreatic Adenocarcinoma
36.	Phase III	RTOG-0848 (NCT01013649)	Treatment	Abrams, Ross	Phase III Randomized Study of Adjuvant Gemcitabine Hydrochloride With Versus Without Erlotinib Hydrochloride Followed by the Same Chemotherapy Regimen With Versus Without Chemoradiotherapy With Either Capecitabine or Fluorouracil in Patients With Resected Head of Pancreas Adenocarcinoma
37.	No phase specified	00-032 (NCT00582647)	Tissue collection/ Repository	Allen, Peter	Collection of Tissue, Blood and Other Specimens From Patients With Benign and Malignant Tumors of the Soft Tissue, Gastrointestinal Tract, and Other Intra-abdominal Sites.
38.	No phase specified	NCI-05-C-0044 (NCT00104832)	Treatment	Avital, Itzhak	Study of Standard Surgical Resection in Patients With Resectable Pancreatic Neoplasms or Suspected Mass
39.	No phase specified	ID02-139 (NCT00526578)	Natural history/ Epidemiology	Bondy, Melissa	Pancreatic Cancer Genetic Epidemiology (PACGENE) Study
40.	No phase specified	VU-VICC-GI-0717 (NCT00900003)	Biomarker/ Laboratory analysis	Chakravarthy, A. Bapsi	Study of Biomarkers in Patients With Pancreatic Cancer
41.	No phase specified	VU-VICC-GI-0666 (NCT00897832)	Biomarker/ Laboratory analysis	Chakravarthy, A. Bapsi	Study of Predictive Biomarkers of Therapeutic Response Using Tumor Tissue Samples From Patients Who Have Undergone Surgery for Pancreatic Cancer
42.	No phase specified	UARIZ-06-0609-04 (NCT00896935)	Tissue collection/ Repository	Chambers, Setsuko	Repository of Tumor, Tissue, and Blood Samples From Patients With Pancreatic Cancer
43.	No phase specified	FCCC-07011 (NCT00900016)	Biomarker/ Laboratory analysis	Cheng, Jonathan	Study of Fibroblast Activity Protein in Patients With Localized Pancreatic Cancer Undergoing Surgical Resection

Health of the Field and Overarching Issues
Clinical Trials Relevant to Pancreatic Cancer (cont)

No.	Phase	Primary ID (ClinicalTrials.gov)	Trial Type	PI Name	Title
44.	No phase specified	NCI-07-C-0111 (NCT00452946)	Biomarker/ Laboratory analysis	Citrin, Deborah	Pilot Study of Biomarkers of Tumor Burden and Radiation Toxicity in Patients Undergoing Radiotherapy for Gastrointestinal Malignancies
45.	No phase specified	CASE6Y07 (NCT00684801)	Supportive care	Daly, Barbara	Improving the Quality of Advanced Cancer Care With Disease Management
46.	No phase specified	MAYO-MC0744 (NCT00898781)	Biomarker/ Laboratory analysis	Erlichman, Charles	Study of Molecular Detection of Circulating Cancer Cells in Patients With Metastatic Breast, Ovarian, Colon, or Pancreatic Cancer
47.	No phase specified	SU-06302009-2800 (NCT01034670)	Diagnostic	Friedland, Shai	Advanced Gastrointestinal Endoscopic Imaging
48.	No phase specified	CDR0000629414 (NCT00902733)	Health services research	Grant, Marcia	A Standardized Nursing Intervention Protocol for Pancreatic Cancer as a Chronic Illness
49.	No phase specified	MGH-2007-P-000368 (NCT00706290)	Educational/Counseling/ Training	Greer, Joseph	Pilot Randomized Study of Cognitive-Behavioral Therapy Versus Standard Care in Patients With Advanced Gastrointestinal Cancer or Lung Cancer
50.	No phase specified	MAYO-MCS1065 (NCT00836992)	Natural history/ Epidemiology	Halyard, Michele Yvette	Randomized Prospective Pilot Study of the Clinical Significance of Real-time Quality of Life Data in Patients With Primary Lung, Head and Neck, or Gastrointestinal Cancer Undergoing Radiotherapy
51.	No phase specified	CASE5Y06 (NCT00899132)	Biomarker/ Laboratory analysis	Jin, Ge	The Role of TAB3 Protein in Tumorigenesis
52.	No phase specified	CDR0000600355 (NCT00727441)	Treatment	Laheru, Daniel A.	A Randomized Three-Arm Neoadjuvant and Adjuvant Feasibility and Toxicity Study of a GM-CSF Secreting Allogeneic Pancreatic Cancer Vaccine Administered Either Alone or in Combination With Either a Single Intravenous Dose or Daily Metronomic Oral Doses of Cyclophosphamide for the Treatment of Patients With Surgically Resected Adenocarcinoma of the Pancreas
53.	No phase specified	90161 (NCT00923026)	Natural history/ Epidemiology	Not Specified	Follow Up Protocol for Subjects Previously Enrolled in NCI Surgery Branch Studies
54.	No phase specified	MAYO-35406 (NCT00830557)	Natural history/ Epidemiology	Petersen, Gloria	Collection of Medical Data and Biospecimens From Patients With Pancreatic Conditions Including Pancreatic Cancer
55.	No phase specified	JHOC-J0685 (NCT00499733)	Treatment	Rodriguez, Ronald	Pilot Study of Cyclophosphamide and Cryoablation in Patients With Advanced or Metastatic Epithelial Solid Cancer

Health of the Field and Overarching Issues
Clinical Trials Relevant to Pancreatic Cancer (cont)

No.	Phase	Primary ID (ClinicalTrials.gov)	Trial Type	PI Name	Title
56.	No phase specified	405-02 (NCT00661882)	Natural history/ Epidemiology	Sherman, Simon	1) Development of the Pancreatic Cancer Collaborative Registry and Risk Assessment Models; 2) Pancreatic Cancer Pre-Validation Reference Set for Serum/Plasma Biomarkers; 3) Effects of Tobacco and Alcohol on Pancreatic Cancer; 4) Enhancing the Biomedical Computing Platform for Pancreatic Cancer Research
57.	No phase specified	CDR0000632905 (NCT00950144)	Natural history/ Epidemiology	Sun, Virginia	Illness Perception, Pain and Symptom Distress in Gastrointestinal Cancers
58.	No phase specified	UMCC-2010-003 (NCT01143415)	Biomarker/ Laboratory analysis	Zalupski, Mark	Pilot Study of the Effect of Hedgehog Antagonist GDC-0449 and Gemcitabine Hydrochloride on Cancer Stem Cells in Patients With Advanced Pancreatic Cancer

Tumor Biology

NCI Initiatives Related to Tumor Biology

Initiative	Program Announcement/Request for Applications
Mouse Models of Human Cancers Consortium	RFA-CA-08-018 (U01)
Pilot Studies in Pancreatic Cancer	PA-08-208 (R21) PA-08-209 (R03)
Pancreatic Cancer Case-Control Consortium	PANC4
Pancreatic Cancer Cohort Consortium	PanScan

Recommendation 1: Understand the normal biology of the pancreas.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	R01	Hebrok, Matthias	2R01CA112537-06A1	Embryonic Signaling Pathways in Pancreatic Cancer	100	DCB	1.4
2.	R01	Konieczny, Stephen	5R01CA124586-02	Kras-Induced Cellular Plasticity in Pancreatic Cancer	100	DCB	1.3, 1.4
3.	R01	Schuller, Hildegard	1R01CA130888-01A2	The GABA-B Receptor Is a Novel Drug Target for Pancreatic Cancer	100	DCTD	3.3, 5.3
4.	R01	Schuller, Hildegard	2R01CA042829-15A2	GABA-B-R-mediated Prevention of Pancreatic Cancer	100	DCP	2.1
5.	R01	White, Michael	3R01CA129451-03S1	The RaLGTPase Regulatory Network	50	CRCHD	1.4, 2.2
6.	R01	White, Michael	5R01CA129451-03	The RaLGTPase Regulatory Network	50	DCB	1.4, 2.2
7.	R01	Xie, Jingwu	7R01CA094160-08	Molecular Basis of Hedgehog Signaling in Carcinogenesis	100	DCB	2.3
8.	R01	Xie, Keping	5R01CA129956-02	KLF4 Genetic and Epigenetic Changes in Human Pancreatic Cancer	100	DCB	1.2, 1.3
9.	R21	Houchen, Courtney Wayne	1R21CA13748201A2	Pancreatic Stem Cells and Cancer	100	DCB	1.1, 1.4

Tumor Biology
Recommendation 1: Understand the normal biology of the pancreas. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
10.	R21	Spitz, Douglas	1R21CA139182-01	Enhancement of Cancer Therapy Using Ketogenic Diets	50	DCTD	5.3, 5.6
11.	*R21*	*Xie, Keping*	*1R21CA140999-01*	*Molecular Basis of Pancreatic Cancer Progression and Metastasis*	*100*	*DCB*	*1.4*

Recommendation 2: Elucidate the development of pancreatic adenocarcinoma.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	P01	Giaccia, Amato	5P01CA067166-13	Tumor Hypoxia: Molecular Studies & Clinical Exploitation	50	DCTD	1.4, 5.3
2.	P01	Leach, Steven	1P01CA134292-01A1	Functional Annotation of the Pancreatic Cancer Genome	100	DCB	1.2 ,1.3, 2.2, 2.4, 4.1, 7.1
3.	P20	Abbruzzese, James	P20 CA101936	SPORE in Pancreatic Cancer	100	DCTD	1.4, 5.3
4.	P50	Hollingsworth, Michael	5P50CA127297-02	SPORE in Gastrointestinal Cancer	100	DCTD	1.5, 5.3, 5.4, 5.7
5.	R01	Bardeesy, Nabeel	5R01CA133557-02	TGF-beta Signaling in Pancreatic Cancer	100	DCB	1.3, 1.4
6.	*R01*	*Batra, Surinder*	*3R01CA078590-11S1*	*Molecular Studies on MUC4 Mucin Gene*	*100*	*DCB*	*1.4*
7.	R01	Batra, Surinder	3R01CA133774-02S1	Smoking and Pancreatic Cancer	100	CRCHD	2.3
8.	R01	Batra, Surinder	5R01CA078590-11	Molecular Studies on MUC4 Mucin Gene	100	DCB	1.4
9.	R01	Batra, Surinder	5R01CA133774-02	Smoking and Pancreatic Cancer	100	DCB	2.3
10.	R01	Blobe, Gerard	1R01CA136786-01A1	Function of TbRIII as a BMP Co-receptor in Human Cancer	100	DCB	2.2

Tumor Biology
Recommendation 2: Elucidate the development of pancreatic adenocarcinoma. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
11.	R01	Bouvet, Michael	1R01CA132971-01A1	Color-Coded Imaging of Pancreatic Cancer Microenvironment for Drug Discovery	100	DCTD	7.1
12.	R01	Brekken, Rolf	5R01CA118240-03	Matricellular Proteins as Regulators of Tumor Progression	100	DCB	1.4
13.	R01	Brunicardi, Francis	5R01CA095731-07	PDX-1 Is a Therapeutic Target for Pancreatic Cancer	100	DCTD	4.2 , 5.3
14.	*R01*	*Cheresh, David*	*3R01CA045726-23S1*	*Regulation of Metastasis by Alpha V Integrin and Src*	*100*	*DCB*	*1.4, 5.3*
15.	R01	Cheresh, David	5R01CA045726-23	Regulation of Metastasis by Alpha V Integrin and Src	100	DCB	1.4, 5.3
16.	R01	Chiao, Paul	2R01CA097159-05A2	Mechanisms of RelA Activation in Cancer	100	DCB	1.4
17.	R01	Chiao, Paul	1R01CA140410-01A1	Function and Regulation Mechanisms of Polo-like Kinase 3 in Pancreatic Cancer	100	DCB	1.3, 2.2, 2.3
18.	R01	Chiao, Paul	1R01CA142674-01A1	Mechanisms of Overexpressed TrkB in Inducing Pancreatic Cancer Metastasis	100	DCB	1.3, 1.4
19.	R01	Counter, Christopher	5R01CA094184-08	Molecular Mechanisms of Neoplastic Transformation in Human Cells	100	DCB	2.2
20.	R01	Counter, Christopher	5R01CA123031-03	Dynamic Requirements of Ras Signaling During Cancer	100	DCB	1.3, 1.4
21.	R01	Der, Channing	5R01CA042978-23	Biological Activity of Ras Oncogenes	100	DCB	1.3
22.	R01	Eibl, Guido	5R01CA122042-03	The Role of n-3 Polyunsaturated Fatty Acids in Pancreatic Cancer	100	DCP	3.2, 5.6
23.	R01	Elferink, Lisa	5R01CA119075-04	Cellular Response to cMet Endocytosis	100	DCB	2.2
24.	R01	Engelward, Bevin	5R01CA079827-07	Mechanisms of Damage-Induced Homologous Recombination	100	DCB	1.2
25.	*R01*	*Evan, Gerard*	*3R01CA098018-07S1*	*Kinetic Analysis of Myc-induced Carcinogenesis In Vivo*	*100*	*DCB*	*1.3, 5.3*
26.	R01	Evan, Gerard	5R01CA098018-07	Kinetic Analysis of Myc-induced Carcinogenesis In Vivo	50	DCB	1.3

Tumor Biology
Recommendation 2: Elucidate the development of pancreatic adenocarcinoma. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
27.	R01	Fernandez-Zapico, Martin	1R01CA136526-01	Hedgehog and EGF Interaction: A Novel Therapeutic Approach for Pancreatic Cancer	100	DCB	5.3
28.	*R01*	*Fischer, Susan*	*1R01CA135386-01A1*	*Obesity and Pancreatic Cancer: The Role of IGF-1*	*100*	*DCP*	*2.1, 3.2*
29.	R01	Fischer, Susan	5R01CA124615-02	Cyclooxygenase-2 Induced Pancreatic Cancer	100	DCB	2.2
30.	R01	Freeman, James	2R01CA069122-11A2	Role of TGFBeta Alterations in Pancreatic Cancer	100	DCB	1.3, 1.4
31.	R01	Giaccia, Amato	5R01CA116685-04	CTGF in Pancreatic Tumor Growth	100	DCB	1.3, 1.4
32.	R01	Gibbs, Richard	5R01CA112483-03	Inhibition of Prenylated Protein Processing	100	DCTD	5.3
33.	R01	Heaney, Anthony	5R01CA123273-03	Refined Fructose Promotes Pancreatic Cancer Growth	100	DCB	1.4, 3.2
34.	R01	Hebrok, Matthias	2R01CA112537-06A1	Embryonic Signaling Pathways in Pancreatic Cancer	100	DCB	1.4
35.	R01	Hingorani, Sunil	1R01CA129357-01A2	Genetic Progression of Pancreatic Mucinous Cystic Neoplasms to Invasive Carcinoma	100	DCB	1.3, 1.4
36.	R01	Hollingsworth, Michael	5R01CA057362-14	Studies on the Post-translational Processing of MUC1	100	DCB	1.4
37.	R01	Howe, Philip	5R01CA055536-18	Transforming Growth Factor Beta Signaling Pathways	25	DCB	2.2
38.	R01	Huang, Peng	5R01CA085563-08	Superoxide, ROS, and Novel Targets for Cancer Therapy	50	DCTD	5.3
39.	R01	Iacobuzio-Donahue, Christine	1R01CA140599-01	TGF-beta Signaling in Pancreatic Cancer Progression	100	DCB	1.2, 1.4
40.	*R01*	*Kern, Scott*	*1R01CA128920-01A2*	*High-Throughput Analysis of Pancreatic Cancer Mutations*	*100*	*DCB*	*1.2*
41.	R01	Kern, Scott	5R01CA123483-02	Fanconi Defects in Pancreatic Cancer Oncogenesis	100	DCB	1.2
42.	R01	Klemke, Richard	5R01CA097022-07	Survival Mechanisms of Invasive Carcinoma Cells	100	DCB	1.4

Tumor Biology
Recommendation 2: Elucidate the development of pancreatic adenocarcinoma. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
43.	R01	Konieczny, Stephen	5R01CA124586-02	Kras-Induced Cellular Plasticity in Pancreatic Cancer	100	DCB	1.3, 1.4
44.	R01	Lin, Richard	1R01CA136754-01A1	Phosphatidylinositol 3-kinase and Prevention of Pancreatic Cancer	100	DCP	1.4, 3.3
45.	R01	McNiven, Mark A.	2R01CA104125-06A2	Cytoskeletal Dynamics in Pancreatic Cancer Metastasis	100	DCB	1.4
46.	R01	Mitchell, Robert	1R01CA129967-01A2	Amplification of Tumor Hypoxic Responses by MIF-dependent HIF Stabilization	100	DCB	1.4
47.	R01	Mukherjee, Pinku	5R01CA118944-05	Role of MUC1 in Pancreatic Cancer	100	DCB	1.3, 5.3
48.	R01	Nassar, Nicolas	5R01CA115611-03	Ras, Cycling and Inhibition.	30	DCB	1.3, 5.3
49.	R01	Nelkin, Barry	5R01CA134767-02	Targeting CDK5 in Pancreatic Cancer: Mechanistic and Preclinical Development	100	DCTD	5.3
50.	*R01*	*Quigley, James*	*3R01CA105412-06A1S1*	*Transmembrane Proteins Involved in Human Tumor Expansion*	*100*	*DCB*	*4.1*
51.	R01	Riese, David	5R01CA114209-04	Regulation of ErbB4 Signaling by Neuregulin Isoforms	33	DCB	1.4, 7.1
52.	R01	Saluja, Ashok	5R01CA124723-03	The Inhibition of HSP70 Induces Apoptosis in Pancreatic Cancer Cells	100	DCB	1.4, 5.3
53.	R01	Schuller, Hildegard	1R01CA130888-01A2	The GABA-B Receptor Is a Novel Drug Target for Pancreatic Cancer	100	DCTD	3.3, 5.3
54.	R01	Schuller, Hildegard	2R01CA042829-15A2	GABA-B-R-mediated Prevention of Pancreatic Cancer	100	DCP	2.1
55.	R01	Schwartz, Edward	5R01CA089352-08	Mechanisms of Thymide Phosphorylase Angiogenesis	100	DCB	1.4, 2.2
56.	R01	Simeone, Diane	5R01CA131045-02	ATDC Function in Human Pancreatic Adenocarcinoma	100	DCB	1.2, 5.3
57.	R01	Smith, Jill	5R01CA117926-03	The Cholecystokinin-C (CCK-C) Receptor for Early Detection of Pancreatic Cancer	100	DCP	4.1, 7.1
58.	R01	Vlodavsky, Israel	2R01CA106456-06	Regulation of Heparanase in Cancer Progression	50	DCB	1.4

Tumor Biology
Recommendation 2: Elucidate the development of pancreatic adenocarcinoma. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
59.	R01	White, Michael	3R01CA071443-13S1	Components of Ras-Mediated Growth Control	100	CRCHD	1.3
60.	R01	White, Michael	3R01CA071443-13S2	Components of Ras-Mediated Growth Control	100	CRCHD	1.3
61.	R01	White, Michael	5R01CA071443-13	Components of Ras-Mediated Growth Control	100	DCB	1.3
62.	R01	Xie, Jingwu	7R01CA094160-08	Molecular Basis of Hedgehog Signaling in Carcinogenesis	100	DCB	2.3
63.	R01	Xie, Keping	5R01CA129956-02	KLF4 Genetic and Epigenetic Changes in Human Pancreatic Cancer	100	DCB	1.2, 1.3
64.	R01	Xie, Keping	1R01CA148954-01A1	Genetic Approaches to Pancreatic Cancer Progression	100	DCB	1.3, 1.4, 7.1
65.	R01	Xie, Keping	1R01CA152309-01	Functional Validation of Pancreatic Cancer Progression Biomarker	100	DCB	1.3, 1.4
66.	R03	Grossman, Steven	1R03CA143763-01	Targeting the ARF/CtBP Axis in Pancreatic Cancer	100	DCB	5.3
67.	R03	Haab, Brian	1R03CA139225-01	Induced Glycan Alterations in Sub-populations of Pancreatic Tumors	100	DCB	1.1
68.	R03	Hocevar, Barbara	1R03CA139313-01	Regulation of Pancreatic Tumor Progression by Disabled-2	100	DCB	1.4
69.	R03	Jain, Maneesh	1R03CA139285-01	EGFRvIII in Pancreatic Cancer	100	DCB	4.1
70.	R03	Murray, Nicole	1R03CA143164-01	Role of Atypical PKCs in Pancreatic Tumor Growth and Metastasis	100	DCTD	5.3
71.	R03	Resar, Linda	1R03CA139331-01	Targeting HMGA1 in Pancreatic Tumor Progression	100	DCTD	1.4
72.	R03	Singh, Ajay	1R03CA137513-01A1	MicroRNAs in Pancreatic Cancer	100	DCB	1.2
73.	R21	Altomare, Deborah	1R21CA129302-01A2	AKT Function in Pancreatic Tumor Cell Invasiveness and In Vivo Pathogenesis	100	DCB	1.3
74.	*R21*	*Attardi, Laura*	*1R21CA141087-01*	*Using p53 Knock-In Mice to Understand p53's Role in Pancreatic Cancer*	*100*	*DCB*	*1.3*

Tumor Biology
Recommendation 2: Elucidate the development of pancreatic adenocarcinoma. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
75.	R21	Bouvet, Michael	1R21CA135435-01A1	Divalent Cation Activation of the Integrin-mediated Malignant Phenotype in Pancreatic Cancer	100	DCTD	5.3
76.	*R21*	*Buchberg, Arthur*	*1R21CA135166-01A1*	*Sensitized Screen to Identify Cooperating Genes Involved in Pancreatic Cancer*	*100*	*DCB*	*1.2, 1.3*
77.	R21	Cullen, Joseph	1R21CA137230-01A1	Mechanisms of Ascorbate-induced Cytotoxicity in Pancreatic Cancer	100	DCTD	5.3
78.	R21	Friedman, Eileen Anne	1R21CA135164-01A2	A Novel ROS Controlling Kinase	100	DCB	1.2, 1.3
79.	*R21*	*Han, Haiyong*	*1R21CA140924-01*	*Molecular Mechanisms of Perineural Invasion in Pancreatic Cancer*	*100*	*DCB*	*1.4*
80.	R21	Houchen, Courtney Wayne	1R21CA13748201A2	Pancreatic Stem Cells and Cancer	100	DCB	1.1, 1.4
81.	R21	Korc, Murray	1R21CA135664-01A1	Role of microRNAs in Genetic Mouse Models of Pancreatic Cancer	100	DCB	1.2, 1.3
82.	R21	Lampe, Paul	1R21CA149554-01	Cx43 Phosphorylation Modulated Kras Mediated Pancreas Cancer Progression	100	DCB	1.4, 1.6
83.	R21	Li, Min	1R21CA133604-01A2	Roles of Zinc Transporter ZIP4 (SLC39A4) in Pancreatic Cancer Pathogenesis	100	DCB	1.4, 2.2
84.	R21	Lubman, David	1R21CA134623-02	Proteomic Pathways for Pancreatic Cancer Stem Cells	100	DCB	1.4, 2.2
85.	*R21*	*Mehta, Kapil*	*1R21CA135218-01A1*	*Biological and Therapeutic Significance of TG2 in Pancreatic Cancer*	*100*	*DCTD*	*5.3*
86.	R21	Quelle, Dawn	1R21CA127031-01A2	Novel Suppressors of Pancreatic Cancer	100	DCB	1.3
87.	R21	Radice, Glenn	1R21CA133609-01A1	The Role of N-cadherin in Tumor Progression	100	DCB	1.4
88.	R21	Rozengurt, Juan	1R21CA137292-01A1	Targeting Crosstalk Between Insulin and Gq Signaling Systems in Pancreatic Cancer	100	DCTD	5.3
89.	R21	Salgia, Ravi	1R21CA140003-01	Novel Targeted Therapy in Pancreatic Cancer	100	DCTD	1.3, 5.3
90.	R21	Spitz, Douglas	1R21CA139182-01	Enhancement of Cancer Therapy Using Ketogenic Diets	50	DCTD	5.3, 5.6

Tumor Biology
Recommendation 2: Elucidate the development of pancreatic adenocarcinoma. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
91.	*R21*	*Xie, Keping*	*1R21CA140999-01*	*Molecular Basis of Pancreatic Cancer Progression and Metastasis*	*100*	*DCB*	*1.4*
92.	R37	Korc, Murray	3R37CA075059-11S1	Dysregulation of TGF Beta Action in Pancreatic Cancer	100	DCB	2.2, 7.1
93.	R37	Korc, Murray	5R37CA075059-12	Dysregulation of TGF Beta Action in Pancreatic Cancer	100	DCB	2.2, 7.1
94.	SC2	Baines, Antonio	5SC2CA137845-02	The Role of Pim Kinases as a Novel Molecular Target in Pancreatic Cancer	100	CRCHD	1.3
95.	U01	Castrillon, Diego	1U01CA141576-01	LKB1 Tumor Suppressor and Human Cancer	25	DCB	1.3, 7.2
96.	U01	Cheng, Yung-Chi	5U01CA063477-14	Nucleoside Analogs as Anticancer Compounds	50	DCTD	5.3
97.	U01	Varki, Ajit	5U01CA128442-03	Neu5Gc and Anti-Neu5Gc Antibodies for Detection of Cancer and Cancer Risk	34	DCP	4.1

Recommendation 3: Study the natural history of stroma and desmoplasia.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	R01	Joyce, Johanna	5R01CA125162-03	Dissecting the Function of Cysteine Cathepsins in the Tumor Microenvironment	100	DCB	1.4, 2.2
2.	R01	Munshi, Hidayatullah	5R01CA126888-02	Fibrosis-Protease Cross-Talk Regulating Pancreatic Cancer Invasion	100	DCB	1.4
3.	*R01*	*Quigley, James*	*3R01CA129484-02S1*	*A Cellular and Molecular Analysis of the Intravasation Step in Tumor Metastasis*	*25*	*DCB*	*1.4*
4.	R01	Quigley, James	5R01CA129484-02	A Cellular and Molecular Analysis of the Intravasation Step in Tumor Metastasis	25	DCB	1.4
5.	R21	Provenzano, Paolo	1R21CA152249-01	Dissecting the Roles of Stellate Cells in Pancreas Cancer Progression	100	DCB	1.4, 1.6

Recommendation 4: Study host-tumor interactions and develop related therapeutic strategies.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	P01	Giaccia, Amato	5P01CA067166-13	Tumor Hypoxia: Molecular Studies & Clinical Exploitation	50	DCTD	1.4, 5.3
2.	P20	Abbruzzese, James	P20 CA101936	SPORE in Pancreatic Cancer	100	DCTD	1.4, 5.3
3.	P50	Hollingsworth, Michael	5P50CA127297-02	SPORE in Gastrointestinal Cancer	100	DCTD	1.5, 5.3, 5.4, 5.7
4.	R01	Counter, Christopher	5R01CA123031-03	Dynamic Requirements of Ras Signaling During Cancer	100	DCB	1.3, 1.4
5.	R01	Engelward, Bevin	5R01CA079827-07	Mechanisms of Damage-Induced Homologous Recombination	100	DCB	1.2
6.	R01	Fernandez-Zapico, Martin	1R01CA136526-01	Hedgehog and EGF Interaction: A Novel Therapeutic Approach for Pancreatic Cancer	100	DCB	5.3
7.	*R01*	*Fischer, Susan*	*1R01CA135386-01A1*	*Obesity and Pancreatic Cancer: The Role of IGF-1*	*100*	*DCP*	*2.1, 3.2*
8.	R01	Fischer, Susan	5R01CA124615-02	Cyclooxygenase-2 Induced Pancreatic Cancer	100	DCB	2.2
9.	R01	Freeman, James	2R01CA069122-11A2	Role of TGFBeta Alterations in Pancreatic Cancer	100	DCB	1.3, 1.4
10.	*R01*	*Greenberg, Philip*	*3R01CA033084-27S1*	*Mechanisms of Murine Tumor Eradication by Immunotherapy*	*100*	*DCB*	*5.3, 7.1*
11.	R01	Hanahan, Douglas	5R01CA099948-07	Mechanism and Therapeutic Targeting of Evasive Resistance to Antiangiogenic Drugs	50	DCB	5.3, 7.2
12.	R01	Lanier, Lewis	2R01CA095137-06	NK Cell Biology	100	DCB	1.4, 2.2
13.	R01	McConkey, David	1R01CA127494-01A2	Proteasome Inhibition and ER Stress	100	DCB	5.3, 5.4
14.	*R01*	*Quigley, James*	*3R01CA129484-02S1*	*A Cellular and Molecular Analysis of the Intravasation Step in Tumor Metastasis*	*25*	*DCB*	*1.4*
15.	R01	Quigley, James	5R01CA129484-02	A Cellular and Molecular Analysis of the Intravasation Step in Tumor Metastasis	25	DCB	1.4

Tumor Biology
Recommendation 4: Study host-tumor interactions and develop related therapeutic strategies. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
16.	R01	Sarkar, Fazlul	1R01CA132794-01A1	FoxM1: A Molecular Target in Pancreatic Cancer	100	DCB	3.3
17.	*R01*	*Sarkar, Fazlul*	*3R01CA131151-02S1*	*RO1: A Novel and Targeted Approach to Inhibit Invasion and Angiogenesis*	*100*	*DCTD*	*3.3, 3.5*
18.	R01	Sarkar, Fazlul	5R01CA131151-02	RO1: A Novel and Targeted Approach to Inhibit Invasion and Angiogenesis	100	DCTD	3.3
19.	R01	Sherman, Linda	5R01CA057855-18	Generating CTL Against Tumor Associated Peptide Antigens	100	DCB	5.1
20.	R01	Vile, Richard	5R01CA132734-02	Autoimmunity and Antitumor Immunity Outside of the Melanocyte/Melanoma Paradigm	50	DCB	5.3
21.	R03	Guzman, Esther	1R03CA141199-01	Identification of Bioactive Marine Natural Products That Inhibit Mast Cells Implicated in Pancreatic Tumorigenesis	100	DCP	1.4, 3.3
22.	R03	Haab, Brian	1R03CA139225-01	Induced Glycan Alterations in Sub-populations of Pancreatic Tumors	100	DCB	1.1
23.	R21	Carson, William	1R21CA135464-01A1	Cetuximab Therapy of Pancreatic Cancer: Immune Modulation With IL-21	100	DCTD	5.3
24.	*R21*	*Han, Haiyong*	*1R21CA140924-01*	*Molecular Mechanisms of Perineural Invasion in Pancreatic Cancer*	*100*	*DCB*	*1.4*
25.	R21	Modrak, David	5R21CA123313-02	Chemotherapy of Pancreatic Cancer: Induction of Apoptosis or Senescence	100	DCTD	5.3
26.	R21	Spitz, Douglas	1R21CA139182-01	Enhancement of Cancer Therapy Using Ketogenic Diets	50	DCTD	5.3, 5.6
27.	R37	Cheresh, David	2R37CA050286-21	VEGF and PDGF in Angiogenesis and Tumor Progression	25	DCB	1.4
28.	U01	Engleman, Edgar	1U01CA141468-01	Biology and Immunology of Pancreatic Cancer Stem Cells in a Novel Mouse Model	100	DCB	1.4, 7.1
29.	U54	Ferrari, Mauro	1U54CA151668-01	Texas Center for Cancer Nanomedicine	50	CSSI	1.4, 4.1, 4.2, 4.4, 5.1, 5.3, 5.7, 7.1
30.	*U54*	*Klonoff, Elizabeth*	*3U54CA132384-02S1*	*Comprehensive SDSU/UCSD Cancer Center Partnership 1 of 2*	*36*	*CRCHD*	*5.3, 6.1, 6.5*
31.	U54	Klonoff, Elizabeth	5U54CA132384-02	Comprehensive SDSU/UCSD Cancer Center Partnership 1 of 2	36	CRCHD	5.3, 6.1, 6.5

Recommendation 5: Create specimen banks of normal and neoplastic human pancreatic tissue.[6]

No.	Mech	PI	Project #	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	P50	Hollingsworth, Michael	5P50CA127297-02	SPORE in Gastrointestinal Cancer	100	DCTD	1.5, 5.3, 5.4, 5.7

Recommendation 6: Develop experimental model systems.[7]

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	P01	Leach, Steven	1P01CA134292-01A1	Functional Annotation of the Pancreatic Cancer Genome	100	DCB	1.2, 1.3, 2.2, 2.4, 4.1, 7.1
2.	*R01*	*Batra, Surinder*	*3R01CA078590-11S1*	*Molecular Studies on MUC4 Mucin Gene*	*100*	*DCB*	*1.4*
3.	R01	Batra, Surinder	3R01CA133774-02S1	Smoking and Pancreatic Cancer	100	CRCHD	2.3
4.	R01	Batra, Surinder	5R01CA078590-11	Molecular Studies on MUC4 Mucin Gene	100	DCB	1.4
5.	R01	Batra, Surinder	5R01CA133774-02	Smoking and Pancreatic Cancer	100	DCB	2.3
6.	R01	Bouvet, Michael	1R01CA132971-01A1	Color-Coded Imaging of Pancreatic Cancer Microenvironment for Drug Discovery	100	DCTD	7.1
7.	R01	Brekken, Rolf	5R01CA118240-03	Matricellular Proteins as Regulators of Tumor Progression	100	DCB	1.4

[6] Projects coded to Tumor Biology recommendation #5 are also relevant to the *Clinical Trials Planning Meeting on Pancreas Cancer Treatment Consensus Report* Emphasis Area of Establishment of Biorepositories (J Clin Oncol. 2009 Nov 20;27(33):5660-9).

[7] Projects coded to Tumor Biology recommendation #6 are also relevant to the *Clinical Trials Planning Meeting on Pancreas Cancer Treatment Consensus Report* Emphasis Area of Utility of Preclinical Models (J Clin Oncol. 2009 Nov 20;27(33):5660-9).

Tumor Biology
Recommendation 6: Develop experimental model systems. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
8.	R01	Chiao, Paul	2R01CA097159-05A2	Mechanisms of RelA Activation in Cancer	100	DCB	1.4
9.	R01	Heaney, Anthony	5R01CA123273-03	Refined Fructose Promotes Pancreatic Cancer Growth	100	DCB	1.4, 3.2
10.	R01	Hebrok, Matthias	2R01CA112537-06A1	Embryonic Signaling Pathways in Pancreatic Cancer	100	DCB	1.4
11.	R01	Kern, Scott	5R01CA123483-02	Fanconi Defects in Pancreatic Cancer Oncogenesis	100	DCB	1.2
12.	R01	Klemke, Richard	5R01CA097022-07	Survival Mechanisms of Invasive Carcinoma Cells	100	DCB	1.4
13.	R01	Lanier, Lewis	2R01CA095137-06	NK Cell Biology	100	DCB	1.4, 2.2
14.	R01	Lewis, Brian	3R01CA113896-03S1	Molecular Dissection of Pancreatic Ductal Adenocarcinoma	100	CRCHD	1.3
15.	R01	Lewis, Brian	5R01CA113896-03	Molecular Dissection of Pancreatic Ductal Adenocarcinoma	100	DCB	1.3
16.	R01	McNiven, Mark A.	2R01CA104125-06A2	Cytoskeletal Dynamics in Pancreatic Cancer Metastasis	100	DCB	1.4
17.	R01	Nelkin, Barry	5R01CA134767-02	Targeting CDK5 in Pancreatic Cancer: Mechanistic and Preclinical Development	100	DCTD	5.3
18.	*R01*	*Quigley, James*	*3R01CA129484-02S1*	*A Cellular and Molecular Analysis of the Intravasation Step in Tumor Metastasis*	*25*	*DCB*	*1.4*
19.	R01	Quigley, James	5R01CA129484-02	A Cellular and Molecular Analysis of the Intravasation Step in Tumor Metastasis	25	DCB	1.4
20.	R01	Sarkar, Fazlul	1R01CA132794-01A1	FoxM1: A Molecular Target in Pancreatic Cancer	100	DCB	3.3
21.	*R01*	*Sarkar, Fazlul*	*3R01CA131151-02S1*	*RO1: A Novel and Targeted Approach to Inhibit Invasion and Angiogenesis*	*100*	*DCTD*	*3.3, 3.5*
22.	R01	Sarkar, Fazlul	5R01CA131151-02	RO1: A Novel and Targeted Approach to Inhibit Invasion and Angiogenesis	100	DCTD	3.3
23.	R01	Schwartz, Edward	5R01CA089352-08	Mechanisms of Thymide Phosphorylase Angiogenesis	100	DCB	1.4, 2.2

Tumor Biology
Recommendation 6: Develop experimental model systems. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
24.	R01	Sherman, Linda	5R01CA057855-18	Generating CTL Against Tumor Associated Peptide Antigens	100	DCB	5.1
25.	R01	Vlodavsky, Israel	2R01CA106456-06	Regulation of Heparanase in Cancer Progression	50	DCB	1.4
26.	R01	White, Michael	3R01CA129451-03S1	The RaLGTPase Regulatory Network	50	CRCHD	1.4, 2.2
27.	R01	White, Michael	5R01CA129451-03	The RaLGTPase Regulatory Network	50	DCB	1.4, 2.2
28.	R01	Xie, Keping	1R01CA148954-01A1	Genetic Approaches to Pancreatic Cancer Progression	100	DCB	1.3, 1.4, 7.1
29.	R03	Bauer, Todd	1R03CA141245-01	A Primary Human Xenograft Model of Pancreatic Cancer	100	DCB	1.4, 7.1
30.	R21	Altomare, Deborah	1R21CA129302-01A2	AKT Function in Pancreatic Tumor Cell Invasiveness and In Vivo Pathogenesis	100	DCB	1.3
31.	*R21*	*Attardi, Laura*	*1R21CA141087-01*	*Using p53 Knock-In Mice to Understand p53's Role in Pancreatic Cancer*	*100*	*DCB*	*1.3*
32.	*R21*	*Buchberg, Arthur*	*1R21CA135166-01A1*	*Sensitized Screen to Identify Cooperating Genes Involved in Pancreatic Cancer*	*100*	*DCB*	*1.2, 1.3*
33.	R21	Korc, Murray	1R21CA135664-01A1	Role of microRNAs in Genetic Mouse Models of Pancreatic Cancer	100	DCB	1.2, 1.3
34.	R21	Lampe, Paul	1R21CA149554-01	Cx43 Phosphorylation Modulated Kras Mediated Pancreas Cancer Progression	100	DCB	1.4, 1.6
35.	R21	Quelle, Dawn	1R21CA127031-01A2	Novel Suppressors of Pancreatic Cancer	100	DCB	1.3
36.	R37	Korc, Murray	3R37CA075059-11S1	Dysregulation of TGF Beta Action in Pancreatic Cancer	100	DCB	2.2, 7.1
37.	R37	Korc, Murray	5R37CA075059-12	Dysregulation of TGF Beta Action in Pancreatic Cancer	100	DCB	2.2, 7.1
38.	U01	Castrillon, Diego	1U01CA141576-01	LKB1 Tumor Suppressor and Human Cancer	25	DCB	1.3, 7.2
39.	U01	Engleman, Edgar	1U01CA141468-01	Biology and Immunology of Pancreatic Cancer Stem Cells in a Novel Mouse Model	100	DCB	1.4, 7.1

Tumor Biology
Recommendation 6: Develop experimental model systems. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
40.	U01	Holland, Eric	2U01CA105492-06	Using Mouse Models to Probe the Relationship of Oncogenesis to Development and Oncogene Dependence	33	DCB	1.3, 7.2

Risk, Prevention, Screening, and Diagnosis

NCI Initiatives Related to Risk, Prevention, Screening, and Diagnosis of Pancreatic Cancer

Initiative	Program Announcement/Request for Applications
Cancer Prevention Small Grants Program	PAR-08-055 (R03)
Early Detection Research Network: Biomarker Reference Laboratories	RFA-CA-09-019 (U24) RFA-CA-09-017 (U01)
Molecular Approaches to Diet and Pancreatic Cancer Prevention	PA-08-032 (R01) PA-07-257 (R01)
Small Grants Program for Cancer Epidemiology	PAR-08-237 (R03)
Exploratory Studies in Cancer Detection, Diagnosis, and Prognosis	PA-08-267 (R21)
Pilot Studies in Pancreatic Cancer	PA-08-208 (R21) PA-08-209 (R03)
Alliance of Glycobiologists for Detection of Cancer and Cancer Risk	RFA-CA-07-020 (U01)
Pancreatic Cancer Case-Control Consortium	PANC4
Pancreatic Cancer Cohort Consortium	PanScan

Recommendation 1: Identify genetic and environmental factors that contribute to disease development.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	*P01*	*DePinho, Ronald*	*3P01CA117969-04S1*	*Genetics and Biology of Pancreatic Duct Adenocarcinoma*	*100*	*DCB*	*1.3, 7.1*
2.	P01	DePinho, Ronald	5P01CA117969-04	Genetics and Biology of Pancreatic Duct Adenocarcinoma	100	DCB	1.3, 1.5, 2.2, 4.2, 4.4, 5.3
3.	P01	Leach, Steven	1P01CA134292-01A1	Functional Annotation of the Pancreatic Cancer Genome	100	DCB	1.2 ,1.3, 2.2, 2.4, 4.1, 7.1
4.	P20	Abbruzzese, James	P20 CA101936	SPORE in Pancreatic Cancer	100	DCTD	1.4, 5.3
5.	P50	Petersen, Gloria	5P50CA102701-07	Mayo Clinic SPORE in Pancreatic Cancer	100	DCTD	1.4, 5.3

Risk, Prevention, Screening, and Diagnosis
Recommendation 1: Identify genetic and environmental factors that contribute to disease development. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
6.	R01	Batra, Surinder	3R01CA133774-02S1	Smoking and Pancreatic Cancer	100	CRCHD	2.3
7.	R01	Batra, Surinder	5R01CA133774-02	Smoking and Pancreatic Cancer	100	DCB	2.3
8.	R01	Chen, Xinbin	5R01CA121137-04	Molecular Oncogenic Properties of Mutant p53	25	DCB	1.3
9.	R01	Cole, David	5R01CA123159-03	Targeting the CASM Oncogene as a Novel Therapy for Pancreatic Cancer	100	DCTD	5.3
10.	R01	Engelward, Bevin	5R01CA079827-07	Mechanisms of Damage-induced Homologous Recombination	100	DCB	1.2
11.	*R01*	*Fischer, Susan*	*1R01CA135386-01A1*	*Obesity and Pancreatic Cancer: The Role of IGF-1*	*100*	*DCP*	*2.1, 3.2*
12.	R01	Jaenisch, Rudolf	5R01CA087869-09	Epigenetics, Stem Cells, and Cancer	33	DCB	1.2
13.	R01	Joyce, Johanna	5R01CA125162-03	Dissecting the Function of Cysteine Cathepsins in the Tumor Microenvironment	100	DCB	1.4, 2.2
14.	R01	Lewis, Brian	3R01CA113896-03S1	Molecular Dissection of Pancreatic Ductal Adenocarcinoma	100	CRCHD	1.3
15.	R01	Lewis, Brian	5R01CA113896-03	Molecular Dissection of Pancreatic Ductal Adenocarcinoma	100	DCB	1.3
16.	R01	Parsons, Ramon	5R01CA082783-09	PTEN Tumor Suppressor and Signal Transduction	50	DCB	1.3
17.	R01	Risch, Harvey	5R01CA114421-03	Case Control Study of Pancreas Cancer in Shanghai, China	100	DCCPS	2.1, 2.3
18.	R01	Schuller, Hildegard	1R01CA130888-01A2	The GABA-B Receptor Is a Novel Drug Target for Pancreatic Cancer	100	DCTD	3.3, 5.3
19.	R01	Schuller, Hildegard	2R01CA042829-15A2	GABA-B-R-mediated Prevention of Pancreatic Cancer	100	DCP	2.1
20.	R01	Velculescu, Victor	5R01CA121113-04	Large-scale Genetic Analyses of Gene Families in Colorectal Cancer	40	DCB	2.2
21.	R03	Klein, Robert	1R03CA141524-01	Are Shared Controls Useful in Genome-wide Association Studies for Cancer Genetics?	100	DCCPS	1.5

Risk, Prevention, Screening, and Diagnosis
Recommendation 1: Identify genetic and environmental factors that contribute to disease development. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
22.	R03	Olson, Sara	1R03CA141570-01	Allergies and Pancreatic Cancer: A Pooled Analysis in PANC4	100	DCCPS	2.3, 2.4
23.	R03	Satia, Jessie	1R03CA139261-01	Dietary Supplement Use, Physical Activity, Body Mass Index, and Pancreatic Cancer	100	DCCPS	3.1, 3.2
24.	R21	Tranah, Gregory	1R21CA133080-01A1	Mitochondrial DNA Mutations in Pancreatic Cancer	100	DCCPS	2.3, 2.4
25.	R21	Zhou, Jin-Rong	1R01CA127794-01A2	Metabolic Syndrome as Pancreatic Cancer Etiology	100	DCB	2.2, 3.2
26.	R44	Jacquez, Geoffrey	2R44CA135818-02	Case-only Cancer Clustering for Mobile Populations	100	SBIRDC	2.1, 7.2
27.	U01	Genkinger, Jeanine	1U01CA139578-01	Dietary Factors and Risk of Pancreatic Cancer in a Pooled Analysis	100	DCCPS	2.1, 3.1

Recommendation 2: Develop approaches for prevention in high-risk cohorts.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	R01	Eibl, Guido	5R01CA122042-03	The Role of n-3 Polyunsaturated Fatty Acids in Pancreatic Cancer	100	DCP	3.2, 5.6
2.	*R01*	*Fischer, Susan*	*1R01CA135386-01A1*	*Obesity and Pancreatic Cancer: The Role of IGF-1*	*100*	*DCP*	*2.1, 3.2*
3.	R01	Fischer, Susan	5R01CA124615-02	Cyclooxygenase-2 Induced Pancreatic Cancer	100	DCB	2.2
4.	*R01*	*Fisher, Paul*	*1R01CA127641-01A2*	*Pancreatic Cancer Management by Novel Gene Therapy & Dietary Agents*	*100*	*DCP*	*5.6, 7.1*
5.	R01	Lin, Richard	1R01CA136754-01A1	Phosphatidylinositol 3-kinase and Prevention of Pancreatic Cancer	100	DCP	1.4, 3.3
6.	R01	Malafa, Mokenge	5R01CA129227-02	Intervention of Pancreatic Oncogenic Pathways with Dietary Tocotrienol	100	DCP	3.3, 5.6

Risk, Prevention, Screening, and Diagnosis
Recommendation 2: Develop approaches for prevention in high-risk cohorts. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
7.	R01	Petersen, Gloria	5R01CA097075-07	Pancreatic Cancer Genetic Epidemiology Consortium (PACGENE)	100	DCCPS	2.2, 2.3
8.	R01	Pollack, Jonathan	5R01CA112016-04	Gene Amplification and Deletion in Pancreatic Cancer	100	DCB	1.2, 1.3
9.	R01	Sarkar, Fazlul	1R01CA132794-01A1	FoxM1: A Molecular Target in Pancreatic Cancer	100	DCB	3.3
10.	*R01*	*Sarkar, Fazlul*	*3R01CA131151-02S1*	*RO1: A Novel and Targeted Approach to Inhibit Invasion and Angiogenesis*	*100*	*DCTD*	*3.3, 3.5*
11.	R01	Sarkar, Fazlul	5R01CA131151-02	RO1: A Novel and Targeted Approach to Inhibit Invasion and Angiogenesis	100	DCTD	3.3
12.	R01	Sporn, Michael	2R01CA078814-11A1	New Triterpenoids for Chemoprevention and Therapy of Cancer	34	DCP	3.3, 5.3
13.	*R01*	*Srivastava, Rakesh*	*3R01CA125262-02S1*	*Chemoprevention of Pancreatic Cancer by EGCG*	*100*	*DCTD*	*3.2, 3.5*
14.	R01	Srivastava, Rakesh	5R01CA125262-02	Chemoprevention of Pancreatic Cancer by EGCG	100	DCTD	3.2, 3.5
15.	R01	Srivastava, Sanjay	1R01CA129038-01A2	Chemoprevention of Pancreatic Cancer by Capsaicin	100	DCP	3.2
16.	R03	Guzman, Esther	1R03CA141199-01	Identification of Bioactive Marine Natural Products that Inhibit Mast Cells Implicated in Pancreatic Tumorigenesis	100	DCP	1.4, 3.3
17.	R03	Satia, Jessie	1R03CA139261-01	Dietary Supplement Use, Physical Activity, Body Mass Index, and Pancreatic Cancer	100	DCCPS	3.1, 3.2
18.	R21	Lanza-Jacoby, Susan	1R21CA127840-01A2	Variations of Calorie Restriction for the Prevention of Pancreatic Cancer	100	DCP	3.2

Recommendation 3: Develop early detection methods.[8]

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	P50	Brenner, Dean	P50 CA130810	SPORE in Gastrointestinal Cancer	50	DCTD	1.4, 4.3, 5.3, 5.4
2.	P50	Buchsbaum, Donald	P50 CA101955	SPORE in Pancreatic Cancer	100	DCTD	1.4, 4.3, 4.4, 5.3, 5.4, 5.7
3.	P50	Hollingsworth, Michael	5P50CA127297-02	SPORE in Gastrointestinal Cancer	100	DCTD	1.5, 5.3, 5.4, 5.7
4.	P50	Kern, Scott	5P50CA062924-16	SPORE in Gastrointestinal Cancer	50	DCTD	2.2, 4.3
5.	P50	Petersen, Gloria	5P50CA102701-07	Mayo Clinic SPORE in Pancreatic Cancer	100	DCTD	1.4, 5.3
6.	R01	Batra, Surinder	5R01CA131944-02	Molecular Markers for the Diagnosis of Pancreatic Cancer	100	DCP	4.1
7.	R01	Brentnall, Teresa	5R01CA107209-04	Pancreatic Cancer Protein Biomarkers for Early Detection	100	DCP	4.3
8.	R01	Goggins, Michael	5R01CA120432-04	Markers of Early Pancreatic Cancer	100	DCP	4.1
9.	R01	Kelly, Kimberly	5R01CA137071-02	Development of Molecularly Targeted Imaging Agents for Early Detection of PDAC	100	DCTD	4.1, 7.1
10.	R01	Misek, David	1R01CA140211-01	Distinctive Glycan Fingerprints of Pancreatic Cancer for Plasma Detection	100	DCP	4.1
11.	R03	Wang, Xinhui	1R03CA141086-01	B7-H3 in Prognosis and Immunotherapy of Pancreatic Cancer	100	DCTD	4.1, 5.3
12.	R21	Emelianov, Stanislav	1R21CA141203-01	Nanocage System for Endoscopic Imaging and Staging of Pancreatic Cancer	100	DCTD	4.1
13.	R21	Lubman, David	5R21CA124441-02	A Lectin Glycoarray Approach for Markers of Pancreatic Cancer	100	DCB	4.1

[8] Projects coded to Risk, Prevention, Screening, and Diagnosis recommendation #3 are also relevant to the *Clinical Trials Planning Meeting on Pancreas Cancer Treatment Consensus Report* Emphasis Area of Biomarkers (J Clin Oncol. 2009 Nov 20;27(33):5660-9).

Risk, Prevention, Screening, and Diagnosis
Recommendation 3: Develop early detection methods. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
14.	R21	Liu, Bin	1R21CA137429-01A1	Selection of Internalizing Human Antibodies Targeting Pancreatic Tumor Cells In Situ by Laser Capture Microdissection	100	DCB	4.1, 5.3
15.	R21	Tranah, Gregory	1R21CA133080-01A1	Mitochondrial DNA Mutations in Pancreatic Cancer	100	DCCPS	2.3, 2.4
16.	R21	Willmann, Juergen	1R21CA139279-01A1	Early Detection of Pancreatic Cancer With Targeted Contrast-enhanced Ultrasound	100	DCTD	4.1
17.	R33	Haab, Brian	5R33CA122890-03	Defining Secreted Glycan Alterations in Pancreatic Cancer	100	DCP	4.1
18.	R44	Iftimia, Nicusor	2R44CA117218-03	Image Guided Intervention System for Pancreatic Cystic Lesions	100	SBIRDC	4.3, 5.1
19.	U01	Halas, Naomi J.	1U01CA151886-01	Preclinical Platform for Theranostic Nanoparticles in Pancreatic Cancer	100	CSSI	4.1, 4.2, 5.1, 5.3, 7.1
20.	U01	Hollingsworth, Michael	5U01CA128437-03	Autoantibodies Against Glycopeptide Epitopes as Serum Biomarkers of Cancer	40	DCP	4.1
21.	U01	Hollingsworth, Michael	2U01CA111294-06	Early Diagnosis of Pancreatic Cancer	100	DCP	4.1
22.	U01	Killary, Ann	2U01CA111302-06	Biomarkers for Early Detection of Pancreatic Cancer	100	DCP	4.1
23.	U01	Lin, Wenbin	1U01CA151455-01	Nanoscale Metal-organic Frameworks for Imaging and Therapy of Pancreatic Cancer	100	CSSI	4.1, 4.2, 5.1, 5.3, 5.4, 7.1
24.	U01	Yang, Lily	1U01CA151810-01	Theranostic Nanoparticles for Targeted Treatment of Pancreatic Cancer	100	CSSI	4.1, 4.2, 5.1, 5.3, 7.1
25.	*U01*	*Pierce, James*	*3U01CA128454-03S2*	*Tumor Glycomics Laboratory for Discovery of Pancreatic Cancer Markers*	*80*	*DCP*	*4.1, 4.3*
26.	U01	Pierce, James	5U01CA128454-03	Tumor Glycomics Laboratory for Discovery of Pancreatic Cancer Markers	100	DCP	4.1, 4.2
27.	U01	Porter, Marc D.	1U01CA151650-01	Magnetoresistive Sensor Platform for Parallel Cancer Marker Detection	100	CSSI	4.1, 4.2, 4.3, 7.1, 7.2
28.	U01	Varki, Ajit	5U01CA128442-03	Neu5Gc and Anti-Neu5Gc Antibodies for Detection of Cancer and Cancer Risk	34	DCP	4.1
29.	U54	Ferrari, Mauro	1U54CA151668-01	Texas Center for Cancer Nanomedicine	50	CSSI	1.4, 4.1, 4.2, 4.4, 5.1, 5.3, 5.7, 7.1

Risk, Prevention, Screening, and Diagnosis
Recommendation 3: Develop early detection methods. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
30.	U54	Mirkin, Chad A.	1U54CA151880-01	Nanomaterials for Cancer Diagnostics and Therapeutics	60	CSSI	4.1, 4.2, 4.3, 4.4, 5.1, 5.3, 7.1, 7.2, 7.3
31.	*U54*	*Nie, Shuming*	*3U54CA119338-05S1*	*Emory-GA Tech Nanotechnology Center for Personalized and Predictive Oncology*	*50*	*CSSI*	*4.4, 5.7*
32.	U54	Searson, Peter C.	1U54CA151838-01	Center of Cancer Nanotechnology Excellence at Johns Hopkins	25	CSSI	4.1, 4.2, 4.3, 4.4, 5.1, 5.3, 7.1, 7.2, 7.3

Recommendation 4: Create new registries and expand existing registries.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	P50	Kern, Scott	5P50CA062924-16	SPORE in Gastrointestinal Cancer	50	DCTD	2.2, 4.3
2.	*R01*	*Holly, Elizabeth*	*3R01CA109767-05S1*	*Molecular Epidemiology of Pancreatic Cancer*	*100*	*DCCPS*	*2.1*
3.	R01	Holly, Elizabeth	5R01CA109767-05	Molecular Epidemiology of Pancreatic Cancer	100	DCCPS	2.1
4.	R01	Petersen, Gloria	5R01CA097075-07	Pancreatic Cancer Genetic Epidemiology Consortium (PACGENE)	100	DCCPS	2.2, 2.3
5.	R01	Sherman, Simon	1R01CA140940-01A1	Enhancing the Biomedical Computing Platform for Pancreatic Cancer Research	100	DCB	4.4, 4.3
6.	R21	Tranah, Gregory	1R21CA133080-01A1	Mitochondrial DNA Mutations in Pancreatic Cancer	100	DCCPS	2.3 , 2.4

Recommendation 5: Develop specimen banks.[9]

No.	Mech	PI	Project #	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	P50	Hollingsworth, Michael	5P50CA127297-02	SPORE in Gastrointestinal Cancer	100	DCTD	1.5, 5.3, 5.4, 5.7

Recommendation 6: Establish consortia to elucidate causal factors.

No grants or contracts

Recommendation 7: Develop education and training resources.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	U54	Ferrari, Mauro	1U54CA151668-01	Texas Center for Cancer Nanomedicine	50	CSSI	1.4, 4.1, 4.2, 4.4, 5.1, 5.3, 5.7, 7.1
2.	U54	Mirkin, Chad A.	1U54CA151880-01	Nanomaterials for Cancer Diagnostics and Therapeutics	60	CSSI	4.1, 4.2, 4.3, 4.4, 5.1, 5.3, 7.1, 7.2, 7.3
3.	U54	Searson, Peter C.	1U54CA151838-01	Center of Cancer Nanotechnology Excellence at Johns Hopkins	25	CSSI	4.1, 4.2, 4.3, 4.4, 5.1, 5.3, 7.1, 7.2, 7.3
4.	U54	Torchilin, Vladimir P.	1U54CA151881-01	Center for Translational Cancer Nanomedicine	60	CSSI	4.1, 4.2, 4.3, 4.4, 5.1, 5.3, 5.7, 7.1, 7.3

[9] Projects coded to Risk, Prevention, Screening, and Diagnosis recommendation #5 are also relevant to the *Clinical Trials Planning Meeting on Pancreas Cancer Treatment Consensus Report* Emphasis Area of Establishment of Biorepositories (J Clin Oncol. 2009 Nov 20;27(33):5660-9).

Recommendation 8: Develop a Web-based imaging library.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	R01	Sevick-Muraca, Eva	5R01CA135673-08	Fluorescence Enhanced Optical Tomography	33	DCTD	4.1
2.	R21	Willmann, Juergen	1R21CA139279-01A1	Early Detection of Pancreatic Cancer With Targeted Contrast-enhanced Ultrasound	100	DCTD	4.1

Recommendation 9: Establish technology centers for gene and protein expression.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	R01	Allbritton, Nancy	1R01CA139599-01	Multiplexed Measurement of Kinase Activity in Single Cancer Cells	50	DCB	4.1

Recommendation 10: Develop animal models.[10]

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	R01	Hidalgo, Manuel	5R01CA129963-03	Tailoring New Drugs in Pancreatic Cancer	100	DCTD	5.3, 5.4
2.	R01	Joyce, Johanna	5R01CA125162-03	Dissecting the Function of Cysteine Cathepsins in the Tumor Microenvironment	100	DCB	1.4, 2.2
3.	R01	Parsons, Ramon	5R01CA082783-09	PTEN Tumor Suppressor and Signal Transduction	50	DCB	1.3

[10] Projects coded to Risk, Prevention, Screening, and Diagnosis recommendation #10 are also relevant to the *Clinical Trials Planning Meeting on Pancreas Cancer Treatment Consensus Report* Emphasis Area of Utility of Preclinical Models (J Clin Oncol. 2009 Nov 20;27(33):5660-9).

Risk, Prevention, Screening, and Diagnosis
Recommendation 10: Develop animal models. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
4.	R01	Sarkar, Fazlul	1R01CA132794-01A1	FoxM1: A Molecular Target in Pancreatic Cancer	100	DCB	3.3
5.	*R01*	*Sarkar, Fazlul*	*3R01CA131151-02S1*	*RO1: A Novel and Targeted Approach to Inhibit Invasion and Angiogenesis*	*100*	*DCTD*	*3.3, 3.5*
6.	R01	Sarkar, Fazlul	5R01CA131151-02	RO1: A Novel and Targeted Approach to Inhibit Invasion and Angiogenesis	100	DCTD	3.3
7.	*R01*	*Srivastava, Rakesh*	*3R01CA125262-02S1*	*Chemoprevention of Pancreatic Cancer by EGCG*	*100*	*DCTD*	*3.2, 3.5*
8.	R01	Srivastava, Rakesh	5R01CA125262-02	Chemoprevention of Pancreatic Cancer by EGCG	100	DCTD	3.2, 3.5
9.	R01	Yamamoto, Masato	2R01CA094084-06A2	Enhanced CRAd for Pancreatic Cancer	100	DCTD	5.3
10.	R21	Sommer, Frank	1R21CA137472-01	MRI-guided Ultrasonic Ablation of Pancreatic Cancer	100	DCTD	5.2
11.	U01	Holland, Eric	2U01CA105492-06	Using Mouse Models to Probe the Relationship of Oncogenesis to Development and Oncogene Dependence	33	DCB	1.3, 7.2

Therapy

NCI Initiatives Related to Therapy

Initiative	Program Announcement/Request for Applications
Accelerating Clinical Trials of Novel Oncologic Pathways (ACTNOW)	ACTNOW
NCI Experimental Therapeutics (NExT) Program	NExT
Quick Trials for Novel Cancer Therapies	PAR-08-025 (R21) PAR-06-451 (R21)
Pilot Studies in Pancreatic Cancer	PA-08-208 (R21) PA-08-209 (R03)

Recommendation 1: Facilitate discovery and development of targeted therapeutics.[11]

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	P01	Dorr, Robert	5P01CA017094-30	Therapeutic Targeting of Hypoxic and Oxidative Stress	50	DCTD	5.3, 5.4
2.	P01	Giaccia, Amato	5P01CA067166-13	Tumor Hypoxia: Molecular Studies & Clinical Exploitation	50	DCTD	1.4, 5.3
3.	P01	Hasan, Tayyaba	2P01CA084203-06A1	Molecular Response and Imaging-based Combination Strategies for Optimal PDT	59	DCTD	4.1, 5.1, 5.2, 5.5
4.	P01	Leach, Steven	1P01CA134292-01A1	Functional Annotation of the Pancreatic Cancer Genome	100	DCB	1.2 ,1.3, 2.2, 2.4, 4.1, 7.1
5.	P20	Abbruzzese, James	P20 CA101936	SPORE in Pancreatic Cancer	100	DCTD	1.4, 5.3
6.	P50	Brenner, Dean	P50 CA130810	SPORE in Gastrointestinal Cancer	50	DCTD	1.4, 4.3, 5.3, 5.4
7.	P50	Buchsbaum, Donald	P50 CA101955	SPORE in Pancreatic Cancer	100	DCTD	1.4, 4.3, 4.4, 5.3, 5.4, 5.7

[11] Projects coded to Therapy recommendation #1 are also relevant to the *Clinical Trials Planning Meeting on Pancreas Cancer Treatment Consensus Report* Emphasis Area of New Targets for Drug Development (J Clin Oncol. 2009 Nov 20;27(33):5660-9).

Therapy
Recommendation 1: Facilitate discovery and development of targeted therapeutics. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
8.	P50	Hollingsworth, Michael	5P50CA127297-02	SPORE in Gastrointestinal Cancer	100	DCTD	1.5, 5.3, 5.4, 5.7
9.	P50	Kern, Scott	5P50CA062924-16	SPORE in Gastrointestinal Cancer	50	DCTD	2.2, 4.3
10.	R00	Medarova, Zdravka	4R00CA129070-03	Target-Specific Imaging and Delivery of siRNA to Tumors	33	DCTD	4.2, 5.3
11.	R01	Bardeesy, Nabeel	5R01CA133557-02	TGF-beta Signaling in Pancreatic Cancer	100	DCB	1.3, 1.4
12.	R01	Bortfeld, Thomas	5R01CA103904-06	Multi-Criteria IMRT Optimization	33	DCTD	5.1, 5.2
13.	R01	Brock, Kristy	5R01CA124714-02	Dynamic Multi-organ Anatomical Models for Hypofractionated RT Design and Delivery	25	DCTD	5.1
14.	R01	Brunicardi, Francis	5R01CA095731-07	PDX-1 Is a Therapeutic Target for Pancreatic Cancer	100	DCTD	4.2, 5.3
15.	*R01*	*Cheresh, David*	*3R01CA045726-23S1*	*Regulation of Metastasis by Alpha V Integrin and Src*	*100*	*DCB*	*1.4, 5.3*
16.	R01	Cheresh, David	5R01CA045726-23	Regulation of Metastasis by Alpha V Integrin and Src	100	DCB	1.4, 5.3
17.	R01	Cole, David	5R01CA123159-03	Targeting the CASM Oncogene as a Novel Therapy for Pancreatic Cancer	100	DCTD	5.3
18.	R01	Fernandez-Zapico, Martin	1R01CA136526-01	Hedgehog and EGF Interaction: A Novel Therapeutic Approach for Pancreatic Cancer	100	DCB	5.3
19.	*R01*	*Fisher, Paul*	*1R01CA127641-01A2*	*Pancreatic Cancer Management by Novel Gene Therapy & Dietary Agents*	*100*	*DCP*	*5.6, 7.1*
20.	R01	Gillies, Robert	7R01CA123547-03	Targeting Pancreatic Cancer	100	DCTD	5.3
21.	R01	Graves, Edward	5R01CA131199-02	Small Animal Image-Guided Radiotherapy	50	DCTD	5.1
22.	*R01*	*Greenberg, Philip*	*3R01CA033084-27S1*	*Mechanisms of Murine Tumor Eradication by Immunotherapy*	*100*	*DCB*	*5.3, 7.1*
23.	R01	Hanahan, Douglas	5R01CA099948-07	Mechanism and Therapeutic Targeting of Evasive Resistance to Antiangiogenic Drugs	50	DCB	5.3, 7.2

Therapy
Recommendation 1: Facilitate discovery and development of targeted therapeutics. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
24.	R01	Huang, Peng	5R01CA085563-08	Superoxide, ROS, and Novel Targets for Cancer Therapy	50	DCTD	5.3
25.	R01	June, Carl	5R01CA120409-04	Immunotherapy of Mesothelin Expressing Tumors With Lentiviral Engineered T Cells	25	DCTD	5.3
26.	R01	Kern, Scott	5R01CA123483-02	Fanconi Defects in Pancreatic Cancer Oncogenesis	100	DCB	1.2
27.	R01	Kolesnick, Richard	5R01CA042385-24	Targeting KSR to Treat Pancreatic Cancer	100	DCTD	5.1
28.	*R01*	*Lawrence, Theodore*	*3R01CA078554-10S1*	*Gemcitabine-Radiation for Advanced Pancreatic Cancer*	*100*	*DCTD*	*5.2, 5.4*
29.	*R01*	*Lawrence, Theodore*	*3R01CA078554-10S2*	*Gemcitabine-Radiation for Advanced Pancreatic Cancer*	*100*	*DCTD*	*5.2, 5.4*
30.	R01	Lawrence, Theodore	5R01CA078554-10	Gemcitabine-Radiation for Advanced Pancreatic Cancer	100	DCTD	5.2, 5.4
31.	R01	Malafa, Mokenge	5R01CA129227-02	Intervention of Pancreatic Oncogenic Pathways with Dietary Tocotrienol	100	DCP	3.3, 5.6
32.	*R01*	*McAlpine, Shelli*	*1R01CA137873-01*	*Conformational Based Design and Development of Antitumor Agents*	*50*	*DCTD*	*5.3*
33.	R01	McConkey, David	1R01CA127494-01A2	Proteasome Inhibition and ER Stress	100	DCB	5.3, 5.4
34.	R01	Mohammad, Ramzi	5R01CA109389-03	Specific Targets for Pancreatic Cancer Therapy	100	DCTD	5.3
35.	R01	Mukherjee, Priyabrata	1R01CA135011-01A1	Development of a Gold Nanoparticles Based Targeted Delivery System	100	DCTD	5.3
36.	R01	Nelkin, Barry	5R01CA134767-02	Targeting CDK5 in Pancreatic Cancer: Mechanistic and Preclinical Development	100	DCTD	5.3
37.	R01	Ojima, Iwao	2R01CA103314-18A1	Tumor-targeting Chemotherapeutic Agents	25	DCTD	5.3
38.	*R01*	*Quigley, James*	*3R01CA105412-06A1S1*	*Transmembrane Proteins Involved in Human Tumor Expansion*	*100*	*DCB*	*4.1*
39.	R01	Ross, David	5R01CA051210-19	Biochemical and Molecular Studies on DT Diaphorase	100	DCTD	5.3

Therapy
Recommendation 1: Facilitate discovery and development of targeted therapeutics. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
40.	R01	Safe, Stephen	5R01CA124998-03	NUR77 Agonists: New Targets for Pancreatic Cancer Chemotherapy	100	DCTD	5.3
41.	*R01*	*Scheidt, Karl*	*1R01CA126827-01A2*	*Synthesis of Anticancer Pyran Natural Products*	*25*	*DCTD*	*5.3*
42.	R01	Schuller, Hildegard	1R01CA130888-01A2	The GABA-B Receptor Is a Novel Drug Target for Pancreatic Cancer	100	DCTD	3.3, 5.3
43.	R01	Schuller, Hildegard	2R01CA042829-15A2	GABA-B-R-mediated Prevention of Pancreatic Cancer	100	DCP	2.1
44.	R01	Sevick-Muraca, Eva	5R01CA135673-08	Fluorescence Enhanced Optical Tomography	33	DCTD	4.1
45.	R01	Sherman, Linda	5R01CA057855-18	Generating CTL Against Tumor Associated Peptide Antigens	100	DCB	5.1
46.	R01	Simeone, Diane	5R01CA131045-02	ATDC Function in Human Pancreatic Adenocarcinoma	100	DCB	1.2, 5.3
47.	R01	Sporn, Michael	2R01CA078814-11A1	New Triterpenoids for Chemoprevention and Therapy of Cancer	34	DCP	3.3, 5.3
48.	*R01*	*Srivastava, Rakesh*	*3R01CA125262-02S1*	*Chemoprevention of Pancreatic Cancer by EGCG*	*100*	*DCTD*	*3.2, 3.5*
49.	R01	Srivastava, Rakesh	5R01CA125262-02	Chemoprevention of Pancreatic Cancer by EGCG	100	DCTD	3.2, 3.5
50.	R01	Srivastava, Sanjay	1R01CA129038-01A2	Chemoprevention of Pancreatic Cancer by Capsaicin	100	DCP	3.2
51.	R01	Turkson, James	5R01CA128865-02	Therapeutic Application of Novel Stat3 Inhibitors in Breast and Pancreatic Cancer	50	DCTD	5.3
52.	R01	Vile, Richard	5R01CA132734-02	Autoimmunity and Anti-tumor Immunity Outside of the Melanocyte/Melanoma Paradigm	50	DCB	5.3
53.	R01	Von Hoff, Daniel	5R01CA095031-08	Aurora Kinases as Therapeutic Targets in Pancreatic Cancer	100	DCTD	5.3
54.	R01	Wang, Liewei	1R01CA138461-01	Pharmacogenomics and Mechanisms of Cytidine Analogues	100	DCTD	5.3
55.	R01	Wold, William	5R01CA118022-04	Hamster Model for Oncolytic Adenovirus Vectors	60	DCTD	4.1, 7.1

Therapy
Recommendation 1: Facilitate discovery and development of targeted therapeutics. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
56.	R01	Woo, Savio	1R01CA130897-01A2	Anaerobic Bacteria as Oncopathic Agents for Pancreatic Cancer	100	DCB	5.3
57.	*R01*	*Xu, Liang*	*3R01CA121830-04S1*	*Tumor-Targeted Silencing of Bcl-2/Bcl-xL by the Self-assembled siRNA-Nanovectors*	*100*	*DCTD*	*1.3, 5.3*
58.	R01	Yamamoto, Masato	2R01CA094084-06A2	Enhanced CRAd for Pancreatic Cancer	100	DCTD	5.3
59.	R03	Awasthi, Vibhudutta	1R03CA143614-01	Pancreatic Cancer Therapy With GRP Receptor-Targeted Imageable Diphenyl Difluorok	100	DCTD	5.3
60.	R03	Claudio, Pier Paolo	1R03CA140024-01	Ultrasound-guided Gene Delivery in Pancreatic Cancer	100	DCTD	5.3
61.	R03	Grossman, Steven	1R03CA143763-01	Targeting the ARF/CtBP Axis in Pancreatic Cancer	100	DCB	5.3
62.	R03	Kuroda, Toshihiko	1R03CA139266-01	Prodrug Enzyme Therapy of Pancreatic Cancer Mediated by Oncolytic HSV Vector	100	DCTD	5.3
63.	R03	Lin, Jiayuh	1R03CA137479-01A1	A New Curcumin Analogue With Potent Suppressive Activity in Pancreatic Cancer	100	DCTD	5.3
64.	R03	Murray, Nicole	1R03CA143164-01	Role of Atypical PKCs in Pancreatic Tumor Growth and Metastasis	100	DCTD	5.3
65.	R03	Wang, Xinhui	1R03CA141086-01	B7-H3 in Prognosis and Immunotherapy of Pancreatic Cancer	100	DCTD	4.1, 5.3
66.	R21	Bouvet, Michael	1R21CA135435-01A1	Divalent Cation Activation of the Integrin-mediated Malignant Phenotype in Pancreatic Cancer	100	DCTD	5.3
67.	R21	Carson, William	1R21CA135464-01A1	Cetuximab Therapy of Pancreatic Cancer: Immune Modulation With IL-21	100	DCTD	5.3
68.	*R21*	*Counter, Christopher*	*1R21CA140190-01*	*Preclinical Evaluation of NOS Inhibitors for the Treatment of Pancreatic Cancer*	*100*	*DCTD*	*5.3*
69.	R21	Cullen, Joseph	1R21CA137230-01A1	Mechanisms of Ascorbate-induced Cytotoxicity in Pancreatic Cancer	100	DCTD	5.3
70.	R21	Faller, Douglas	1R21CA133654-01A2	Inducing Chromosomal Damage Responses in Pancreatic Cancer	100	DCTD	5.3
71.	R21	Javle, Milind	1R21CA135604-01A1	Phase I Study of the BikDD Nanoparticle for Advanced Cancer of the Pancreas	100	DCTD	5.4

Therapy
Recommendation 1: Facilitate discovery and development of targeted therapeutics. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
72.	R21	Johnson, Keith	1R21CA137401-01	Exploiting Novel Pathways to Treat Pancreatic Cancer	100	DCTD	5.3
73.	R21	Koch, Tad	1R21CA141101-01	Development of a CES 2-activated Doxazolidine Prodrug for Pancreatic Cancer	100	DCTD	5.3
74.	R21	Lin, Jiayuh	1R21CA133652-01A1	Target Stat3 in Pancreatic Cancer Using Novel Small Molecule inhibitors	100	DCTD	5.3
75.	R21	Liu, Bin	1R21CA137429-01A1	Selection of Internalizing Human Antibodies Targeting Pancreatic Tumor Cells In Situ by Laser Capture Microdissection	100	DCB	4.1, 5.3
76.	R21	Lowy, Andrew	1R21CA137692-01A1	Targeting RON Receptor Signaling in Pancreatic Cancer	100	DCTD	5.3
77.	*R21*	*Mehta, Kapil*	*1R21CA135218-01A1*	*Biological and Therapeutic Significance of TG2 in Pancreatic Cancer*	*100*	*DCTD*	*5.3*
78.	R21	Mousa, Shaker	5R21CA124931-02	Experimental Models for Testing Novel Targets for Pancreatic Cancer Cell Invasion	100	DCTD	1.4, 5.3
79.	R21	Rozengurt, Juan	1R21CA137292-01A1	Targeting Crosstalk Between Insulin and Gq Signaling Systems in Pancreatic Cancer	100	DCTD	5.3
80.	R21	Salgia, Ravi	1R21CA140003-01	Novel Targeted Therapy in Pancreatic Cancer	100	DCTD	1.3, 5.3
81.	R21	Spitz, Douglas	1R21CA139182-01	Enhancement of Cancer Therapy Using Ketogenic Diets	50	DCTD	5.3, 5.6
82.	*R21*	*Yao, Qizhi*	*1R21CA140828-01*	*Enhancement of Dendritic Cell Vaccine Efficiency Against Pancreatic Cancer by MSK*	*100*	*DCTD*	*5.3*
83.	*R21*	*Zundel, Wayne*	*1R21CA140919-01*	*Targeted CSN5 Inhibition in Pancreatic Cancer*	*100*	*DCTD*	*5.3*
84.	R37	Cheresh, David	2R37CA050286-21	VEGF and PDGF in Angiogenesis and Tumor Progression	25	DCB	1.4
85.	R44	Jones, Frank	2R44CA134063-02	Development of a Novel CEA Expressing Ad5 [E1-, E2b-] Vector for Treatment	30	SBIRDC	5.3
86.	R44	Shahan, Mark	2R44CA128141-02A1	Improving Efficacy of RNase Cancer Therapy by Pharmacokinetics	50	SBIRDC	5.3
87.	*RC2*	*Goggins, Michael*	*1RC2CA148346-01*	*Predicting Pancreatic Cancer Responses for a Parp Inhibitor-based Clinical Trial*	*100*	*DCTD*	*4.3, 5.4*

Therapy
Recommendation 1: Facilitate discovery and development of targeted therapeutics. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
88.	U01	Castrillon, Diego	1U01CA141576-01	LKB1 Tumor Suppressor and Human Cancer	25	DCB	1.3, 7.2
89.	U01	Cheng, Yung-Chi	5U01CA063477-14	Nucleoside Analogs as Anticancer Compounds	50	DCTD	5.3
90.	U01	Engleman, Edgar	1U01CA141468-01	Biology and Immunology of Pancreatic Cancer Stem Cells in a Novel Mouse Model	100	DCB	1.4, 7.1
91.	U01	Halas, Naomi J.	1U01CA151886-01	Preclinical Platform for Theranostic Nanoparticles in Pancreatic Cancer	100	CSSI	4.1, 4.2, 5.1, 5.3, 7.1
92.	U01	Lin, Wenbin	1U01CA151455-01	Nanoscale Metal-organic Frameworks for Imaging and Therapy of Pancreatic Cancer	100	CSSI	4.1, 4.2, 5.1, 5.3, 5.4, 7.1
93.	U01	Yang, Lily	1U01CA151810-01	Theranostic Nanoparticles for Targeted Treatment of Pancreatic Cancer	100	CSSI	4.1, 4.2, 5.1, 5.3, 7.1
94.	U54	Ferrari, Mauro	1U54CA151668-01	Texas Center for Cancer Nanomedicine	50	CSSI	1.4, 4.1, 4.2, 4.4, 5.1, 5.3, 5.7, 7.1
95.	*U54*	*Klonoff, Elizabeth*	*3U54CA132384-02S1*	*Comprehensive SDSU/UCSD Cancer Center Partnership 1 of 2*	*36*	*CRCHD*	*5.3, 6.1, 6.5*
96.	U54	Klonoff, Elizabeth	5U54CA132384-02	Comprehensive SDSU/UCSD Cancer Center Partnership 1 of 2	36	CRCHD	5.3, 6.1, 6.5
97.	U54	Mirkin, Chad A.	1U54CA151880-01	Nanomaterials for Cancer Diagnostics and Therapeutics	60	CSSI	4.1, 4.2, 4.3, 4.4, 5.1, 5.3, 7.1, 7.2, 7.3
98.	*U54*	*Navarro, Ana*	*3U54CA132379-02S1*	*Comprehensive SDSU-UCSD Cancer Center Partnership (2 of 2)*	*44*	*CRCHD*	*5.3*
99.	U54	Navarro, Ana	5U54CA132379-02	Comprehensive SDSU-UCSD Cancer Center Partnership (2 of 2)	44	CRCHD	5.3
100.	U54	Searson, Peter C.	1U54CA151838-01	Center of Cancer Nanotechnology Excellence at Johns Hopkins	25	CSSI	4.1, 4.2, 4.3, 4.4, 5.1, 5.3, 7.1, 7.2, 7.3
101.	U54	Torchilin, Vladimir P.	1U54CA151881-01	Center For Translational Cancer Nanomedicine	60	CSSI	4.1, 4.2, 4.3, 4.4, 5.1, 5.3, 5.7, 7.1, 7.3

Recommendation 2: Discover techniques to assess targeted therapeutics.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	P01	Dorr, Robert	5P01CA017094-30	Therapeutic Targeting of Hypoxic and Oxidative Stress	50	DCTD	5.3, 5.4
2.	P01	Hasan, Tayyaba	2P01CA084203-06A1	Molecular Response and Imaging-based Combination Strategies for Optimal PDT	59	DCTD	4.1, 5.1, 5.2, 5.5
3.	P30	Carson, Dennis	3P30CA023100-25S2	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
4.	P30	Carson, Dennis	3P30CA023100-25S3	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
5.	P30	Carson, Dennis	3P30CA023100-25S4	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
6.	P30	Carson, Dennis	3P30CA023100-25S5	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
7.	P30	Carson, Dennis	3P30CA023100-25S6	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
8.	P30	Carson, Dennis	3P30CA023100-25S7	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
9.	P30	Carson, Dennis	5P30CA023100-25	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
10.	R00	Medarova, Zdravka	4R00CA129070-03	Target-Specific Imaging and Delivery of siRNA to Tumors	33	DCTD	4.2, 5.3
11.	R01	Allbritton, Nancy	1R01CA139599-01	Multiplexed Measurement of Kinase Activity in Single Cancer Cells	50	DCB	4.1
12.	R01	Bouvet, Michael	1R01CA132971-01A1	Color-coded Imaging of Pancreatic Cancer Microenvironment for Drug Discovery	100	DCTD	7.1
13.	R01	Brunicardi, Francis	5R01CA095731-07	PDX-1 Is a Therapeutic Target for Pancreatic Cancer	100	DCTD	4.2, 5.3
14.	R01	D'souza, Warren	5R01CA124766-03	Feedback Control of Respiration Induced Tumor Motion With a Treatment Couch	33	DCTD	5.1

Therapy
Recommendation 2: Discover techniques to assess targeted therapeutics. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
15.	R01	Hidalgo, Manuel	5R01CA116554-04	Individualized Treatment of Pancreatic Cancer	100	DCTD	5.3
16.	R01	Hidalgo, Manuel	5R01CA129963-03	Tailoring New Drugs in Pancreatic Cancer	100	DCTD	5.3, 5.4
17.	R01	June, Carl	5R01CA120409-04	Immunotherapy of Mesothelin Expressing Tumors With Lentiviral Engineered T Cells	25	DCTD	5.3
18.	R01	Kelly, Kimberly	5R01CA137071-02	Development of Molecularly Targeted Imaging Agents for Early Detection of PDAC	100	DCTD	4.1, 7.1
19.	R01	Kolesnick, Richard	5R01CA042385-24	Targeting KSR to Treat Pancreatic Cancer	100	DCTD	5.1
20.	R01	McConkey, David	1R01CA127494-01A2	Proteasome Inhibition and ER Stress	100	DCB	5.3 , 5.4
21.	R01	Ojima, Iwao	2R01CA103314-18A1	Tumor-targeting Chemotherapeutic Agents	25	DCTD	5.3
22.	R01	Repasky, Elizabeth	5R01CA108888-04	Analysis of Patient Tumor Responses to Apo2L/TRAIL	50	DCTD	5.3
23.	*R01*	*Xu, Liang*	*3R01CA121830-04S1*	*Tumor-targeted Silencing of Bcl-2/Bcl-xL by the Self-assembled siRNA-Nanovectors*	*100*	*DCTD*	*1.3, 5.3*
24.	R01	Yamamoto, Masato	2R01CA094084-06A2	Enhanced CRAd for Pancreatic Cancer	100	DCTD	5.3
25.	R03	Awasthi, Vibhudutta	1R03CA143614-01	Pancreatic Cancer Therapy With GRP Receptor-Targeted Imageable Diphenyl Difluorok	100	DCTD	5.3
26.	R21	Sommer, Frank	1R21CA137472-01	MRI-guided Ultrasonic Ablation of Pancreatic Cancer	100	DCTD	5.2
27.	R44	Barnett, Allen	2R44CA121611-02	Commercial Development of Src Kinase Inhibitors for Oncology	25	SBIRDC	4.1, 5.3
28.	R44	Shahan, Mark	2R44CA128141-02A1	Improving Efficacy of RNase Cancer Therapy by Pharmacokinetics	50	SBIRDC	5.3
29.	*RC2*	*Goggins, Michael*	*1RC2CA148346-01*	*Predicting Pancreatic Cancer Responses for a Parp Inhibitor-based Clinical Trial*	*100*	*DCTD*	*4.3, 5.4*
30.	U01	Halas, Naomi J.	1U01CA151886-01	Preclinical Platform for Theranostic Nanoparticles in Pancreatic Cancer	100	CSSI	4.1, 4.2, 5.1, 5.3, 7.1

Therapy
Recommendation 2: Discover techniques to assess targeted therapeutics. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
31.	U01	Lin, Wenbin	1U01CA151455-01	Nanoscale Metal-organic Frameworks for Imaging and Therapy of Pancreatic Cancer	100	CSSI	4.1, 4.2, 5.1, 5.3, 5.4, 7.1
32.	U01	Yang, Lily	1U01CA151810-01	Theranostic Nanoparticles for Targeted Treatment of Pancreatic Cancer	100	CSSI	4.1, 4.2, 5.1, 5.3, 7.1
33.	U54	Ferrari, Mauro	1U54CA151668-01	Texas Center for Cancer Nanomedicine	50	CSSI	1.4, 4.1, 4.2, 4.4, 5.2, 5.3, 5.7, 7.1
34.	U54	Mirkin, Chad A.	1U54CA151880-01	Nanomaterials for Cancer Diagnostics and Therapeutics	60	CSSI	4.1, 4.2, 4.3, 4.4, 5.1, 5.3, 7.1, 7.2, 7.3
35.	U54	Searson, Peter C.	1U54CA151838-01	Center of Cancer Nanotechnology Excellence at Johns Hopkins	25	CSSI	4.1, 4.2, 4.3, 4.4, 5.1, 5.3, 7.1, 7.2, 7.3

Recommendation 3: Conduct research on the supportive care of patients.

No grants or contracts.

Recommendation 4: Develop mechanisms to facilitate access to targeted therapies.

No grants or contracts.

Recommendation 5: Develop infrastructure for molecular target assessment.[12]

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	R01	Schuller, Hildegard	1R01CA130888-01A2	The GABA-B Receptor Is a Novel Drug Target for Pancreatic Cancer	100	DCTD	3.3, 5.3
2.	R01	Schuller, Hildegard	2R01CA042829-15A2	GABA-B-R-mediated Prevention of Pancreatic Cancer	100	DCP	2.1

[12] Projects coded to Therapy recommendation #5 are also relevant to the *Clinical Trials Planning Meeting on Pancreas Cancer Treatment Consensus Report* Emphasis Area of Biomarkers (J Clin Oncol. 2009 Nov 20;27(33):5660-9).

Recommendation 6: Improve infrastructure for clinical trials and promote patient participation.[13]

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	P30	Carson, Dennis	3P30CA023100-25S2	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
2.	P30	Carson, Dennis	3P30CA023100-25S3	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
3.	P30	Carson, Dennis	3P30CA023100-25S4	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
4.	P30	Carson, Dennis	3P30CA023100-25S5	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
5.	P30	Carson, Dennis	3P30CA023100-25S6	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
6.	P30	Carson, Dennis	3P30CA023100-25S7	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
7.	P30	Carson, Dennis	5P30CA023100-25	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3

[13] Projects coded to Therapy recommendation #6 are also relevant to the *Clinical Trials Planning Meeting on Pancreas Cancer Treatment Consensus Report* Emphasis Area of Future Clinical Trials (J Clin Oncol. 2009 Nov 20;27(33):5660-9).

Health Services Research

NCI Initiatives Related to Health Services Research

Initiative	Program Announcement/Request for Applications
Centers of Excellence in Cancer Communication Research II	RFA-CA-08-004 (P50)

Recommendation 1: Identify effective forms of provider/patient communication.

No grants or contracts.

Recommendation 2: Study message effectiveness in patient decision making.

No grants or contracts.

Recommendation 3: Study requirements and costs of multidisciplinary clinical trials.

No grants or contracts.

Recommendation 4: Evaluate current practices in diagnosis and care.

No.	Mech	PI	Project #	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	R01	D'souza, Warren	5R01CA124766-03	Feedback Control of Respiration Induced Tumor Motion With a Treatment Couch	33	DCTD	5.1
2.	R01	Lamont, Elizabeth	5R01CA132900-02	Population-based Assessment of Cancer Trial Generalizability in the Elderly	25	DCCPS	6.1
3.	R01	Repasky, Elizabeth	5R01CA108888-04	Analysis of Patient Tumor Responses to Apo2L/TRAIL	50	DCTD	5.3

Health Services Research

Recommendation 5: Develop a survivorship registry.

No grants or contracts.

Recommendation 6: Create a Web-based repository for information about clinical trial costs.

No grants or contracts.

Recommendation 7: Develop new models for application in community and academic settings.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	R01	Lamont, Elizabeth	5R01CA132900-02	Population-based Assessment of Cancer Trial Generalizability in the Elderly	25	DCCPS	6.1

Recommendation 8: Create new education, training, and communication tools.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	P50	Fuchs, Charles	5P50CA127003-03	DF/HCC SPORE in Gastrointestinal Cancer	40	DCTD	4.4, 5.7
2.	P50	Kern, Scott	5P50CA062924-16	SPORE in Gastrointestinal Cancer	50	DCTD	2.2, 4.3
3.	U54	Mirkin, Chad A.	1U54CA151880-01	Nanomaterials for Cancer Diagnostics and Therapeutics	60	CSSI	4.1, 4.2, 4.3, 4.4, 5.1, 5.3, 7.1, 7.2, 7.3
4.	U54	Torchilin, Vladimir P.	1U54CA151881-01	Center for Translational Cancer Nanomedicine	60	CSSI	4.1, 4.2, 4.3, 4.4, 5.1, 5.3, 5.7, 7.1, 7.3

Scientific Toolkit

Initiatives Related to Scientific Toolkit

Initiative	Program Announcement/Request for Applications
Mouse Models of Human Cancers Consortium	RFA-CA-08-018 (U01)
Cancer Nanotechnology Platform Partnerships	RFA-CA-09-013 (U01) RFA-CA-05-026 (R01)

Recommendation 1: Establish a specimen resource.[14]

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	P30	Carson, Dennis	3P30CA023100-25S2	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
2.	P30	Carson, Dennis	3P30CA023100-25S3	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
3.	P30	Carson, Dennis	3P30CA023100-25S4	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
4.	P30	Carson, Dennis	3P30CA023100-25S5	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
5.	P30	Carson, Dennis	3P30CA023100-25S6	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
6.	P30	Carson, Dennis	3P30CA023100-25S7	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
7.	P30	Carson, Dennis	5P30CA023100-25	Specialized Cancer Center Support Grant	26	OCC	1.2, 2.4, 3.6, 4.4, 5.7, 6.9, 7.3
8.	P50	Hollingsworth, Michael	5P50CA127297-02	SPORE in Gastrointestinal Cancer	100	DCTD	1.5, 5.3, 5.4, 5.7
9.	*R01*	*Holly, Elizabeth*	*3R01CA109767-05S1*	*Molecular Epidemiology of Pancreatic Cancer*	*100*	*DCCPS*	*2.1*
10.	R01	Holly, Elizabeth	5R01CA109767-05	Molecular Epidemiology of Pancreatic Cancer	100	DCCPS	2.1

[14] Projects coded to Scientific Toolkit recommendation #1 are also relevant to the *Clinical Trials Planning Meeting on Pancreas Cancer Treatment Consensus Report* Emphasis Area of Establishment of Biorepositories (J Clin Oncol. 2009 Nov 20;27(33):5660-9).

Recommendation 2: Develop a database of biological profiles.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	*P01*	*DePinho, Ronald*	*3P01CA117969-04S1*	*Genetics and Biology of Pancreatic Duct Adenocarcinoma*	*100*	*DCB*	*1.3, 7.1*
2.	P01	DePinho, Ronald	5P01CA117969-04	Genetics and Biology of Pancreatic Duct Adenocarcinoma	100	DCB	1.3, 1.5, 2.2, 4.2, 4.4, 5.3
3.	P01	Leach, Steven	1P01CA134292-01A1	Functional Annotation of the Pancreatic Cancer Genome	100	DCB	1.2, 1.3, 2.2, 2.4, 4.1, 7.1
4.	R21	Lubman, David	5R21CA124441-02	A Lectin Glycoarray Approach for Markers of Pancreatic Cancer	100	DCB	4.1
5.	R21	Lubman, David	1R21CA134623-02	Proteomic Pathways for Pancreatic Cancer Stem Cells	100	DCB	1.4, 2.2

Recommendation 3: Develop new biological sampling techniques.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	R21	Makrigiorgos, G.	1R21CA138280-01	Technology for Sensitive and Reliable Mutational Profiling in Pancreatic Cancer	100	DCTD	4.1, 4.4
2.	U01	Porter, Marc D.	1U01CA151650-01	Magnetoresistive Sensor Platform for Parallel Cancer Marker Detection	100	CSSI	4.1, 4.2, 4.3, 7.1, 7.2

Recommendation 4: Capture knowledge of relevant molecular pathways.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	P50	Fuchs, Charles	5P50CA127003-03	DF/HCC SPORE in Gastrointestinal Cancer	40	DCTD	4.4, 5.7
2.	R01	Repasky, Elizabeth	5R01CA108888-04	Analysis of Patient Tumor Responses to Apo2L/TRAIL	50	DCTD	5.3
3.	R33	Schmittgen, Thomas	5R33CA114304-03	Real-time PCR Expression Profiling of microRNA	100	DCB	1.5
4.	U01	Porter, Marc D.	1U01CA151650-01	Magnetoresistive Sensor Platform for Parallel Cancer Marker Detection	100	CSSI	4.1, 4.2, 4.3, 7.1, 7.2

Recommendation 5: Develop gene-based model systems.[15]

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	P01	Leach, Steven	1P01CA134292-01A1	Functional Annotation of the Pancreatic Cancer Genome	100	DCB	1.2, 1.3, 2.2, 2.4, 4.1, 7.1
2.	P50	Petersen, Gloria	5P50CA102701-07	Mayo Clinic SPORE in Pancreatic Cancer	100	DCTD	1.4, 5.3
3.	*R01*	*Batra, Surinder*	*3R01CA078590-11S1*	*Molecular Studies on MUC4 Mucin Gene*	*100*	*DCB*	*1.4*
4.	R01	Batra, Surinder	3R01CA133774-02S1	Smoking and Pancreatic Cancer	100	CRCHD	2.3
5.	R01	Batra, Surinder	5R01CA078590-11	Molecular Studies on MUC4 Mucin Gene	100	DCB	1.4
6.	R01	Batra, Surinder	5R01CA133774-02	Smoking and Pancreatic Cancer	100	DCB	2.3

[15] Projects coded to Scientific Toolkit recommendation #5 are also relevant to the *Clinical Trials Planning Meeting on Pancreas Cancer Treatment Consensus Report* Emphasis Area of Utility of Preclinical Models (J Clin Oncol. 2009 Nov 20;27(33):5660-9).

Scientific Toolkit
Recommendation 5: Develop gene-based model systems. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
7.	R01	Brekken, Rolf	5R01CA118240-03	Matricellular Proteins as Regulators of Tumor Progression	100	DCB	1.4
8.	R01	Chiao, Paul	2R01CA097159-05A2	Mechanisms of RelA Activation in Cancer	100	DCB	1.4
9.	*R01*	*Evan, Gerard*	*3R01CA098018-07S1*	*Kinetic Analysis of Myc-induced Carcinogenesis In Vivo*	*100*	*DCB*	*1.3, 5.3*
10.	R01	Evan, Gerard	5R01CA098018-07	Kinetic Analysis of Myc-induced Carcinogenesis In Vivo	50	DCB	1.3
11.	R01	Hebrok, Matthias	2R01CA112537-06A1	Embryonic Signaling Pathways in Pancreatic Cancer	100	DCB	1.4
12.	R01	Hidalgo, Manuel	5R01CA129963-03	Tailoring New Drugs in Pancreatic Cancer	100	DCTD	5.3, 5.4
13.	R01	Xie, Keping	1R01CA148954-01A1	Genetic Approaches to Pancreatic Cancer Progression	100	DCB	1.3, 1.4, 7.1
14.	R01	Kern, Scott	5R01CA123483-02	Fanconi Defects in Pancreatic Cancer Oncogenesis	100	DCB	1.2
15.	R01	Klemke, Richard	5R01CA097022-07	Survival Mechanisms of Invasive Carcinoma Cells	100	DCB	1.4
16.	R01	Lanier, Lewis	2R01CA095137-06	NK Cell Biology	100	DCB	1.4, 2.2
17.	R01	Lewis, Brian	3R01CA113896-03S1	Molecular Dissection of Pancreatic Ductal Adenocarcinoma	100	CRCHD	1.3
18.	R01	Lewis, Brian	5R01CA113896-03	Molecular Dissection of Pancreatic Ductal Adenocarcinoma	100	DCB	1.3
19.	R01	Mohammad, Ramzi	5R01CA109389-03	Specific Targets for Pancreatic Cancer Therapy	100	DCTD	5.3
20.	R01	Nelkin, Barry	5R01CA134767-02	Targeting CDK5 in Pancreatic Cancer: Mechanistic and Preclinical Development	100	DCTD	5.3
21.	*R01*	*Quigley, James*	*3R01CA129484-02S1*	*A Cellular and Molecular Analysis of the Intravasation Step in Tumor Metastasis*	*25*	*DCB*	*1.4*
22.	R01	Quigley, James	5R01CA129484-02	A Cellular and Molecular Analysis of the Intravasation Step in Tumor Metastasis	25	DCB	1.4

Scientific Toolkit
Recommendation 5: Develop gene-based model systems. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
23.	R03	Bauer, Todd	1R03CA141245-01	A Primary Human Xenograft Model of Pancreatic Cancer	100	DCB	1.4, 7.1
24.	R21	Altomare, Deborah	1R21CA129302-01A2	AKT Function in Pancreatic Tumor Cell Invasiveness and In Vivo Pathogenesis	100	DCB	1.3
25.	*R21*	*Attardi, Laura*	*1R21CA141087-01*	*Using p53 Knock-In Mice to Understand p53's Role in Pancreatic Cancer*	*100*	*DCB*	*1.3*
26.	*R21*	*Buchberg, Arthur*	*1R21CA135166-01A1*	*Sensitized Screen to Identify Cooperating Genes Involved in Pancreatic Cancer*	*100*	*DCB*	*1.2, 1.3*
27.	R21	Korc, Murray	1R21CA135664-01A1	Role of microRNAs in Genetic Mouse Models of Pancreatic Cancer	100	DCB	1.2, 1.3
28.	R21	Lampe, Paul	1R21CA149554-01	Cx43 Phosphorylation Modulated Kras Mediated Pancreas Cancer Progression	100	DCB	1.4, 1.6
29.	R21	Quelle, Dawn	1R21CA127031-01A2	Novel Suppressors of Pancreatic Cancer	100	DCB	1.3
30.	R37	Korc, Murray	3R37CA075059-11S1	Dysregulation of TGF Beta Action Pancreatic Cancer	100	DCB	2.2 , 7.1
31.	R37	Korc, Murray	5R37CA075059-12	Dysregulation of TGF Beta Action Pancreatic Cancer	100	DCB	2.2, 7.1
32.	U01	Castrillon, Diego	1U01CA141576-01	LKB1 Tumor Suppressor and Human Cancer	25	DCB	1.3, 7.2
33.	U01	Engleman, Edgar	1U01CA141468-01	Biology and Immunology of Pancreatic Cancer Stem Cells in a Novel Mouse Model	100	DCB	1.4, 7.1
34.	U01	Holland, Eric	2U01CA105492-06	Using Mouse Models to Probe the Relationship of Oncogenesis to Development and Oncogene Dependence	33	DCB	1.3, 7.2

Recommendation 6: Improve imaging systems.

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
1.	P01	Hasan, Tayyaba	2P01CA084203-06A1	Molecular Response and Imaging-based Combination Strategies for Optimal PDT	59	DCTD	4.1, 5.1, 5.2, 5.5
2.	P50	Weissleder, Ralph	5P50CA086355-10	Center for Molecular Imaging Research at MGH/HMS	25	DCTD	4.1 , 5.3
3.	R01	Allbritton, Nancy	1R01CA139599-01	Multiplexed Measurement of Kinase Activity in Single Cancer Cells	50	DCB	4.1
4.	R01	Brock, Kristy	5R01CA124714-02	Dynamic Multi-organ Anatomical Models for Hypofractionated RT Design and Delivery	25	DCTD	5.1
5.	R01	D'souza, Warren	5R01CA124766-03	Feedback Control of Respiration Induced Tumor Motion With a Treatment Couch	33	DCTD	5.1
6.	R01	Kelly, Kimberly	5R01CA137071-02	Development of Molecularly Targeted Imaging Agents for Early Detection of PDAC	100	DCTD	4.1, 7.1
7.	R01	Sevick-Muraca, Eva	5R01CA135673-08	Fluorescence Enhanced Optical Tomography	33	DCTD	4.1
8.	R21	Emelianov, Stanislav	1R21CA141203-01	Nanocage System for Endoscopic Imaging and Staging of Pancreatic Cancer	100	DCTD	4.1
9.	R21	Lowy, Andrew	1R21CA137692-01A1	Targeting RON Receptor Signaling in Pancreatic Cancer	100	DCTD	5.3
10.	R21	Sommer, Frank	1R21CA137472-01	MRI-guided Ultrasonic Ablation of Pancreatic Cancer	100	DCTD	5.2
11.	R21	Willmann, Juergen	1R21CA139279-01A1	Early Detection of Pancreatic Cancer With Targeted Contrast-enhanced Ultrasound	100	DCTD	4.1
12.	R44	Iftimia, Nicusor	2R44CA117218-03	Image Guided Intervention System for Pancreatic Cystic Lesions	100	SBIRDC	4.3, 5.1
13.	*RC2*	*Nie, Shuming*	*1RC2CA148265-01*	*Nanotechnology for Multiplexed and Intraoperative Cancer Detection*	*33*		*4.1*
14.	U01	Halas, Naomi J.	1U01CA151886-01	Preclinical Platform for Theranostic Nanoparticles in Pancreatic Cancer	100	CSSI	4.1, 4.2, 5.1, 5.3, 7.1

Scientific Toolkit
Recommendation 6: Improve imaging systems. (cont)

No.	Mech	PI	Project Number	Title	% Rel	Divisions, Offices, and Centers	Common Scientific Outline
15.	U01	Lin, Wenbin	1U01CA151455-01	Nanoscale Metal-organic Frameworks for Imaging and Therapy of Pancreatic Cancer	100	CSSI	4.1, 4.2, 5.1, 5.3, 5.4, 7.1
16.	U01	Yang, Lily	1U01CA151810-01	Theranostic Nanoparticles for Targeted Treatment of Pancreatic Cancer	100	CSSI	4.1, 4.2, 5.1, 5.3, 7.1
17.	U54	Ferrari, Mauro	1U54CA151668-01	Texas Center for Cancer Nanomedicine	50	CSSI	1.4, 4.1, 4.2, 4.4, 5.1, 5.3, 5.7, 7.1
18.	U54	Mirkin, Chad A.	1U54CA151880-01	Nanomaterials for Cancer Diagnostics and Therapeutics	60	CSSI	4.1, 4.2, 4.3, 4.4, 5.1, 5.3, 7.1, 7.2, 7.3
19.	*U54*	*Nie, Shuming*	*3U54CA119338-05S1*	*Emory-GA Tech Nanotechnology Center for Personalized and Predictive Oncology*	*50*	*CSSI*	*4.4, 5.7*
20.	U54	Searson, Peter C.	1U54CA151838-01	Center of Cancer Nanotechnology Excellence at Johns Hopkins	25	CSSI	4.1, 4.2, 4.3, 4.4, 5.1, 5.3, 7.1, 7.2, 7.3

Common Scientific Outline Key

Biology	
1.1	Normal Functioning
1.2	Cancer Initiation: Alteration in Chromosomes
1.3	Cancer Initiation: Oncogenes and Tumor Suppressor Genes
1.4	Cancer Progression and Metastasis
1.5	Resources and Infrastructure
1.6	Cancer Related Biology
Etiology	
2.1	Exogenous Factors in the Origin and Cause of Cancer
2.2	Endogenous Factors in the Origin and Cause of Cancer
2.3	Interactions of Genes and/or Genetic Polymorphisms With Exogenous and/or Endogenous Factors
2.4	Resources and Infrastructure Related to Etiology
Prevention	
3.1	Interventions to Prevent Cancer: Personal Behaviors That Affect Cancer Risk
3.2	Nutritional Science in Cancer Prevention
3.3	Chemoprevention
3.4	Vaccines
3.5	Complementary and Alternative Prevention Approaches
3.6	Resources and Infrastructure Related to Prevention
Early Detection, Diagnosis, and Prognosis	
4.1	Technology Development and/or Marker Discovery
4.2	Technology and/or Marker Evaluation With Respect to Fundamental Parameters of Method
4.3	Technology and/or Marker Testing in a Clinical Setting
4.4	Resources and Infrastructure Related to Detection, Diagnosis, or Prognosis

Common Scientific Outline Key (cont)

Treatment	
5.1	Localized Therapies - Discovery and Development
5.2	Localized Therapies - Clinical Applications
5.3	Systemic Therapies - Discovery and Development
5.4	Systemic Therapies - Clinical Applications
5.5	Combinations of Localized and Systemic Therapies
5.6	Complementary and Alternative Treatment Approaches
5.7	Resources and Infrastructure Related to Treatment
Cancer Control, Survivorship, and Outcomes Research	
6.1	Patient Care and Survivorship Issues
6.2	Surveillance
6.3	Behavior
6.4	Cost Analyses and Health Care Delivery
6.5	Education and Communication
6.6	End-of-Life Care
6.7	Ethics and Confidentiality in Cancer Research
6.8	Complementary and Alternative Approaches for Supportive Care of Patients and Survivors
6.9	Resources and Infrastructure Related to Cancer Control, Survivorship, and Outcomes Research
Scientific Model Systems	
7.1	Development and Characterization of Model Systems
7.2	Application of Model Systems
7.3	Resources and Infrastructure Related to Scientific Model Systems