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Eliminating the Suffering and Death Due to Cancer

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Tumors May Promote Inflammation to Evade Detection

A new study suggests that inflammation triggered by a protein found in many human tumors may help the tumors grow and avoid attacks by the immune system.

The protein, interleukin (IL)-23, represents an important link between inflammation and cancer, the researchers say. And it may help explain why cancers tend to occur in tissues that have been damaged by chronic inflammation.

In the study, researchers from Schering-Plough Biopharma in California found that IL-23 has an increased presence in many types of human tumors. The protein may cause inflammation around tumors that, among other things, protects them.

"Tumors are apparently using inflammation to escape the normal surveillance done by immune cells," says study co-leader Dr. Martin Oft.

Discovered 5 years ago, IL-23 controls a number of genes involved in the body's response to infection and other challenges. In many cases, says Dr. Oft, the immune response basically starts with IL-23.

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Director's Update

Guest Update by Dr. Craig W. Reynolds

Dr. Craig W. Reynolds NCI Associate Director and Director of the Office of Scientific Operations, NCI-Frederick

NCI-Frederick: Helping to Transform Cancer Research

The 10th annual Spring Research Festival on the NCI campus in Frederick, Md. (NCI-Frederick), kicks off later this week. The festival has become a welcome tradition and a great way for those on campus to highlight a unique component of NCI and its mission.

Approximately one-third of the laboratories of principal investigators from the Center for Cancer Research (CCR) are located at NCI-Frederick. But that is just one small part of a much larger operation. Over the last 5 to 10 years, in fact, our campus has undergone a significant transformation.

NCI-Frederick has rapidly become one of the preeminent Federally Funded Research and Development Centers, or FFRDC, in the United States. FFRDC is a congressional designation that provides NCI-Frederick with unique abilities to form and facilitate partnerships with industry and other federal agencies to promote and advance biomedical research.

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The protein also plays a critical role in causing inflammation associated with autoimmune disorders such as Crohn's disease, multiple sclerosis, and rheumatoid arthritis, where the body essentially attacks itself.

"We know that IL-23 drives the inflammation that causes the tissue damage in autoimmune disorders," says Dr. Robert Kastelein, who co-led the study. "And it does the same thing in tumors."

By promoting inflammation, he says, tumors are able to induce new blood vessels, a process called angiogenesis that is critical to both cancer and fighting infections.

When the immune system mobilizes, one of the first changes in the local area is the formation of new blood vessels and the recruitment of inflammatory cells to help fight the infection. Under normal circumstances, this inflammation is then suppressed and educated immune cells arrive to "mop up" the infection.

But tumors, on the other hand, perpetuate the inflammation around them and never make it to the step when tumor-eliminating immune cells arrive on the scene.

The researchers found that mice born without IL-23 were protected against cancer. The mice were also protected when their IL-23 was blocked by antibodies, suggesting that a similar strategy might one day be possible against human cancers.

In the absence of inflammation caused by IL-23, the researchers conclude, immune cells can do their jobs and kill precancerous cells.

The findings, published online May 10 in *Nature*, come at a time when many researchers are investigating the relationship between cancer and chronic inflammation and the biological processes they seem to share.

"People have felt for 100 years that there's a link between inflammation and cancer, but I don't think anyone has known exactly what that link was," says Dr. Oft.

"We think this molecule is a key link that brings it all together," he says. ◆

By Edward R. Winstead

(Director's Update continued from page 1)

As such, one of our most valuable assets is the ability to step into situations and provide novel mechanisms for launching important programs or initiatives that, for a variety of reasons, could not be implemented using typical mechanisms, such as a grant or contract.

One excellent example was highlighted last year in the *NCI Cancer Bulletin*: the establishment of a new synchrotron at the Argonne National Laboratory in Chicago that uses x-ray crystallography to determine protein structures. NCI-Frederick played a central role in making this possible, coordinating an effort that involved two NCI divisions, two NIH institutes, two federal agencies, an activity at an extramural site, and a piece of state-of-the-art equipment purchased from a foreign company.

NCI-Frederick houses the world's largest high-performance computing center dedicated solely to biomedical research, the Advanced Biomedical Computing Center (ABCC). This system supports 1,800 researchers, including those from NCI, other NIH and federal government agencies, and hundreds of NCI-funded extramural investigators.

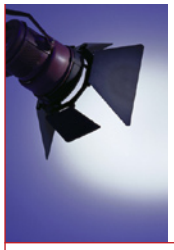
In addition, there are two biopharmaceutical production facilities on campus to support the drug development efforts of NCI intramural researchers, NCI-funded extramural investigators, small biotech companies, and the National Institute of Allergy and Infectious Diseases' vaccine research program.

As part of our Research Technology Program, we offer such advanced services as proteomics, molecular imaging, analytical chemistry, high-throughput gene sequencing and genomic analysis. These primarily are used by investigators from NIH and other federal agencies, but also can be made available to extramural investigators.

Other NCI programs at NCI-Frederick include the Developmental Therapeutics Program, which has contributed to the development of nearly 40 anticancer drugs, and the Natural Products Branch, which makes its expansive library of natural products available to industry and academic investigators to screen for anticancer activity. In both instances, these are materials that typically cannot be obtained elsewhere by investigators.

We have ambitious goals for the future. We hope to become a major resource for training cancer researchers on the use of new advanced technologies. We also hope to engage in more public-private partnerships aimed at finding novel uses for advanced technologies, and then adding those technologies to our research repertoire. And, finally, we hope to significantly increase our involvement in the area of systems biology, using the ABCC to develop complex mathematical models that will allow us to reverse engineer and visualize how cancer cells develop and proliferate.

I'm extremely proud to be part of the work being done at NCI-Frederick and the important role it plays in advancing cancer research. It is a truly rewarding position, and I believe our most important work is yet to come. ◆



Spotlight

The Curious Rise of Esophageal Adenocarcinoma

An incidence chart of major cancers in the United States over the past three decades shows lines that are mostly flat or moderately sloped. But if the incidence of a relatively uncommon cancer, esophageal adenocarcinoma (EA), is added to the graph, the contrast is stark. After all, rarely do incidence rates of any disease, let alone a type of cancer, increase by 300 to 400 percent in 30 years.

Already infamous for being one of the most lethal types of cancer, these stunning gains in incidence have garnered EA a reputation as a looming threat.

"There are a lot of issues at play as to why those numbers have gone up," says Dr. Nicholas Shaheen, director of the Center for Esophageal Diseases and Swallowing at the University of North Carolina at Chapel Hill. "But I am concerned because we haven't been able to figure out what's causing the increase."

Epidemiologic studies have identified several factors that significantly increase EA risk, says Dr. Wong-Ho Chow, of the NCI Division of Cancer Epidemiology and Genetics. A 1999 case-control study conducted in Sweden, for instance, found that long-standing and severe reflux symptoms increased EA risk by more than 40-fold. When coupled with overweight or obesity, the risk increase jumped to more than 100-fold. Several studies have shown that smoking is also an important risk factor.

While these are risk factors for what is still a fairly rare cancer—approximately 7,000 new cases a year, mostly late-stage disease—it's as if something has happened to unleash what was once nothing more than a medical anomaly.

"The only change in Western society that really mirrored this increase in incidence is the epidemic of obesity," says Dr. Shaheen. "And that makes it the most logical candidate for why things are going the way they are. But we really don't know that. It's still just a theory at this point."

According to Dr. Chow, for a significant portion of patients, EA is thought to begin with reflux, which causes acid from the stomach to spout up into the lower portion of the esophagus. The acid displaces cells that line the lower part of the esophagus—just above where it meets the stomach—with a different, potentially cancerous cell type in a condition known as Barrett's esophagus.

People with Barrett's esophagus have at least a 30- to 40-fold increased risk of developing EA compared with the general population; however, their overall risk is very low: 90 to 95 percent of patients will never develop the cancer.

"Why only a small percentage of Barrett's continues to become cancer, and what makes some people progress and others not, we just don't know yet," Dr. Chow says.

Unfortunately, most people who develop EA don't have symptoms until they already have late-stage disease, at which time the few available treatment options are not very successful. Even for patients who are amenable to treatment, 5-year survival ranges from just 5 to 30 percent.

A handful of investigators who have been involved in studies with Barrett's patients are searching for molecular indicators that might predict the likelihood of somebody with chronic reflux or Barrett's progressing to EA. At the University of Southern California/Norris Comprehensive Cancer Center, Dr. Peter W. Laird and colleagues are using a test called MethyLight to see if certain changes in the extent of DNA methylation—a way to activate or deactivate genes—can detect EA in its earliest stages or predict the likelihood of progression.

At Fred Hutchinson Cancer Research Center, Dr. Brian Reid, who heads the Center's Barrett's Esophagus Program, and colleagues are examining biopsy samples to determine whether mutations in two genes (p16 and p53), as well as abnormalities in the amount of DNA in a cell—that is, a condition called aneuploidy—are predictive of progression to EA.

Because EA is still so rare, much of this work is really about surveillance, Dr. Reid notes.

"If we can reassure those people who are at low risk, and get high-risk people into appropriate surveillance or treatment options, it would be a big help," he says.

The only current option for screening of people with chronic reflux or surveillance of Barrett's is endoscopy, which involves inserting a long, flexible tube—fitted with a light and

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Cancer Research Highlights

Tumor Stem Cells May Improve Research on Brain Tumors

Researchers at NCI and the National Institute of Neurological Disorders and Stroke have found that glioblastoma tumor stem cells are a better model for studying the biology and physiology of glioblastomas than the cancer cell lines typically used in research laboratories. Tumor stem cells accurately reflect the biological mechanisms and genetic characteristics of the parent tumor, the researchers report in the May 15 *Cancer Cell.*

"This study illustrates that traditional cancer cell lines are a flawed model and poorly represent human tumors," said lead researcher Dr. Howard Fine, chief of NCI's Neuro-Oncology Branch. "We have shown that these tumor stem cell lines may ultimately offer a model system that more accurately represents the biology of the tumors actually found in patients."

His team grew glioblastoma tumor stem cell lines in two different culture conditions: one containing serum and the other serum free. The resulting stem cell lines were then compared with traditional glioblastoma cell lines grown in serum and with normal neural stem cell lines grown in serum-free solutions.

The investigators found that the glioblastoma stem cells grown under the two different conditions had very different physiological and genetic characteristics. The tumor stem cells grown under serum-free conditions had the same characteristics as the parent glioblastoma cells. The glioblastoma tumor stem cells cultured with serum, however, lost all biological and genetic characteristics of the original tumor cells.

Computerized Ordering of Chemo Drugs Slashes Error Risk

Use of a computerized system to order chemotherapy for pediatric cancer patients dramatically reduces the risk of potentially dangerous medication errors, according to a new study from Johns Hopkins University researchers.

To conduct the study, published in the May issue of *Archives of Pediatric & Adolescent Medicine*, the researchers conducted daily audits of sequential pediatric chemotherapy orders before and after the deployment of a new computerized provider order entry (CPOE) system in the Children's Center at Hopkins' Sidney Kimmel Comprehensive Cancer Center.

Compared with handwritten orders, use of the CPOE system resulted in a 74-percent reduction in improper dosing, a 91-percent reduction in incorrect dosing calculations, and a 68-percent reduction in missing cumulative dose calculations.

Multiple checks on medication orders by oncologists, pharmacists, and nurses are already in place, says lead author Dr. George R. Kim, so the chances of the errors getting through to patients are small.

Nevertheless, says co-author Dr. Allen Chen, dosing errors are potentially more harmful in children because, among other things, they absorb and metabolize drugs differently. "It's something that we worry a lot about in pediatrics because the dose range that's valid for one patient or another is enormous," he says.

Implementation of the CPOE system, the researchers cautioned, also introduced a new error: Medications were ordered that were not included in patients' approved treatment plans. The finding, Dr. Chen notes, reinforces the "importance of measuring the results of change and the need for careful monitoring when introducing a new system."

The results from the Hopkins trial, says Dr. Crystal Mackall, acting chief of the NCI Pediatric Oncology Branch, demonstrate that migrating clinical care processes—such as ordering medications—to a computer-based system with built-in decision support "should be a matter of high priority for improving the delivery of cancer care."

Rise in Thyroid Cancer Attributed to Better Detection

Data from NCI's Surveillance, Epidemiology, and End Results (SEER) program suggest that thyroid cancer in the United States increased by a factor of 2.4 between 1973 and 2002, rising from 3.6 to 8.7 cases per 100,000. Writing in the May 10 *Journal of the American Medical Association,* Drs. Louise Davis and H. Gilbert Welch of the Veterans Affairs Outcomes Group in White River Junction, Vt., conclude that "increased diagnostic scrutiny has caused an apparent increase in incidence of cancer rather than a real increase."

The authors found that papillary cancer (which accounts for 88 percent of all thyroid cancer) increased

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2.9-fold, from 2.7 to 7.7 cases per 100,000, accounting for virtually all of the observed increase in overall incidence between 1973 and 2002. The increase was almost entirely attributable to small papillary cancers: Since 1988, 87 percent of the increase came from cancers 2 cm or smaller, and 49 percent from papillary thyroid microcarcinomas 1 cm or smaller. Improvements in technology made these smaller cancers increasingly likely to be detected; thyroid ultrasound can detect nodules as small as 0.2 cm, and fine-needle aspiration can immediately assess the cytology of the tissue. Since mortality remained constant throughout the 30-year period, the most likely conclusion is that these nodules were there all along, unobserved, underdiagnosed, and not progressing to death or even clinical disease.

In an accompanying editorial, Dr. Ernest L. Mazzaferri of the University of Florida agreed with the analysis, but warned that "some microcarcinomas are destined to become aggressive cancers," and cannot be ignored or relegated to watchful waiting on the basis of small size alone.

Researchers Identify Prostate Cancer Gene Variant

Researchers are reporting what they say is the first identification of a common genetic variant directly linked to the increased risk of prostate cancer. The variant, they reported early online May 7 in *Nature Genetics*, is more prevalent in African American men than in those of European ancestry, which, they note, may explain why African Americans are at higher risk of the disease.

Led by Dr. Kari Stefansson, of deCODE Genetics in Reykjavik, Iceland, the study included genetic analyses of participants in four case-control study groups from Iceland, Sweden, and the United States. They identified a genetic marker on chromosome 8, an allele of a microsatellite DG8S737, that increased risk in these different groups by more than 60 percent. The marker's presence yielded a "population attributable risk"—that is, the expected percentage of a given population whose cancer is attributed to the variant—of 8 percent in those of European ancestry and 16 percent in African Americans.

In the study, the researchers initially identified a suspect section on chromosome 8 in a study of Icelandic men with prostate cancer. They then performed genotyping on samples from participants in the four prostate cancer case-control studies to further determine if they could pinpoint a genetic variant linked to risk.

Compared with controls, the variant's frequency was significantly greater in prostate cancer patients with Gleason scores of 7 to 10. The variant's frequency also was greater in prostate cancer patients with higher Gleason scores than in those with lower Gleason scores, but only to a modest degree. ◆

(Spotlight continued from page 3)
video camera on one end—through the mouth and down into the throat to examine and take biopsies from the esophagus and stomach.

But using endoscopy as an everyday screening tool for EA isn't prudent or really feasible, Dr. Shaheen argues. An estimated 40 percent of people have chronic heartburn, "and most will never go on to have Barrett's or certainly will never have cancer, so you'd literally be searching for a needle in a haystack," he says. "We do that in other areas of medicine, but we generally don't do it with a test that costs more than $1,000."

Dr. William J. Blot, of the Vanderbilt-Ingram Cancer Center, is leading an effort that he hopes might help identify candidates for regular EA surveillance. Much like the Gail model, which assesses breast cancer risk, he and his colleagues are developing a model that takes into account all of a person's risk factors and stratifies them into a low- or high-risk category for developing EA over a subsequent 5-year period.

There is not nearly as much data on EA risk factors as there is for a far more common cancer such as breast cancer, Dr. Blot says, so the new model would be less precise than the Gail model. "But," he adds, "it's a start."

Getting Bigger Numbers

Much of the uncertainty surrounding EA can be directly attributed to the fact that it is rare.

To gather enough EA and Barrett's cases—and, more importantly, biological samples from those cases—to generate the statistical strength to provide a clearer picture of these diseases, NCI has formed a consortium of academic medical institutions and cancer centers that specialize in EA and Barrett's.

Called BEACON and currently chaired by Dr. Thomas Vaughan of the Fred Hutchinson Cancer Research Center, the consortium includes investigators who have conducted case-control studies of EA and Barrett's in the United States, Canada, Great Britain, Sweden, and Australia. ◆

By Carmen Phillips

Funding Opportunities

Studies of Energy Balance and Cancer in Humans

Announcement Number: PA-06-405
New Application Receipt Dates: June 1 and Oct. 1, 2006; Feb. 1, June 1, and Oct. 1, 2007; Feb. 1, June 1, and Oct. 1, 2008; Feb. 1, 2009.

This is a renewal of PA-04-124 and will use the R21 award mechanism. For more information, see http://cri.nci.nih.gov/4abst.cfm?initiativeparfa_id=3460. Inquiries: Dr. Virginia W. Hartmuller—hartmulv@mail.nih.gov; Dr. Noreen M. Aziz—na45f@nih.gov; Dr. Sharon Ross—rosssha@mail.nih.gov

Cancer Surveillance Using Health Claims-Based Data

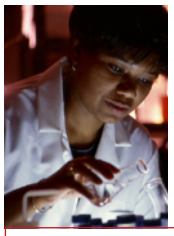
Announcement Number: PA-06-385
New Application Receipt Dates: June 1 and Oct. 1, 2006; Feb. 1, June 1, and Oct. 1, 2007; Feb. 1, June 1, and Oct. 1, 2008; Feb. 1, 2009.

This is a renewal of PA-04-012 and will use the R01 award mechanism. For more information, see http://cri.nci.nih.gov/4abst.cfm?initiativeparfa_id=3452. Inquiries: Dr. Joan Warren—warrenj@mail.nih.gov

Cancer Surveillance Using Health Claims-Based Data

Announcement Number: PA-06-386
New Application Receipt Dates: June 1 and Oct. 1, 2006; Feb. 1, June 1, and Oct. 1, 2007; Feb. 1, June 1, and Oct. 1, 2008; Feb. 1, 2009.

This is a renewal of PA-04-012 and will use the R21 award mechanism. For more information, see http://cri.nci.nih.gov/4abst.cfm?initiativeparfa_id=3453. Inquiries: Dr. Joan Warren—warrenj@mail.nih.gov ◆



Featured Clinical Trial

Adjuvant Treatment of Rectal Cancer

Name of the Trial
Phase III Randomized Study of Adjuvant Oxaliplatin, Leucovorin Calcium, and Fluorouracil With Versus Without Bevacizumab in Patients Who Have Undergone Surgery and Neoadjuvant Chemoradiotherapy for Stage II or III Rectal Cancer (ECOG-E5204). See the protocol summary at http://cancer.gov/clinicaltrials/ECOG-E5204.

Principal Investigators
Drs. Al Benson and Neal Jay Meropol, ECOG; Dr. Nicholas Petrelli, NSABP; Dr. Frank Sinicrope, NCCTG; Dr. C. Gail Leichman, SWOG; and Dr. Joel Tepper, CALGB

Dr. Al Benson

Why This Trial Is Important
Surgery is the primary treatment for rectal cancer that has not spread (metastasized) to other parts of the body. Even though surgery can cure many patients with localized rectal tumors, recurrence after surgery remains a worrisome possibility.

To help prevent recurrence and improve survival, doctors are exploring the use of other treatments given either before (neoadjuvant) or after (adjuvant) surgery. In this trial, patients who were treated previously with neoadjuvant chemoradiotherapy (chemotherapy combined with radiation therapy) will be randomly assigned to receive adjuvant chemotherapy with or without the addition of the monoclonal antibody bevacizumab, which inhibits tumor blood vessel formation. Researchers will compare the overall survival of patients in the two treatment groups.

This trial is designed to accommodate patients who received neoadjuvant chemoradiotherapy as part of another clinical trial conducted by the National Surgical Adjuvant Breast and Bowel Project (NSABP-R-04).

"These two trials are intended to help define the best way to administer neoadjuvant and adjuvant treatment for rectal cancer," said Dr. Benson. "We hope to extend the benefits we have seen recently in adjuvant treatment for colon cancer to patients with rectal cancer."

Who Can Join This Trial
Researchers will enroll 2,100 patients aged 18 and over with surgically removed rectal cancer who received preoperative radiation and chemotherapy. See the list of eligibility criteria at http://www.cancer.gov/clinicaltrials/ECOG-E5204. This trial is eligible for special Medicare coverage.

Study Sites and Contact Information
Study sites in the United States are recruiting patients for this trial. See the list of study contacts at http://www.cancer.gov/clinicaltrials/ECOG-E5204, or call NCI's Cancer Information Service at 1-800-4-CANCER (1-800-422-6237) for more information. The toll-free call is confidential. ◆

An archive of "Featured Clinical Trial" columns is available at http://cancer.gov/clinicaltrials/ft-all-featured-trials.

Notes

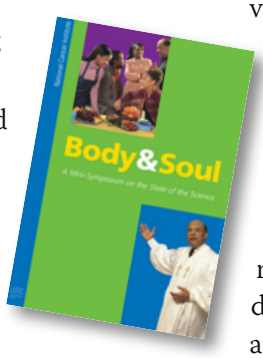
Meltzer to Head CCR Genetics Branch

Dr. Paul Meltzer has been named chief, Genetics Branch, and head, Clinical Molecular Profiling Core at NCI's CCR. He joins CCR from the Cancer Genetics Branch of the National Human Genome Research Institute.

Dr. Meltzer is internationally recognized for his groundbreaking work on genes and mechanisms in cancer cell development. He and his colleagues advanced studies of gene expression profiles in cancer cells to better understand the progression and prognosis of cancers. By focusing on gene expression, gene amplification, and chromosomal abnormalities in various types of cancer cells, he is leading efforts to classify cancers, advance understanding of molecular events that mark cancer origin and progression, and identify novel therapeutic targets.

Dr. Meltzer earned his Ph.D. from the California Institute of Technology and M.D. from the University of Tennessee. He received postdoctoral training in genetics at the University of Cambridge and the University of Arizona, the latter at which he also completed his clinical training in pediatric hematology-oncology.

Body & Soul Mini-Symposium: Moving Research to Practice



On May 1, NCI held a mini-symposium to discuss research evidence to guide future efforts of its *Body & Soul* program, in partnership with the Centers for Disease Control and Prevention, African American church organizations, and representatives from the NIH Office of the Director.

Body & Soul is a faith-based, healthy living program developed by NCI-funded investigators for African American churches. The program provides congregations with strategies on how to include more fruits and vegetables as part of a healthy diet. It also teaches program leaders how to incorporate these messages into church gatherings, activities, and workshops.

At the symposium, key researchers presented the latest findings in cancer prevention and chronic disease behavior interventions—such as diet, physical activity, screening, and obesity—in faith-based channels, and discussed with practitioners the issues related to broadly disseminating the most effective findings in order to address and have an impact on important health issues.

To learn more about *Body & Soul*, or to order a free copy of the *Body & Soul Program Guide*, visit http://www.bodyandsoul.nih.gov.

This Week Is National Women's Health Week

National Women's Health Week began on May 14 and ends on May 20. Information on treatment, prevention, genetics, screening, clinical trials, literature, research, and statistics for cancers that occur mainly in women can be found at http://www.cancer.gov/cancertopics/types/womenscancers. Highlights of NCI-supported research to understand, prevent, diagnose, and treat cancers in women are available at http://women.cancer.gov. Information on other federal, state, regional, and local planned events celebrating National Women's Health Week can be found at http://www.4woman.gov/whw/index.cfm.

NCI's Diet History Questionnaire Is Now Web Based

The Diet History Questionnaire (DHQ), developed by NCI staff, is a food frequency questionnaire (FFQ) for researchers that consists of 124 food items, and includes both portion size and dietary supplement questions. The DHQ was designed to be easy to use and has been shown to be as good as, or superior to, other FFQs for most nutrients.

As an extension of the DHQ, NCI recently unveiled DHQ*Web, which is a Web-based questionnaire nearly identical in content to its hard-copy predecessor. DHQ*Web is a free research resource that takes advantage of the key aspects of automated and electronic questionnaires—respondents follow automated skip patterns, must complete all questions before proceeding, can navigate within the instrument to modify responses, and can log in at any time. DHQ*Web provides more efficient data quality because respondents cannot complete the questionnaire with missing or inconsistent responses.

For more information and a demonstration, go to http://riskfactor.cancer.gov/DHQ. ◆

Featured Meetings and Events

A calendar of scientific meetings and events sponsored by the National Institutes of Health is available at http://calendar.nih.gov ◆

Community Update

TREC Cancer Initiative Launches New Collaborative Relationships

The cancer research community faces a new challenge for the new century: the rising incidence of obesity worldwide and the suspected role that obesity plays in the development of many types of cancer. In response, NCI launched the Transdisciplinary Research on Energetics and Cancer (TREC) initiative to fund collaborative research—on how weight, diet, exercise, the environment, and other factors affect physiologic systems and intracellular pathways—to see whether and how they influence the development of cancer.

An essential component of the TREC initiative is the creation of a separately funded coordination center, located at the Fred Hutchinson Cancer Research Center, which promotes data sharing, evaluation, and collaboration among TREC investigators at four funded research centers, as well as with non-TREC investigators. Through this information hub, TREC is expanding opportunities for biospecimen banking, standardizing research methods across sites, and exploring ways to share data collection efforts at different centers.

In a traditional research framework, researchers at separate centers work independently and share their findings after all data has been gathered and analyzed. The TREC model ensures that data are pooled and progress is shared regularly so that research dollars are maximized and questions that will help guide public health efforts are answered in the shortest time possible.

"By creating the coordination center, we've not only capitalized on what worked well from earlier initiatives, but we're also looking at ways to improve our ability to develop transdisciplinary, trans-site partnerships," explains Dr. Linda Nebeling, chief of NCI's Health Promotion Research Branch of the Division of Cancer Control and Population Sciences. "We're bridging new transdisciplinary partnerships from areas of science that have not commonly worked together."

At a recent meeting on how best to integrate their research and maximize collaboration, TREC investigators found that respective programmatic goals could be leveraged to investigate a possible association between sleep disorders (sleep phenotype and gene-environment interactions)—which have been linked to obesity—and cancer. The TREC coordination center immediately helped organize a working group in this area, and research collaboration began. As research continues, the center will assist by providing collaborative study support for the development of common data elements and standardized measures, knowledge dissemination, network coordination, and evaluation.

The coordination center also assesses the overall effectiveness of the TREC research model. The center leads a unique evaluation research project, which includes a questionnaire to gather substantive evaluative data, in contrast to traditional self-reported measures. The data will be analyzed to measure the success of the individual centers, as well as the entire initiative.

"This evaluative effort looks at the productivity and impact of the TREC centers more extensively than has ever been done before for a large-scale transdisciplinary initiative," notes Dr. Nebeling. The evaluation results will have broader implications for NCI research models as a whole because the data will validate whether this type of transdisciplinary research mechanism is one that moves science forward.

"NCI is committed to developing better measures of team science processes and performance, and we hope to eventually use this information to inform decisions about the management of large initiatives such as TREC," says Dr. Nebeling. ◆

The *NCI Cancer Bulletin* is produced by the National Cancer Institute (NCI). NCI, which was established in 1937, leads the national effort to eliminate the suffering and death due to cancer. Through basic, clinical, and population-based biomedical research and training, NCI conducts and supports research that will lead to a future in which we can identify the environmental and genetic causes of cancer, prevent cancer before it starts, identify cancers that do develop at the earliest stage, eliminate cancers through innovative treatment interventions, and biologically control those cancers that we cannot eliminate so they become manageable, chronic diseases.

For more information on cancer, call 1-800-4-CANCER or visit http://www.cancer.gov. Contact the *NCI Cancer Bulletin* staff at ncicancerbulletin@mail.nih.gov.