

KENTUCKY LUNG CANCER RESEARCH PROGRAM *Newsletter*

Volume 3 Issue 1

Fall 2003

Kentucky Clinical Trials Network

by Jonathan D. Adams, Pharm. D., Director of Clinical Trials Network operations

The Kentucky Lung Cancer Research Program publishes this newsletter twice a year.

The first four issues focused on the epidemiology of lung cancer in the Commonwealth. Starting with this issue, the newsletter has been expanded from four to eight pages to include articles on early detection and prevention of lung cancer, and on clinical trials research.

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The Kentucky Lung Cancer Research Program has established a physician network to make clinical trials available to lung cancer patients. Called the KLCR Clinical Trials Network, this alliance of physicians and health professionals will work with researchers at University of Kentucky, University of Louisville, and pharmaceutical companies to evaluate the effectiveness of innovative drugs, devices, and procedures in controlling and treating lung cancer.

The network's first trial

The network's first clinical trial, or studies that involve human subjects, will evaluate the effect of the drug Celebrex on the rate of lung cancer recurrence in patients who have had surgical removal of non-small cell lung cancers, a group of several types of lung cancer tumor cells so named because of the way they look. Informally referred to as the COX-2 trial,¹

this open study has already enrolled its first patient.

Patients eligible for the COX-2 trial must meet certain criteria. They must have had a diagnosis of non-small cell lung cancer. They must have had the disease completely removed by surgery within the past six months and have no other therapy planned. Patients must have had no adverse reactions to the drug Celebrex, including liver or kidney problems. If female, they must not be pregnant or breast feeding. Patients must not have had other cancers in the last five years.

In this and future issues of the newsletter we will introduce and build upon the language and methodology of clinical trials. In this issue we begin with the COX-2 trial's *schema* — a diagrammatic representation of the study's experimental design (Fig. 1).

continued on page 2

¹ The study's full title is *Therapeutic affects of COX-2 inhibitors in NSCLC: A randomized, double-blind placebo controlled trial of the COX-2 inhibitor Celebrex for preventing recurrence of completely resected Stage II and IIIA NSCLC.*

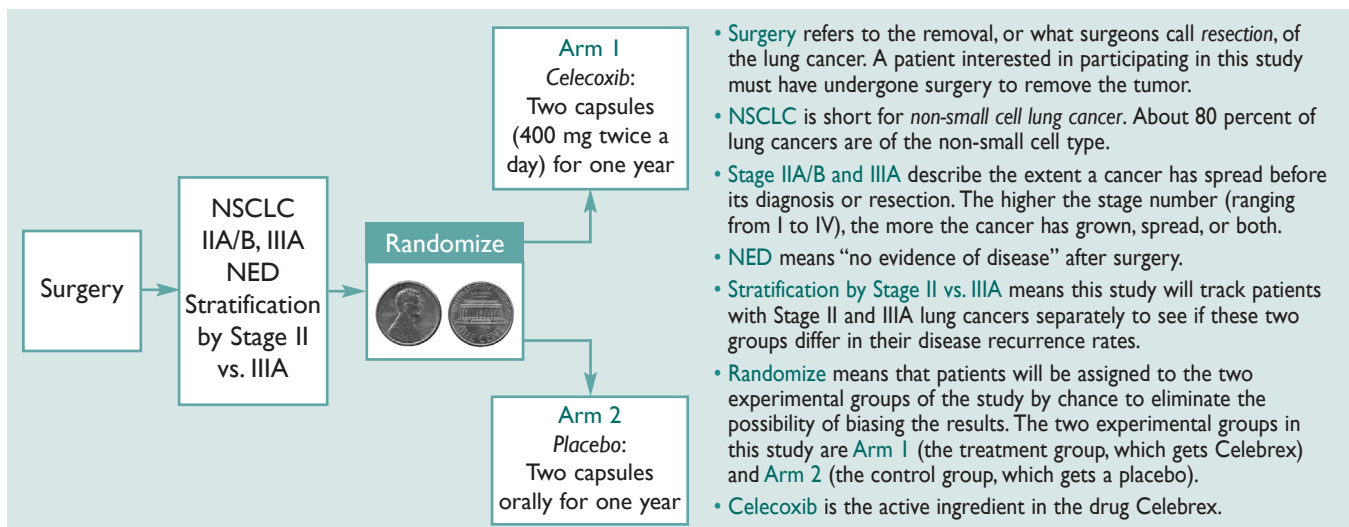


Figure 1. The COX-2 trial schema.

continued from page 1

COX-2 trial researchers will note the difference in the number of patients who remain free of lung cancer for five years and the survival rates in the treatment and control groups to determine the effectiveness of Celebrex therapy.

Researchers will also examine the amount of COX-2 receptors on cancer cells and the level of two associated protein substances, PGE-2 and IL10, in the blood to see if they are related to rates of cancer remission and survival.

The COX-2 trial is just one of several clinical trials that researchers will be conducting. Future studies on lung cancer the KLCR Clinical Trials Network will conduct may involve innovative surgical procedures or devices. Others may involve new or modified treatment strategies that include chemotherapy, radiation, and surgery. Yet others may focus on the psychological burden lung cancer places on patients and their families.

A growing network

Meetings in Frankfort and Bowling Green with physicians and health professionals revealed emphatic support for a decentralized alliance of community physicians and health professionals to provide programmatic direction for the KLCR Clinical Trials Network and to offer the trials through their practices. But physicians and health professionals also stressed the importance of a centralized operations office to direct the regulatory and administrative tasks of conducting a multi-center clinical trial.

A decentralized model for clinical trials in the community with a centralized cancer center-based management team

The 24 “Commission on Cancer” hospitals in the Commonwealth will provide the backbone for the Clinical Trials Network. These hospitals have demonstrated a keen interest in the diagnosis, treatment, and prevention of cancer. Network staff is contacting administrators at these hospitals to finalize their participation in the network and to increase awareness among health care professionals and the public about these trials.

A copy of the COX-2 trial’s experimental design has been mailed to network sites, along with instructions on participating in the study. A necessary first step for prospective investigators is to have the study reviewed and approved by a qualified Institutional Review Board. The network’s coordinating office has arranged to have a

commercial IRB available to physicians who are not represented by their own IRB.

Coordinating office

The coordinating office was created at the University of Kentucky Markey Cancer Center to manage the administrative details of network clinical trials, such as the enlistment of participating sites, patient registration, study placement, study document collection, drug ordering, reporting of adverse events or reactions, and collection of study data.

The coordinating office also serves as a conduit for a variety of public information and professional education programs. Network Coordinator Gerry Piper and Network Associate Karen Bowman manage this office.

If you are interested in the COX-2 trial or would like to receive a site application questionnaire, call Gerry Piper at (859) 323-1109 or e-mail her at Gerry.Piper@uky.edu.

You can also download the site application questionnaire from the Kentucky Lung Cancer Research Program’s Web site at kentuckylungcancer.org/mainpages/clinical.htm. Once on that page, click on “Clinical Trials Site Application” to download a PDF file of the questionnaire.

Contact information

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Eligibility criteria

Patients interested in the COX-2 trial must meet the following criteria:

- ✓ Patients must have had a diagnosis of non-small cell lung cancer.
- ✓ Patients must have had their non-small cell lung cancer completely removed by surgery within the past six months and have no other therapy planned.
- ✓ Patients must have no adverse reactions to the drug Celebrex, including liver or kidney problems.
- ✓ If female, patients must not be pregnant or breast feeding.
- ✓ Patients must not have had other cancers in the last five years.

Early detection of lung cancer: KY research initiative

The National Lung Screening Trial

by Mary Jennings, Public Relations Office, Jewish Hospital

High-tech spiral CT scans or conventional chest X-rays: Is one imaging technique better than the other in detecting lung cancer? This is the question researchers in the National Lung Screening Trial hope to answer.

Most people are familiar with conventional X-rays and the kinds of images they produce. Spiral CT is a procedure that also uses X-rays, but with this technology a patient lies on a table while an X-ray machine rotates quickly around the patient's body, taking hundreds of pictures from different angles. The various images are then assembled by a computer into a 3-dimensional model of the organ.

In 15 to 30 percent of lung cancers detected by diagnostic imaging tests, the tumor has already spread outside the lung, making treatment less effective and survival less likely. The logic goes that the sooner a patient's tumor is detected – when the cancer is smaller and has not spread to other regions in the lung or other parts of the body – the greater the chances of successful treatment and, ultimately, survival.

Spiral CT is a promising diagnostic technology because it can detect tumors much smaller than those picked up by conventional chest X-rays. Nevertheless, despite the theoretical advantage of spiral CT, scientific evidence so far has not shown conclusively whether this high-tech scanning device is any better than conventional chest X-rays in reducing a person's chance of dying from lung cancer.

To help determine if spiral CT is a useful technology to detect lung cancer, the Kentucky Lung Cancer Research Program is supporting the National Lung Screening Trial, a comprehensive trial intended to last eight years and accrue approximately 50,000 patients across the nation. Specifically, the study will examine whether screening with low-dose spiral CT scan versus chest X-rays reduces lung cancer-specific mortality in participants who are at high risk for developing lung cancer. The National Lung Screening Trial meets the highest scientific standards for clinical trials research – studies that involve people – because it is a large, randomized, and controlled study.

The urgency for such research is clear in the Commonwealth. Kentucky has the highest lung cancer

Screening

“Screening centers around the country will be involved in the National Lung Screening Trial. In addition to the CT scans and chest X-rays that all the centers will do, some — those that are part of a cooperative group sponsored by the American College of Radiology Imaging Network — will also collect samples of participants' blood, urine, or sputum (phlegm) for biomarker studies.”

(Source: www.nci.nih.gov/nlst/screeningcenters)

death rate in the nation. In 1999 Kentucky had 121.4 lung cancer deaths per 100,000 people, whereas the national rate was 90.2 per 100,000 people. The Kentucky Cancer Registry, which tracks cancer incidence and mortality in the Commonwealth, reports on its Web site that 3,303 Kentuckians died from lung and bronchus cancers in 2000. And, according to the American Cancer Society, an estimated 171,900 Americans and 3,500 Kentuckians will receive a diagnosis of lung cancer this year.

The Jewish Hospital Heart and Lung Institute in Louisville is one organization participating in the National Lung Screening Trial. Jewish Hospital has enrolled nearly 900 participants and hopes to increase that number to 2,000 before the study is closed to further participants. At present, the trial requires participants to visit Jewish Hospital for all procedures. If the CT scan or X-rays detect an abnormal result, trial staff will discuss the findings with the patient and will forward all information to the participant's primary physician for diagnostic follow-up.

To participate in the National Lung Screening Trial, participants must meet all these criteria:

- Be a healthy man or woman age 55 to 74.
- Be a current smoker, or a former smoker who has smoked heavily or for many years.
- Be free of lung cancer.
- Be free of any other cancers, except some skin cancers or *in situ* cancers, within the last five years.

To find out more about this trial, visit the Jewish Hospital Web site at www.jewishhospital.org or call the hospital toll free at 1-866-FOR-LUNG (1-866-367-5864).

CT in more detail

Computed tomography, also called CT or CAT scanning, is a diagnostic procedure that uses special X-ray equipment to make cross-sectional pictures of areas inside the body. A spiral (or helical) CT scan is a new kind of CT. During a spiral CT, the X-ray machine rotates continuously around the body, tracing a spiral path to make cross-sectional pictures of the body. This technique is under study as a screening method for lung cancer. Some benefits of this new imaging technology are that it can make 3-dimensional pictures of areas inside the body, it can detect small abnormal areas better than conventional CT, and it is faster, so the person is exposed to less radiation than with conventional CT.

(Source: cis.nci.nih.gov/fact/5_2.htm)

The different types of lung cancer

by Claudia Hopenhayn, M.P.H., Ph.D.

In previous issues of the newsletter, we discussed how cancers can be classified by their stage, or the extent to which they have spread beyond the tissue, organ, or organ system in which they originated. The stage of cancer at diagnosis relates to the severity of the disease and the probability of survival. In general, the greater and more extensive the spread of the cancer, the lower the chances for successful treatment and, ultimately, survival. For lung cancer, most patients receive a diagnosis when the cancer has spread beyond the local, more curable stage, to either the regional stage (to lymph nodes) or the distant stage (to other tissues or organs).

In a previous issue² of the newsletter we also noted that lung cancer can be considered a heterogeneous disease consisting of several sub-types, depending on the kind of cells found in the tumor. In this issue we describe these types in more detail. The type of cancer cell, along with its stage and other factors, helps determine the best course of treatment for a particular lung cancer patient. The type of cancer cell also contributes to determining the aggressiveness of the tumor, thus helping clinicians evaluate the prognosis of the disease. Normally, a pathologist determines the cell type by analyzing under a microscope a sample of the tumor, usually obtained by biopsy or surgery. The *histological classification* is determined by the tumor cell type.

Lung cancers can be classified into four main histological groups: small cell lung cancers or SCLC, adenocarcinomas, squamous cell carcinomas, and large cell carcinomas. The latter three types are sometimes collectively referred to as *non-small cell lung cancer* or NSCLC because of the way the cells appear.

Figure 1 shows the relative distribution of the four major lung cancer types for the nation (as estimated by SEER³ data) and for Kentucky, for

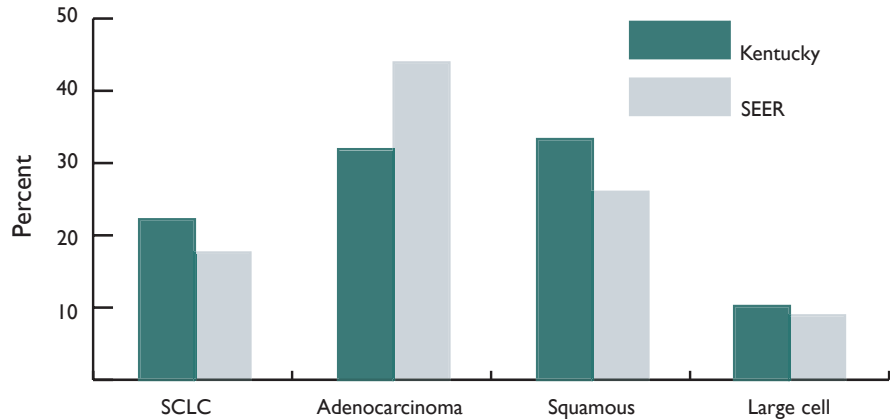


Fig. 1. Relative distribution of lung cancer histological subgroups, for Kentucky and SEER, 1994–2000. (A proportion of cancer cases cannot be classified because the histological type is not specified. Since the percentages of these lung cancer types are similar for Kentucky and for SEER data (22.1% and 22.5% respectively), we excluded them from the calculations. A small percentage (<4%) of rare cancer types, classified as “other,” are not shown here.)

the seven-year period 1994–2000.

Kentucky has a greater percentage of SCLC and squamous cell lung cancers than does SEER, with the opposite being so for adenocarcinomas. Large-cell tumors are less common for both Kentucky and SEER data. SCLC, which comprise approximately 20 percent of lung cancers, often have spread or metastasized by the time they are detected. Because these SCLC are at a more advanced stage and less likely to be operable, they often result in a lower and shorter survival time for patients than other lung cancer types. Table 1 shows the relative distribution of stage at diagnosis across the four histological groups for Kentucky.

The proportions of adenocarcinomas and squamous cell cancers detected in the earlier, localized stage are similar, while the less common large cell type is

lower, though not as low as SCLC.

It is also interesting to examine the distribution of lung cancer according to the age of the patient at time of diagnosis. Table 2 shows the number of cases by 10-year age groups (all cases 39 years of age and under are grouped since lung cancer is much less common under the age of 40).

Even though SCLC comprises only about 20 percent of all lung cancer cell types, the number of SCLC cases is considerable because lung cancer is a common disease. About 670 people in Kentucky will develop this deadly type of lung cancer every year, almost the same figure as the total number of Kentuckians who will get ovarian and pancreatic cancers combined.

How does the age distribution of different lung cancer types in Kentucky compare with those of the nation?

Table 1. Relative distribution of stage at diagnosis by lung cancer types in Kentucky, 1994–2000.

	SCLC	Adenocarcinoma	Squamous	Large cell
Localized	10.2%	26.2%	29.1%	17.6%
Regional	26.9%	25.8%	33.2%	28.1%
Distant	54.7%	40.4%	28.4%	46.1%
Unknown/unstageable	8.2%	7.5%	9.3%	8.2%

Table 2. Total number of lung cancer cases in Kentucky by histological group for the seven-year period 1994–2000.

Age group	SCLC	Adenocarcinoma	Squamous	Large cell	Other
≤39	45	84	40	28	34
40–44	90	154	76	41	21
45–54	573	803	620	221	61
55–64	1341	1783	1767	580	117
65–74	1729	2438	2756	797	265
75–84	827	1287	1621	423	107
85+	90	194	166	58	17
TOTAL	4695	6743	7046	2148	622

The four major lung cancer types are shown in Figure 2. For space and clarity, we grouped cases into two age categories: those less than 55 years of age, and those 55 and over.

Figure 2 illustrates three interesting points:

1) The proportions of SCLC and squamous cell lung cancers are higher in Kentucky than for SEER for both age groups, while the reverse is true for adenocarcinomas.

2) This difference is more pronounced in the younger age group.

3) SCLC is more common in the younger group in Kentucky, with the reverse true for SEER.

The histological diversity of tumors and their distribution across different demographic groups lead epidemiologists to wonder whether specific risk factors may be more strongly or specifically associated with

particular histological groups. Since smoking is by far the single greatest risk factor for lung cancer, investigators have studied in detail the histological distribution associated with smoking. Smoking is the strongest risk factor for all types of lung cancer, but the increase in risk is highest for SCLC, followed by squamous cell carcinoma, and is lowest for adenocarcinomas. In other words, smokers are more likely to get SCLC, while about 60 percent of non-smokers who develop lung cancer will get adenocarcinomas.

Since Kentucky has a greater percentage of smokers than the nation does, it is not surprising that among the lung cancer cases in the Commonwealth 22 percent are SCLC and 32 percent are adenocarcinomas, whereas for SEER these figures are, respectively, 18 percent and 44 percent. Since SCLC is more often detected in

the distant stage, when treatment is not very effective and prognosis is poor, the high prevalence of smoking among Kentuckians not only means higher lung cancer rates, but also a higher frequency of the more advanced and deadlier type of lung cancer.

It is also instructive to see the relationship between smoking cessation and lung cancer type. Quitting smoking decreases the risk of lung cancer relative to continuing to smoke, especially as the number of years since quitting increases. But a pattern emerges among former smokers who develop lung cancer: Former smokers who have quit within the last 10 years have a higher proportion of SCLC, while those that have quit more than 20 years ago show a similar pattern to non-smokers, with a greater proportion of adenocarcinomas. Overall, the proportion of SCLC cases decreases as the number of years since quitting increases. This suggests that even among former smokers who develop lung cancer because of their previous smoking habit, the chance of developing the more aggressive and deadly type, SCLC, drops as the time since quitting increases.

Summary

We have expanded on the epidemiology of lung cancer by describing the subtypes of this disease and how they differ relative to disease severity and age. The comparison of Kentucky with the nation shows that SCLC is more common in the Commonwealth. Finally, and most important, we continue to observe the effect of smoking, most notably the strong association smoking has with SCLC, the deadliest type of lung cancer. This is probably one reason why SCLC is more common in Kentucky than in the nation.

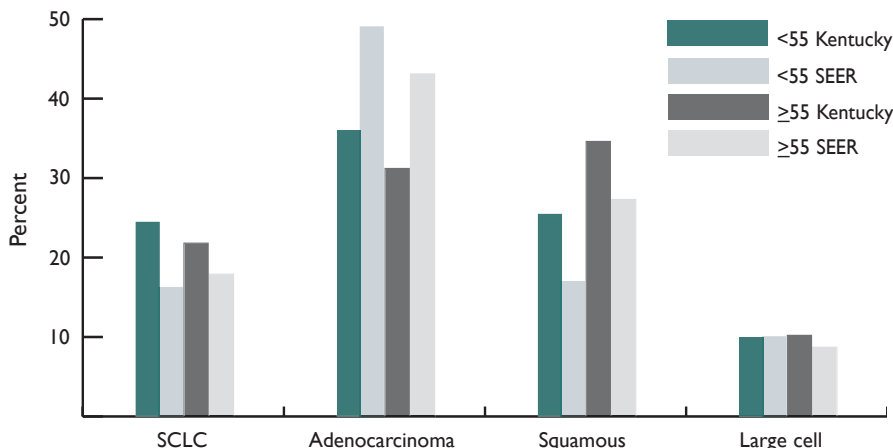


Figure 2. Relative distribution of lung cancer histological groups by age, Kentucky and SEER (1994–2000).

² See ukprc.uky.edu/policynewsletter2-1.pdf

³ The SEER — Surveillance, Epidemiology, and End Results — Program compiles data on cancer from the U.S. population, and is commonly used to approximate the cancer rates and patterns of the nation as a whole.

Solitary pulmonary nodules

A University of Kentucky–based clinical trial

The non-invasive evaluation of solitary pulmonary nodules using PET, contrast-enhanced CT, and depreotide scans

by Eric Bensadoun, M.D., Principal Investigator

Lung cancer often appears on a chest X-ray as a solitary pulmonary nodule or SPN. Although some of these nodules are cancers, many are not, so the challenge for physicians is to surgically remove the malignant (or cancerous) nodules while avoiding unnecessary surgery for benign (or non-cancerous) nodules.

Developing a safe and cost-effective diagnostic test to evaluate SPNs has become particularly important in light of recent interest in lung cancer screening (see “Early detection of lung cancer: KY research initiative” on page 3 of this issue).

The results of two recent lung cancer screening trials showed that in high-risk populations, pulmonary nodules were observed in 20 to 50 percent of baseline low-dose spiral CT exams. The vast majority of these nodules turn out to be benign, but all nodules require a thorough evaluation to rule out the possibility of lung cancer.

Diagnostic imaging tests — such as the contrast-enhanced CT scan, positron emission tomography or PET scan, and the Tc-99m depreotide scan — have the potential to evaluate SPNs. However, several questions about these tests remain unanswered. Specifically, how do these tests perform in a population with a high prevalence of granulomatous infection — a type of infection that results in a mass of inflamed but non-cancerous tissue in the lungs? And how do these tests compare

with each other?

This early detection study is an observational study in which a population of 100 patients with SPNs will receive contrast-enhanced CT, PET, and depreotide scans.

The aim is to determine the sensitivity, specificity and predictive value of these various scans in diagnosing malignancy in SPNs in a population with high prevalence of granulomatous

infection — such as from histoplasmosis, an infectious disease (also known as Darling’s or Appalachian Mountain disease) that’s caused by inhaling fungal spores found in soil. In addition, the study should determine if one diagnostic test is better than the others. The results of the study may also help researchers develop a cost-effective, non-invasive diagnostic test to evaluate solitary pulmonary nodules.

More on solitary pulmonary nodules

A solitary pulmonary nodule is a small, round or egg-shaped lesion or abnormal tissue in the lungs. SPNs typically do not cause symptoms, and they are usually noticed by chance on a chest X-ray that has been done for another reason. SPNs are usually less than 3–4 cm in diameter and are always surrounded by normal, functioning lung tissue.

SPNs are fairly common abnormalities on chest X-ray images: nearly one of every 500 chest X-rays shows a newly diagnosed SPN. In the United States, physicians are challenged each year by more than 150,000 new cases of SPNs.

Fortunately, 60 percent of all SPNs are benign. In certain geographical areas where there are infectious agents, especially fungi, that cause SPNs, the percentage of benign SPNs increases remarkably (in some areas as high as 90% to 95%). Malignant SPNs may be primary Stage I lung cancer tumors or metastases from other parts of the body.

Determining the malignancy of an SPN is an integral and challenging part of diagnosis. One of the goals of diagnosis is to avoid unnecessary invasive procedures, such as surgically removing part of the lung because of a benign SPN. Benign SPNs can be treated in simpler, noninvasive ways.

(Source: www.pulmonologychannel.com/spnl/)

More on scanning technology

With positron emission tomography or PET scans, a radioactively linked substance that the body’s cells normally use is injected into a patient. Then areas in the body where that substance is present in high amounts (like in a tumor) can be detected. PET scans can detect a tumor if it is using more resources like glucose (a sugar used by the body for fuel), blood, or oxygen, than normal tissue. Among other applications, PET scans are beginning to be used to check if a treatment is working — if a tumor’s blood supply is being choked off or if the tumor is using less glucose.

(Source: www.cancer.gov/clinicaltrials/understanding/science-explained-imaging/page8)

Tc-99m depreotide is an “imaging agent” that allows doctors and researchers to get a clearer image of the lungs to detect SPNs and to rule out lung cancer. (Source: preventdisease.com/news/articles/finding_lung_cancer_now_easier.shtml)

FROM THE GOVERNANCE BOARD

Established by legislation in October 2000, the Kentucky Lung Cancer Research Program has made significant strides toward the goals set for it by the Kentucky General Assembly. The Kentucky Clinical Trials Network is moving forward with its initial protocol. The first patient entered this trial in June 2003, one week after the trial was opened. Before June 30, 2004 the hope is that ten additional sites will have begun to recruit patients.

The initiative on statewide screening for lung cancer is taking form as a group of studies into different aspects of early detection. The largest study supported by the Kentucky Lung Cancer Research Program is the National Lung Screening Trial. As for the pursuit of National

Cancer Institute-designation as cancer centers, both the Brown Cancer Center at the University of Louisville and the Markey Cancer Center at the University of Kentucky are proceeding with the analysis of current research status and identification of specific areas on which to focus energy and funds during the current fiscal year.

To date the Kentucky Lung Cancer Research Program has funded 56 research grants in the first four funding cycles. The fifth cycle was announced this July and submissions are due on September 15, 2003. Grant awards for cycles 1 and 2 have been listed in previous issues of the newsletter. Cycle 3 grants, and the recently funded cycle 4 grants, are listed below.

Cycle 3

Researcher	Project title
Arnold, Susanne	Low-dose fractionated radiation plus Docetaxel and Cisplatin as induction therapy for stage II and IIIA non-small cell lung cancer
Gaugler, Joseph	The comprehensive support protocol: Providing psychosocial assistance to lung cancer patients and their families
Glauert, Howard	Antioxidants, NF-kappa beta and cigarette smoke
Kakar, Sham	Molecular mechanisms of PTTG in lung cancer
Kim, Kyung Bo	Molecular mechanism of an apoptosis-inducing estrogen metabolite 2-mehtoxyestradiol
Orren, David	Responses of replication, recombination, and checkpoint signaling pathways to unrepaired polycyclic aromatic hydrocarbon adducts in DNA
Passik, Steven	Testing a strategy for early intervention and prevention of depression in lung cancer patients: Impact on multiple symptoms and quality of life
Ratajczak, Mariusz	The role of microparticles in lung cancer progression, angiogenesis and metastasis
Stout, Robert	Functional polarization of tumor-infiltrating macrophages
Tai, Hsin-Hsiung (Daniel)	Prostaglandin dehydrogenase and lung cancer
Wittliff, James	Gene expression profiling of human lung cancer cells isolated by laser capture microdissection

Cycle 4

Aldrich, Timothy	Lung cancer in Kentucky — Environmental/occupational factor
Bodduluri, Haribabu	Role of chemoattractant-mediated inflammation in development and progression of lung cancer
Chesney, Jason	Glycolysis and lung cancer
Cohen, Donald	Deviation of anti-tumor immunity via IL-10 production by non-small cell carcinomas
Gairola, C. Gary	Genetic-polymorphism and lung cancer: Animal models of tobacco carcinogenesis
Lee, Lu-Yuan	Cellular mechanisms underlying pulmonary stresses in small cell lung cancer
Mitchell, Robert	Promotion of non-small cell lung cancer signaling and development by MIF
Studts, Jamie	Behavioral, cognitive, and affective responses to lung cancer screening
Yannelli, John	Characterization of two newly described lymphocyte defined antigens
Zhou, Sam	Cell structural and cycle alterations related to cancer killing virus

Kentucky Lung Cancer Research Program

In 2003 more than 3,200 people will die from lung cancer in the Commonwealth. Most cases are diagnosed too late – at an advanced stage of cancer development – when the tumor has spread and is difficult or impossible to treat successfully. The prognosis for patients with such advance-stage disease is bleak, since only 2 percent of these patients live another five years or more.

Fortunately, lung cancer is a largely preventable disease since smoking is responsible for more than 85 percent of cases. The difficulty Kentucky faces is that for many years the state has ranked No. 1 in the nation in smoking prevalence and, consequently, in lung cancer mortality.

To raise awareness and improve survival of Kentuckians with lung cancer, the Kentucky General Assembly established the [Kentucky Lung Cancer Research Program](#). This 20-year initiative combines the research efforts of the University of Kentucky and the University of Louisville to become nationally recognized leaders in lung cancer epidemiology, diagnosis and treatment.

Priority for funding will be given to basic, translational and clinical studies in the following areas:

- Early detection and epidemiology of lung cancer
- Biology of lung cancer
- Genetics and familial relationships of lung cancer
- The effectiveness and understanding of lung cancer treatments

Funding will focus on the following:

- New researchers who demonstrate promise and who have a supportive environment for their work.
- Established and productive researchers who propose to apply their prior work to basic lung cancer research, or to higher-level animal models.
- Researchers who will test their novel ideas and develop pilot data for seeking larger awards from the National Institutes of Health and other funding sources.
- Collaborative research between investigators from the University of Kentucky and the University of Louisville.

KENTUCKY LUNG CANCER RESEARCH PROGRAM *Newsletter* is a joint publication of the University of Kentucky and the University of Louisville.

Edited and designed by Joe Petrik, University of Kentucky Prevention Research Center, Markey Cancer Center Cancer Control Program, University of Kentucky. Visit the UK PRC Web site at ukprc.uky.edu/.

Previous issues of the newsletter are available online at ukprc.uky.edu/publications.htm.

Visit the Web site of the Kentucky Lung Cancer Research Program at kentuckylungcancer.org.

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