CANCER RESEARCH CENTER

MIRROR

Located in Columbia, Missouri, a private, non-profit research organization since 1962

Winter 2001 Volume 30 Number 1

Order of the Eastern Star Leads the Way!

CRC board president, Randall Johnston presenting Billie Kraemer, Past Grand Matron of the Order of the Eastern Star with an appreciation plaque.

The Order of the Eastern Star was honored in a reception on December 18, 2000 in the William Whitlow Conference Room at the Cancer Research Center (CRC). This event was in appreciation for the dedication to fighting cancer this organization has demonstrated throughout the years.

At the reception, Billie Kraemer, Past Grand Matron (1998-1999) of the Order of the Eastern Star, Grand Chapter of Missouri, presented CRC board president, Randall Johnston, with a check from their annual fundraising efforts. Serving as Worthy Grand Patron during this period was Larry Albright.

The 2000 allocation to CRC was for $12,912.24. This donation brings the Order of the Eastern Star's all-time contributions to CRC up to $569,559.57, which sets the pace for CRC giving from an organization.

Kraemer commented, "It was my pleasure to name the Cancer Research Center as one of my charities. It is my sincere wish that someday this dreaded disease will be conquered and it would be very satisfying to know that we helped, if only in a small way."

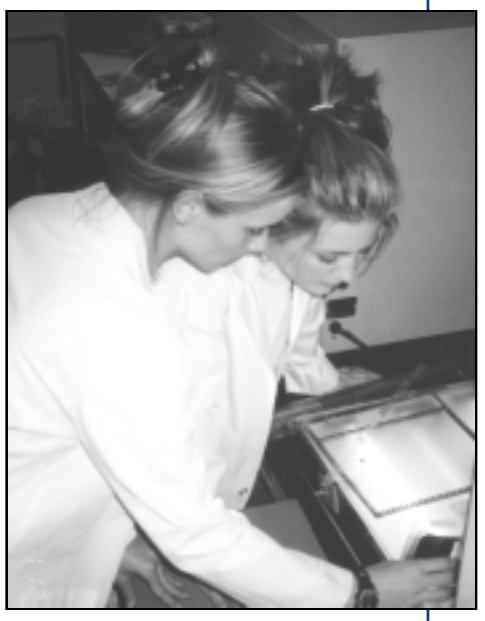
According to Kraemer, Paul Lineberry, current CRC board member and Past Grand Patron of the Order of the Eastern Star, was very helpful in providing information regarding CRC and its recent advances.

CRC's extensive cancer research is funded in large part by the businesses, citizens, and organizations of Missouri communities, who like the Order of the Eastern Star, desire a solution to this lethal disease. CRC is very appreciative of the Order of the Eastern Star, and thanks them for their many years of continued support.

Your Donations at Work as CRC Scholarships

Pictured from left to right, Breca Starr Tracy and Caryn Michelle Alderson

With your financial contributions, the Cancer Research Center (CRC) is able to provide scholarships to many outstanding students to work along side our experienced scientists. During the past summer, CRC added two talented student employees to its cancer fighting team.



In June, Breca Starr Tracy, a junior at Stephens College became CRC's fifth recipient of the prestigious Director's Scholarship. Tracy is currently working on a B.S. degree in Biology and Health Sciences. She plans to earn dual M.D. and Ph.D. degrees so that she may become a research scientist.

Tracy has a 3.5 Grade Point Average; is the President of Stephens' Junior Class; Vice-President of the Beta Beta Beta Biological Honors Society; and captain of the college's tennis team. She recently received Stephens College's prestigious Roeschlaub-Trustee Award, and was nominated for the college's Alumnae Association Scholarship, Staff Advisory Council Scholarship, and Outstanding Underclass Biology Major Award.

The Director's Scholar Fund was established by Dr. Abraham Eisenstark. Dr. Eisenstark currently is CRC's Director for Research. Prior to this, he served as CRC's Director for ten years. Dr. Eisenstark is also a Byler Distinguished Professor (Emeritus) and former Director of Biological Sciences at the University of Missouri-Columbia.

As Director's Scholar, Tracy is systematically surveying as many as 95 possible gene defects in cells. She is sorting out which mutations occur with high probability, and which of the 95 are very stable with rare or no mutations.

In July, CRC awarded the First National Bank & Trust Company Staff Charitable Fund Student Fellowship Award to Caryn Michelle Alderson. Alderson, a graduate of Columbia's Hickman High School, currently is a junior majoring in Biology at the University of Mis-

Continued on page 2

Scholarships, continued from page 1

souri-Columbia and has a 3.6 Grade Point Average.

Since 1999, CRC has been the recipient of a generous annual contribution by the First National Bank & Trust Company Staff Charitable Fund. This is the third year CRC has been designated to receive funding from the bank located in Columbia, Missouri. CRC has established the First National Bank & Trust Company Staff Charitable Fund Student Fellowship Award, in which CRC uses restricted research funds to match this contribution and applies the total amount to this student fellowship. This award will be renewed on an annual basis as funding is available.

At CRC, Alderson is exploring the nature of chromosomal mutation by studying the effects of long-term starvation of cells. She is also studying the susceptibility of cells to infection by bacteriophage as a means of molecular subtyping.

Dr. Kelly Edwards, CRC Senior Scientist, supervises Tracy's and Alderson's cancer research at CRC. According to Dr. Edwards, "These types of scholarships are not only invaluable to CRC and the cancer research we are performing, but they also greatly assist our students with their career goals." She continues, "Both of these women have aspirations to go to medical school and to eventually become doctors. Their internships at CRC will clearly enhance their chances to get accepted into medical school and will make them better doctors in the long run."

Tracy states, "I am thankful for the opportunities that CRC is providing me. I have been introduced to various scientific techniques and research that will help prepare me for my future." Alderson adds, "My grandmother died from cancer, so I am very proud to play a role in CRC's battle against this awful disease."

Tracy, Alderson, and other CRC staff members are available to share their knowledge of cancer research, prevention, detection, and treatment with area groups. There is no charge for these presentations, and you may schedule one by calling Ron Schmidt at (573) 875-2255.

Volunteers Key to Helping CRC Fight Cancer

CRC volunteers from left to right, Emily Brady, Ann Bozarth, Lee Freese, and Myrtle Rapp.

More than 60 friends of the Cancer Research Center (CRC) attended the annual appreciation reception on December 4, 2000 at the Peachtree Banquet Center where they saw Emily Brady and Ann and Jack Bozarth recognized as the 2000 Volunteers of the Year, an honor CRC has bestowed on individuals since 1997 in appreciation of their dedication and generosity in furthering cancer research. Past CRC Volunteer of the Year winners include:

1999	Carole Newman, Steve Lee
1998	Billy and Myrtle Rapp, Lonnie Tapia
1997	Larry Atterberry and family

Besides the honored volunteers, it was stressed by speakers Ron Schmidt and Jim Cherrington of CRC that everyone in the room was key to the success of local cancer research.

Both Emily and Ann have been very instrumental in the past success of the annual Jim Kidwell Gala, CRC's major fund-raiser. This annual gala is named in memory of Jim Kidwell, a long-time loyal and dedicated supporter of CRC. Jim, a life-long Boone County resident, succumbed to cancer in 1990. He worked tirelessly with this annual event before it was named in his memory. Much of what this banquet has become and the much needed funding received for cancer research is directly attributable to Jim, his hard work, and his cheerful personality.

This year's event will be held on Saturday, March 3 at the Peachtree Banquet Center, and is being dedicated in memory of Clifford Hirst, Raymond Freese, and Jim Kidwell. It will have casino-style games; live and silent auctions; live music provided by the Norm Ruebling Band; raffles; and heavy appetizers. It promises to be a good time for all who attend. For more information about this upcoming event, please call Ron Schmidt at (573) 875-2255.

Your Donations Lead to Reduced Cancer Deaths...

■ ■ ■

A number of promising new strategies are being developed by Columbia scientists for the prevention, diagnosis, and treatment of cancer. The Cancer Research Center (CRC) provides additional funds for their projects.

THE SCIENTISTS AND THEIR STRATEGIES INCLUDE:

1. Radiopharmaceuticals to target and destroy tumors. In this strategy, developed at the University of Missouri, drugs are linked up with radioactive metals that specifically attach to tumor cells. First, this can provide a visual image to pinpoint the tumor. Next, the energy emitted from the radioactive metal can then destroy tumor cells. These are the investigators who receive CRC support and who utilize this strategy, and their description of their research.

■ **Radiolabeled Peptides and Fab that Target Prostate Specific Membrane Antigen: New Prostate Cancer Therapeutics**
Dr. Susan Deutscher, CRC award recipient;
Dr. Linda Landon, Postdoctoral Fellow

This research focuses on the identification and development of therapeutic and diagnostic peptides and antibodies that specifically recognize and bind to molecules that are expressed on the surface of prostate cancer cells and other adenocarcinoma cells but that are nor expressed on normal cells. By specifically binding to cancer cells but not normal cells, the peptides and antibodies, which will be labeled with a radioactive atom, will contribute to the early diagnosis of primary adenocarcinoma cancers, such as prostate cancer, and can be used therapeutically to specifically deliver the radioactive atom to cancer cells in both primary and metastasized lesions. Prostate cancer that is detected early (before the tumor cells metastasize and spread to other areas of the body) has the highest rate of being cured. However, current prostate cancer cells has occurred and do not identify the location in the body of the metastasized cells. In addition, there are no reliable anti-prostate cancer therapies to use to identify and destroy metastasized prostate cancer cells. Dr. Landon, Postdoctoral Fellow, has recently shown that peptides and antibodies which specifically bind to the disaccharide Thomsen-Freidenreich antigen (T antigen) can differentiate between cultured cells derived from prostate and breast adenocarcinomas, on which T antigen is exposed, and non-adenocarcinomas cultured cells, on which T antigen is not exposed. Future experiments will be conducted to determine the ability of the reagents to distinguish T antigen from other closely related disaccharides. Currently, Dr. Landon is labeling the peptide and antibody reagents with radioactive atoms so that the reagents can be injected into mice, which have experimentally-induced tumors, order to observe the pharmacokinetic and pharmacodynamic characteristics of the reagents.

Bottom Line – ***This targeted therapy linking radioactive isotopes with drugs should lead to earlier diagnosis as well as destruction of tumor cells.***

■ **Pancreatic Cancer**
Dr. Tim Hoffman, CRC award recipient

Pancreatic cancer is currently the fourth leading cause of cancer mortality in the United States. Present limitations in conventional chemotherapy speak to the need to develop new therapies, coupled with improved diagnostic strategies, to enhance quantity and quality of life in patients diagnosed with pancreatic cancer. The research project being conducted with CRC holds the potential for development of one or more radiolabeled Gastrin Releasing Peptide (GRP) receptor-avid pharmaceuticals, that will be effective site-directed agents, for the diagnosis and/or treatment of patients with localized, as well as metastasized pancreatic cancer. Using appropriate radioisotopes for diagnostic purposes, one can prepare radiolabeled compounds with targeted radiodiagnostic/radiotherapeutic capabilities.

Bottom Line – *Using this selective targeting approach should lessen the toxic effects of drugs that are in current use.*

■ **Malignant Melanomas**
Dr. Thomas Quinn, CRC award recipient

Malignant melanoma has become a serious public health problem due to an increase in incidence and the difficulties in discovering and treating melanoma metastases. Malignant melanoma is the eighth most common cancer in the U.S. In 1993, there were 6,800 deaths due to malignant

Continued on page 4

Continued from page 3

melanoma and 32,000 new cases reported. Currently, 1 out of 105 Caucasians will develop malignant melanoma, and the rate is projected to be 1 out of 75 by the year 20001. Early melanoma tumor diagnosis and prompt surgical removal are a patient's best hope for a cure. Metastatic malignant melanoma is resistant to current chemotherapeutic and immunotherapeutic drugs. Combinations of chemotherapeutic agents or chemo/immunotherapeutic agents offer the best response rates. Despite recent advances in combination therapy regimens, the median survival for patients diagnosed with metastatic malignant melanoma is approximately six to nine months, with less than 10% surviving five years or more.

We have developed a novel family of peptide-based radiopharmaceuticals cyclized through the coordination of radiometals, that target a receptor present on the surfaces of malignant melanoma tumor cells. We have examined its tumor imaging properties in a mouse melanoma model system. The mouse image clearly shows high activity uptake in the melanoma tumor with very low background levels in the rest of the mouse.

Bottom Line – ***This targeted therapy linking radioactive isotopes with drugs should lead to earlier diagnosis as well as destruction of tumor cells.***

■ **Diagnosis and Treatment of Cancers**
Dr. Kattish Katti, CRC award recipient

Although a number of modalities are available for diagnosis of cancer, there is a need for the development of more selective diagnostic agents which can detect primary sites, identify sites where it has spread (metastatic sites), guide surgical interventions, and monitor efficacy of therapeutic agents to improves patient outcomes. In this context, receptor based site-specific 99mTc-labeled radiopharmaceuticals provides emerging diagnostic tools which can fulfill these needs.

Receptor based site-specific radiopharmaceuticals, when prepared with a suitable radioisotope, are also useful in the treatment of cancer. They can localize with high specificity at primary as well as secondary cancer sites, even when their location in the body is unknown. Therapeutic radiopharmaceuticals that specifically target tumors will deliver high radiation doses to the tumor while producing minimal radiation damage to the normal tissue. This would make them more effective than existing external beam radiotherapy. Hence, site-specific radiopharmaceuticals could be called "magic bullets" due to their potential efficacy in selective eradication of cancer.

Bottom Line – ***This targeted therapy linking radioactive isotopes with drugs should lead to earlier diagnosis as well as destruction of tumor cells.***

2. Basic understanding of what triggers chromosome damage and the repair of that damage. Although there are dozens of different kinds of cancer, all of them have one thing in common. All tumors are initiated by damage to DNA. Fortunately, cells have repair mechanisms for repair of this damage. However, in some cases, damage is too great or repair is inadequate and cancer develops. These are the investigators who study DNA damage and repair, and their description of their research.

■ **Study of Cytoskeletal Targets for Prevention of Cell Division During Cancer**
Dr. Heide Schatten, CRC award recipient

While some progress had been achieved in recent years to inhibit cell division with taxol, this treatment is not ideal because of the unwanted side effects associated with taxol. The goal of our research is to inhibit very specifically cell division in cancer cells which will destroy only cancer cells without interfering with cell metabolism in healthy tissue. For this approach we have undertaken studies in a transgenic mouse (TRAMP) model and in the prostate cancer cell lines LNCaP and DU145 to investigate the molecular mechanisms during cell division that specifically distinguish cancer cells from normal cells. For technical reasons, our investigations specialize in prostate cancer but will also benefit cancers of the breast, lung, liver, and other affected organs.

We have focused on the cell organelles which are crucial for cell division. Centrosomes are composed of highly specific proteins which are responsible for precisely organizing the distribution of cellular material to the two daughter cells after cell division. One of the problems during cell division in cancer is that centrosome proteins are imbalanced, which results in imbalanced and unequal cell divisions. This sets up cycles of no return into the resting stage of the cell cycle. In order to control cancer it is crucial to assure a precise regulation of centrosome proteins.

Bottom Line – ***These approaches are preferable over unspecific arrest of cell division with current anti-mitotic drugs such as taxol.***

■ **Cancer: A Balance Between DNA Damage and Repair**
Professor Stephen Alexander, CRC award recipient

DNA, the genetic material of all living organisms is constantly subjected to damage from ultraviolet light and chemicals. In animal cells, unrepaired damage can result in mutations and ultimately cancer. Indeed, skin cancer due to overexposure to sunlight is one of the most prevalent forms of cancer in the world. Fortunately, cells of all organisms have mechanisms for repairing damaged DNA. Several repair mechanisms have been identified in animal cells and they seem to be biased towards the type of DNA damage. However, little is known about how the cell senses the type of DNA damage and how it elicits the correct response to the damage. Solving this problem remains one of the most important challenges in cancer biology today because the solution will provide clues to novel detection methods and therapies.

In addition to mutants that are hypersensitive to DNA damage, we also expect to obtain mutants that repair DNA damage better than normal cells. These mutants may define another class of genes and have great potential for investigating the response to other DNA damaging agents including chemicals and other types of radiation.

We expect to identify several genes involved in the response to UV light induced DNA damage. We can immediately determine how these genes are regulated and whether they are involved in the response to other DNA damaging agents or are specific to UV damage. Virtually nothing is known about the mechanisms that animal cells use to protect themselves from cancer by repairing damaged DNA.

The identification of these protective mechanisms will allow many possibilities for developing new diagnostic protocols, as well as novel therapeutic drugs that intervene at specific steps of the pathway.

Bottom Line – ***By identifying the chemical and immunological structure of critical cell components, superior drugs can be developed to specifically destroy those cell components that lead to runaway growth of tumors.***

■ **Genes that Regulate Synthesis of Anti-Oxidant Enzymes that Avoid or Repair Cancer-Causing Damages to DNA**
Professor Abraham Eisenstark (in collaboration with Associate Professor Miriam Golomb and Research Assistant Professor Michael Calcutt)

Oxidants are like molecular bullets that can damage chromosomes, thus capable of initiating tumors. These oxidants are present in certain foods, present in ultraviolet rays of the sun, and are produced in cells as a result of normal metabolism. Fortunately, cells also produce anti-oxidants and anti-oxidant enzymes that can both destroy oxidants and repair damaged chromosomes. In addition, foods that contain anti-oxidants such as vitamin C, vitamin E, and selenium are important in countering damaging effects of oxidants.

Our research has focussed on understanding how regulatory genes are involved in the synthesis of anti-oxidant enzymes and DNA repair enzymes. One of our earlier discoveries [with Professor John McCormick] was that ultra-violet B radiation from the sun produced oxidants that can cause skin cancer. Because of the recognition of the oxidative effects of sunlight, sunscreens now contain anti-oxidants to combat these harmful effects.

Bottom Line – ***Basic knowledge of the damaging effects of oxidants and the role of anti-oxidant enzymes should lead to the reduction of cancer incidents.***

■ **Finding Key Proteins that Regulate Cell Growth and Death**
Dr. Mark Hannink, CRC award recipient

This research involves the understanding how the activity of proteins implicated in cancer is controlled. Many genes and their encoded proteins have been implicated in cancer, and our laboratory works on one group of these proteins, termed the Nuclear Factor kappa B transcription factor. This group of proteins, also known as NF-B for short, is a key regulator of both cell division and programmed cell death. As cancer cells arise when cell division is inappropriately stimulated and programmed cell death pathways are shut off, the NF-B proteins are important modulators of cancer development.

We will characterize two mechanisms that control the activity of NF-B proteins. One mechanism is through inhibition of nuclear import of NF-B.

Continued on page 6

Symptoms of Cancer

changes in bowel or bladder habits
a sore that does not heal
unusual bleeding or discharge
thickening or lump in the breast or any other part of the body
indigestion or difficulty swallowing
obvious change in a wart or mole
nagging cough or hoarseness

It is important to see a doctor if you have any of these symptoms.

Continued from page 5

In normal cells, NF-B is retained in the cytoplasm through association with an inhibitor protein, known as IB. However, in various types of cancer, IB is no longer unable to inhibit nuclear import of NF-B, with the result that NF-B is able to enter the nucleus and activate expression of growth-stimulatory and anti-cell death genes. This research will enable us to understand how association of NF-B with IB leads to a block in nuclear import of NF-B.

Our laboratory has recently discovered a second regulatory mechanism whereby IB controls NF-B. In particular, we have shown that IB is able to export NF-B from the nucleus. This nuclear export function of IB is part of a feedback inhibitory loop that keeps NF-B activity under control. A second focus of this research will be to dissect the molecular mechanism(s) that are responsible for IB mediated nuclear export of NF-B.

What is the potential impact of this research for reducing cancer incidence and deaths? As NF-B activation occurs in response to a large number of cancer-causing agents, including DNA-damaging agents such as UV irradiation.

Bottom Line – ***This research will lead to a better understanding of how regulation of NF-kB activity can be restored and thereby interfere with the development of cancer cells.***

■ **Role of Estrogens in Cancer Control**
Professor Dennis Lubahn, CRC award recipient

Breast cancer is one of the leading causes of death among women with approximately one in nine contracting some form of this disease within her lifetime. It has been known for some time that certain types of breast cancers require estrogens for proliferation. This observation has lead to a therapy based upon the administration of an estrogen antagonist such as tamoxifen over time, rendering such treatment ineffective. This leads to the development of a tumor that is no longer estrogen responsive. The development of estrogen resistance leads to two central questions. First, what makes some cancers halt cell division in response to estrogen? Second, how do the cancerous cells develop a resistance to this treatment? The answers to these questions are key to developing an effective therapy for many types of breast cancer.

We use specific approaches to identify proteins involved in estrogenic responses in an attempt to isolate a putative estrogen receptor (ER-). The first approach will use the lactoferrin gene promoter that responds to methoxychlor, and estrogenic compound, in an unusual manner.

Identification of all of the receptor proteins involved in the estrogen response of cells is the fundamental first step to understanding how interactions can occur to affect the tumor progression. Such understanding will lead to positive treatments for hormone-responsive cancers through use of selective estrogenic agonists and antagonists to specific receptors. This type of targeted therapy would be a more effective alternative to currently available therapies in the fight to control breast cancer and other estrogen responsive tumors.

Bottom Line – ***This targeted therapy would be a more effective alternative to currently available therapies in the fight to control breast cancer and other estrogen responsive tumors.***

3. Destruction of tumor cells with novel drugs and toxins. The search is still on for much better therapeutic agents to destroy cancer cells.

■ **Determination of the Role of Estrogen in Colon Cancer Development Using Estrogen Receptor Knockout Mice**
Dr. Ruth S. MacDonald, CRC award recipient;
Ju-Yuan Guo, Postdoctoral Fellow

There is increasing evidence that estrogens and phytoestrogens (plant compounds with estrogen activity) affect colon cancer risk. Some evidence suggests that these compounds protect against colon cancer while other evidence suggests they promote colon cancer. The recent widespread availability of phytoestrogen supplements and the promotion of these compounds as safe alternatives to estrogens for treatment of menopause symptoms raise concern of potentially increasing risk of colon cancer. Since colon cancer continues to be a significant cause of cancer related deaths, it is critical to rapidly define the role of estrogen and phytoestrogens in the development of colon cancer. The relationship of estrogens and phytoestrogens to colon cancer is confusing because these compounds can affect cellular behavior through estrogen receptor mediated mechanisms and through non-receptor mechanisms. Additional confusion arises because the different estrogens and different phytoestrogens cause multiple non-estrogen receptor responses. This research will determine if estrogen, conjugated estrogens, genistein, or a mixture of isoflavones alter chemically induced colon cancer in mice. Estrogen receptor mediated responses versus non-estrogen receptor responses will be sorted out by utilizing genetically altered mice that lack estrogen receptors and mice with estrogen receptors.

Genistein and a mixture of soy isoflavones will be used because they are the most widely touted phytoestrogens for reduction of menopause symp-

toms, cancer, and cardiovascular disease. The response to conjugated estrogens, similar to those used in hormone replacement therapy for women, will also be tested. Moreover, changes in enzyme and gene activity in colon cells will be correlated with changes in colon cancer to increase our understanding of cellular events leading to cancer.

Bottom Line – ***Specific plant foods may have a significant role in prevention of cancer.***

■ **Characterization of the Gene that Controls Expression of a Protein Important for Cancer Cells to Spread from the Site of the Original Tumor**

Dr. William Folk, CRC award recipient;
Dr. Kimberly A. Lieber, Postdoctoral Fellow

DNA, the genetic material of all living organisms is constantly subjected to damage from ultraviolet light and chemicals. In animal cells, unrepaired damage can result in mutations and ultimately cancer. Indeed, skin cancer due to overexposure to sunlight is one of the most prevalent forms of cancer in the world. Fortunately, cells of all organisms have mechanisms for repairing damaged DNA. Several repair mechanisms have been identified in animal cells and they seem to be biased towards the type of DNA damage. However, little is known about how the cell senses the type of DNA damage and how it elicits the correct response to the damage. Solving this problem remains one of the most important challenges in cancer biology today because the solution will provide clues to novel detection methods and therapies.

In addition to mutants that are hypersensitive to DNA damage, we also expect to obtain mutants that repair DNA damage better than normal cells. These mutants may define another class of genes and have great potential for investigating the response to other DNA damaging agents including chemicals and other types of radiation.

We expect to identify several genes involved in the response to UV light induced DNA damage. We can immediately determine how these genes are regulated and whether they are involved in the response to other DNA damaging agents or are specific to UV damage. Virtually nothing is known about the mechanisms that animal cells use to protect themselves from cancer by repairing damaged DNA.

Bottom Line – ***The identification o these protective mechanisms will allow development of new diagnostic protocols, as well as novel therapeutic drugs.***

■ **An Application Toward Deciphering Epigenetic Signatures of Breast Cancer**

Dr. Tim H.-M. Huang, CRC award recipient;
Huidong Shi, Postdoctoral Fellow

Cancer is a complex disease, resulting from multiple genetic mutations of genes. One less known phenomenon is epigenetic mutation also frequently observed in cancer. This epigenetic mutation occurs by converting cytosine bases (Cs) to methylated Cs (mCs) via a chemical reaction, called DNA methylation. Because of this epigenetic imbalance, gene regulation specific for a cell type is disrupted, leading to tumor formation. In this project, we will develop a special technique using the so-called DNA chip technology for simultaneous analysis of methylated Cs across thousands of genes in cancer cells. Our approach can generate a vast amount of information for unique molecular identifiers, i.e., epigenetic signatures, of individual cancers.

Bottom Line – ***This study will pave the way for complementing the histopathological examinations currently in use with molecular diagnosis and classification of tumors.***

■ **Does Developmental Exposure to Environmental Estrogens Increase Risk for Prostate Carcinogenesis?**

Dr. Frederick S. vom Saal, CRC award recipient;
Catherine Richter, Postdoctoral Fellow

Mouse fetuses will be exposed to estrogenic chemicals which leach out of plastic bottles and food containers, and the effects on the subsequent development of prostate cancer will be determined using a mouse strain that develops prostate cancer that is similar in many respects to prostate cancer in men.

Exposure during fetal life to estrogenic drugs has been shown to result in prostate cancer in animal studies, and has been related to vaginal cancer in women. However, our studies will be the first to examine the possibility that exposure during fetal life to estrogenic chemicals used to make plastic products is related to subsequent prostate cancer onset and progression.

Bottom Line – ***This study will identify whether certain chemicals alter estrogen in fetal life and lead to prostrate cancer in adults.***

Continued on page 12

CRC THANKS THESE GENEROUS DONORS — 2000

Development Director's Note

The Cancer Research Center (CRC) is a 501(c)3 non-profit organization, thus all donations given to us are tax deductible.

CRC is not affiliated with any national organizations, so we are not obligated to forward any portion of the contributions we receive to any governing body. All gifts stay in Columbia, Missouri and assist our scientists in their battle against cancer. This allows our donations, no matter how big or small, to make a greater difference than they might elsewhere.

As our scientists learn more about tumors, they turn that knowledge into a weapon. For years there were three ways you could address a cancer. You could poison it with a drug (chemotherapy), you could kill it with energy (radiation), or you could cut it out (surgery).

Because of the comprehensive studies that are being conducted at CRC, we are going way beyond poisoning, radiating, and cutting out cancer cells. We are developing procedures to stop cancer before it ever starts and techniques to treat it that avoid destroying or removing good cells along with the cancerous ones.

These research advances were made possible through donations from those individuals, businesses, and organizations listed throughout this newspaper. On behalf of the Board of Trustees and the entire staff at CRC, I would like to express our appreciation for their generous support.

Together, we can put an end to cancer and the devastation it causes.

Sincerely,

Ron Schmidt

■ **ADDRESS UNKNOWN**
Jessie Drew
Everett Heddesheimer
V.F.W. Post 2147
Veda Williams

■ **ALMA, MO**
United Way of Alma

■ **ARMSTRONG, MO**
Pearlene Banning
Alex & Mary Fife
Patsy Kauffman
Mr. & Mrs. Willard Sanders

■ **ASHLAND, MO**
Frank Burkett

■ **AUXVASSE, MO**
Bill & Linda Brooks
Glenn & Polly Crawford
Lois Anne Welsh

■ **BALLWIN, MO**
Patricia Strub

■ **BARNHART, MO**
Marian Tilton

■ **BARNETT, MO**
Mrs. Emmett Dunstan

■ **BLACKWATER, MO**
Edna H. Durham

■ **BLUE SPRINGS, MO**
Geraldine Corley
Jo F. Horner
Brenda Rapp West

■ **BOONVILLE, MO**
Debra Bias
Wilmoth Brown
Rebecca Enochs
Gary & Sharon Thoma
United Church of Christ - Adult Church School Class
Ms. Cecil M. Yaeger

■ **BOWLING GREEN, MO**
Lillian Blackwell
Laura Bunten
Louise Copenhaver
Farmer Farmerette Club
Friendship & Service Club
Bill & Retta Gladney
Dorothy J. Gordy
John & Bobbie Harris
Jack & Jean Hoepf
Betty O. Leverett
Dennis Leverett
Ted Leverett
Mrs. Edmond S. Long
Thelma Miller
Alice Myers
J.R. & Ruth Shy
Jimmie & Helen Turpin
Lois Worthington

■ **BRUNSWICK, MO**
Charles & Kathleen Bondy

■ **CABOOL, MO**
Bill & Ruth Dickison
Jim & Mary Gentry
Ronald & Joan Haywood, Sr.
Deborah Strong

■ **CAIRO, MO**
Bill & Jean Cox

■ **CAMDENTON, MO**
Russell & Louise Elsberry

■ **CAMERON, MO**
Billie Goll

■ **CANTON, MO**
Jim & Donna Pierce
Howard & Nora Stice

■ **CARTHAGE, MO**
Vernie & Mary Ayres
JoAnn Ellett

■ **CENTRALIA, MO**
Jewell Adams
Teresa Allen
Mildred Beane
Beaulah C. Beaver
Merritt & Jane Ann Beck III
Wayne & Linda Benoit
Margie Bevard
Donald & Selma Burnett
Centralia V.F.W. Post 6276
Chance Foundation
Mike & Kathy Colvin
Connie R. Cramer
Ruth Eisele
Lois Fenton
Tom Fenton
Mike & Jan Forsee
William P. Grace
Robert & Linda Griffin
Carol Harlow
Harrison Farm Women's Club
Harold & Arlene Hudson
Roy E. Hulen
George & Pauline Jennings
Helen March
Maupin Funeral Home
Bill & Evadine Overfelt
Emma Palmer
Tom & Mary Quinn
Ed & Ernestine Ramsey
William & Mary Alice Reinhardt, Jr.
Raymond Robison Family
Lois Rohl
Mr. & Mrs. Donald Schlemmer
Snell Propane Gas Company
Paul D. Sturgeon
United Way of Centralia
Richard & Dorothy Ward
Harold & Sue Ward
Nellie Ward
Kathryn Whithaus
Mrs. R.F. Willett
Barbara Wood

■ **CHESTERFIELD, MO**
Sam & Marie Johns
Georgia Linneman

■ **CHILLICOTHE, MO**
Donald Garrison
Erma Lee Pryor

■ **CLARK, MO**
Pete & Beverly Asbury
Dorothea Barton
Irene Fulkerson
Robert & Mary Keyton
Jo Mobley
O.E.S. Clark Chapter #396
Virginia Frances Truesdell
Richard & Janice Williamson

■ **CLARKSBURG, MO**
Harry & Rose Franken

■ **CLARKSVILLE, MO**
Jim Thurmond Cooper
Wanda Elston

■ **CLINTON, MO**
Selma Klein Trust

■ **COLE CAMP, MO**
Ruth B. Kersey
John & Edna Mein

■ **COLUMBIA, MO**
Bob & Dorothy Baeker
Beverly Baird
John & Sophie Baker
Lloyd & Elsie Baker
Hartley & Nancy Banks
Claude Barton
James L. Beckett
Catherine Beckwith
Merle Belcher
J.E. & Mathilde Berkley
Keith Bernhardt Family
Mr. & Mrs. Harold V. Biellier
Clela Blackmore
Gene & Earlene Blank
Clifford & Agnes Boyd
J. Barton Boyle
Don R. "Ray" Brady
Ernest & Cora Breedlove
Harold Breimyer
Heidi Brenner
Don & Thelma Brooker
Keith & Ruth Buescher
Dr. & Mrs. J. Fletcher Burge
Bonnie Burnam
Bud & Louise Burnett
James Carrel & Jan Weaver
Jim & Mindy Cherrington
Family & Friends of Selden Leroy Clark
William M. Clark
Juanita Clemens
Conley-Myers Insurance Agency
Mr. & Mrs. William J. Cragin
Jim & Alva Cunningham
Joe & Dell Cunningham
Judith A. Cunningham
Jamie DeLong
Kathy & Charlie Digges, Sr.
The Dirty Dozen
Edward & Joan Downes
Downtown Optimist Club
Bill & Shirley Drummond
Joan DuBose
Genevieve W. Dulle
Randy Durk
Charles J. Dysart
Joan & Abe Eisenstark
Bill & Donna Elder
Aimee, Joe & Kody Erard
Margaret & Jimmy Farrar
Nancy Toedebusch Fay
First National Bank - Staff Charitable Fund
Dorothy Forbes
Mrs. Ray Freese, Kathy & Ann LaVerne Fulkerson
Jo Gaston
Kate & Doug Geppert
Richard Golden
Charles & Georgia Greer
Jill Gruenkemeyer
Mary Jane Lang Grundler
Ed & Doris Hampton
Virginia Hancock
Marlene L. Haugen
Dick & Jane Hazell
Mrs. Russell Henry
Virginia Higdon
William J. Higgins
Anne Himberger
John William Hussey
Garrell Iddings
The Insurance Group, Inc.
Everett & Lucille Jacobs
Martha B. John
Irvin & Dora Jones
J.P. & Nancy E. Kennedy
Margaret Klug
Harold Knox
Gene, Fran, Laura & Mark Koepke
Dr. & Mrs. Charles A. Kohler
Craig & Lisa Lamm
Henry & Lee Raye Lamm
Don Lance
Ralph & Connie Lander
Red & Dorcas Leighton
Carolyn & David Leuthold
Fred & Jean Lewis
Betty Littleton
Marberry, Miller & Bales
Harding & Dee Maxwell
Mary A. Messey
Jim & Sabra Meyer
Dr. Leroy & Betty Miller
Marguerite Mitchel
Veta Moyes
Roger & Anita Myatt Nanson
Brenda C. Nicholls
Dale G. & Sharon A. Nicholls
Dr. Virginia Norris
Older Americans Klub
Mr. & Mrs. Perry G. Parrigin
Lana Peterman, Jane Maxwell, Shelie, Patti & David
Edward J. Petersheim
J.W. "Chub" & Mary Jo Phillips
Fred & Doris Pistel
T.G. & Mary Powell
Branca Maria Prentiss
Janet Randell
Frank & Mary Ranz
James & Evelyn Reed
Dr. & Mrs. V. James Rhodes
Bruce B. Rice
Jerleen Ricker
Leo & Mary Ann Roberts
George & Lois Ross
Robert & Virginia Ross
J.E. Savage
Ron & Karen Schmidt
John & Retha Schuder
Jane Schuppan
Shelter Financial Bank Employees
Mary Siggia
Mr. & Mrs. Alex Smith
Howard & Carolyn Smith
Mercedes D. Smith
Mrs. William S. Soper
Juanita Sprinkle
Square D Company
Carol Stand
Louise H. Stephens
Max & Juanita Stevens
Terry & Debbie Stidham
Eileen Swanson
Leo Teel
Estate of Ruth Tekotte
Sherman & Merline Tennyson
Derwood & Bettye Tracy
Dudley & Nancy Trice
Nelson & Lorene Trickey
Tuesday Bridge Club
Dr. James R. Turk
Mr. & Mrs. Richard Vaught
Gregory & Jennifer Wade
Ellen Walker
Wayne & Linda Walker
Dorothy M. Walton
Louise Ward
Mr. & Mrs. Herb Watchinski
David E. Wendell
O.V. & Ginger Wheeler
John & Nancy Whiteside
E.E. & Mary A. Wilson
Mr. & Mrs. James A. Wise, Sr.
John & Dulane Wohlman

■ **CONCORDIA, MO**
Ron & Liz Berg

■ **CURRYVILLE, MO**
Claude Maxwell, Bill & Robert

■ **DALTON, MO**
Mary Ann Morris

■ **EDGAR SPRINGS, MO**
Marvin & Wanda Melton & family

■ **ELK CREEK, MO**
Rex Hamilton

■ **ELSBERRY, MO**
Art Hare Family
Mary Ann Lovell

■ **FARMINGTON, MO**
Jane Scrogin

■ **FAYETTE, MO**
George & Helen Amick
Bill & Nettie Cherrington
Commercial Trust Company
Joe Jeff & Marsha Davis
Mr. & Mrs. Otto Frevert, Jr.
Dewey & Lillie Mae Holst
Bill & Hazel Jackson
Sean & Mary Korte
Ron & Jean Lessly & family
Genevieve Meyer
Mike & Dana Porter
Richland Christian Church
Don & Myrt Sanders
Patsy & John Schaefer
Mildred K. Simhiser
Gary Sprick
David & Wanda Teter

■ **FULTON, MO**
George M. Anderson
Utona E. Bell
John & Donna Edwards
First Baptist Church
Fulton State Hospital - Materials Management Department
Joe & Loretta Gallatin
Aron, Kimberly & Tyler Gish
Darrell & Zelda Gish
Roger & Janie Harmon
Darrel & Georgia Haymart
Jan R. Miller
Millersburg Friends
Robert & Dorothy Pasley
Donald & Barbara Stassel
Jean Stringer
Richard & Marnie Tutt
Rowena White

■ **GILLIAM, MO**
Gilliam Friends
Bill & Betty Meyer & family
Randy & Tammy Meyer

■ **GLASGOW, MO**
Sam & Barbara Audsley
Gary & Vivian Becker
Charlie's Quik Chek
M.L. Cherrington
Leon & Doris Crowley
Ellis & Delores Freese
Maxine Friemonth
Mr. & Mrs. Harley Gebhardt
Glasgow Community United Fund
Glasgow Co-op Association
Glasgow Savings Bank
L.H. Hackman
Mr. & Mrs. Larry Hackman
Woody & Rhonda Hammons
Laura Marie Hartung
Mildred Heiman
Leo & Sharon Himmelberg
Jesse & Shelly Howell
Mr. & Mrs. Elvin Imgarten
Helen Jackson
Mr. & Mrs. Bob Johanning
David & Elouise Kallmeyer
Lavena Kallmeyer
Maurine Kirby
Jud & Louise Kneuvean
Waldo & Muriel Kramm
Dennis & Ida Leutung
Bill & Dorothy Lewis
Bill & Gloria Maupin
Wilma O. Michels
Mr. & Mrs. Bob Monnig
John & Jan Monnig
Tom & Natalie Monnig
Tony & Joni Monnig

Bo & Kathy Parks
Bernadine Renne
LeRoy & Esther Sanders
Marion & Ona Mae Sanders
Mr. & Mrs. Robert Sanders
Jim & Nina Schaefer
Pauline Schaefer
Steve & Mary Lou Schaefer
Eldred & Marie Speiser
Anna May Stallman
Gary & Donna Stallman
Mrs. Helen Stapp
Steve & Betty Strodtman
Jim & Paula Thies
Mr. & Mrs. Tony Thies
Tri-County Trust Company
Doug & Theresa Walker
Frank & Danley Walker
Willard & Janice Warford
Kenny & Janet Westhoff
Alta Yaeger
J.O. Young
Charles & Marsha Yung

■ **GLENWOOD, MO**
Glenwood Garden Club

■ **GRANDVIEW, MO**
Paul & Martha Link Yager

■ **GRAVOIS MILLS, MO**
Mr. & Mrs. Charles Peterson
Mr. & Mrs. Richard Schimelfenyg
Mr. & Mrs. Dennis Wiley

■ **GREEN CASTLE, MO**
Roxie M. Brundage
Maryland Long

■ **HALE, MO**
Clara Guilford

■ **HALLSVILLE, MO**
Larry & Rita Jones
Marvin R. Sims

■ **HARRISBURG, MO**
Roy & Luda Francis
Ellen E. Swanson

■ **HARRISONVILLE, MO**
Young's Firestone Service

■ **HARTSBURG, MO**
Allen Sanders
Leonard & Carol Stegeman & family

■ **HARWOOD, MO**
Harwood Royal Neighbors of America

■ **HIGGINSVILLE, MO**
Max E. Tyler
United Way of Higginsville

■ **HOUSTON, MO**
Bucyrus Community Club

■ **HUMPHREYS, MO**
Humphreys Christian Church
Mr. & Mrs. Edison L. Raney

■ **HUNNEWELL, MO**
Robert Chitwood

■ **HUNTSVILLE, MO**
Ruth A. Kimbrough
Gerald & Martha Link

■ **INDEPENDENCE, MO**
Jim & Cathy Cornelius

■ **JAMESTOWN, MO**
Lashley & Joyce Rohrbach

■ **JEFFERSON CITY, MO**
Charles & Mary Brown
Virginia Christian
Frank & Jean Crooks and Bob
Missouri State Employees Charitable Campaign

■ **JONESBURG, MO**
Mary Jones Eime
Glen & Dorothy Garland
Mary Hildebrandt
Keith & Sharon Privett
Pauline Von Hoffer

■ **JOPLIN, MO**
James W. Bright
Laura Mae Frising
United Way of Southwest Missouri

■ **KANSAS CITY, MO**
Brian & Sharon Barksdale
Andrea Foster
Lula Kay
Thomas & Kathleen Kimmerly
Ada E. Loeffler
J.B. Reynolds Foundation

■ **KEARNEY, MO**
Kurt & Yolanda Payton

■ **KENNETT, MO**
Jo Ann Morgan
Donald & Glenda Parker

■ **KEYTESVILLE, MO**
Douglas & Debbie Bachtel
Paul & Mary Catherine Boss

■ **KINGDOM CITY, MO**
Raymond Atkinson
Mr. & Mrs. Terry Atkinson
Clifford & Mary Ann Borgelt
Harlan & Judy Borman
Clifford O'Donley
Joe & Stella Pope

■ **KIRKSVILLE, MO**
Helen Santee

■ **LA BELLE, MO**
O.E.S. La Belle Chapter No. 316

■ **LA GRANGE, MO**
Pleasant Dale Club
St. Peters Lutheran Social Club

■ **LAMAR, MO**
Treva Moyer
Frankie Woody

■ **LAREDO, MO**
Pauline Baldwin

■ **LEE'S SUMMIT, MO**
Mr. & Mrs. Frank Sbisa
Janet Shelby

■ **LEMAY, MO**
Ken & Rose Withrow

■ **LEWISTOWN, MO**
Richard & Janet Porter

■ **LEXINGTON, MO**
Lexington United Campaign Fund

■ **LIBERTY, MO**
Karel L. Reuck

■ **LICKING, MO**
Baxter Club
Ed, Margaret & Karen Decker

■ **LINN, MO**
Bea Jones
Evelyn Perkins

■ **LOHMAN, MO**
Edith S. Hammann

■ **LOOSE CREEK, MO**
Francis Kliethermes

■ **LOUISIANA, MO**
Mr. & Mrs. Charles B. Brown
Maggie Mae Burbridge
Mr. & Mrs. Glenn Holland
Agnes Lindsey
Eugenia Lovell
Mrs. A. Gaylord McDannold
Mrs. Kenneth Morrow
O.E.S. Nightingale Chapter No. 117
Mr. & Mrs. Lawrence S. Poyser
Eileen Rohr
Mark & Linda Shade
Mr. & Mrs. William Sheppard, Jr. Kelly & Shep
Mr. William Sheppard, Sr.
Irene Steers
Robert A. Wahl
James & Rebecca Wood
Virginia M. Wood

■ **MACON, MO**
Lilburn James Feit
Mr. & Mrs. David Headley
Doris Henley
Lois Palmer
Bill & Mary Lou Truitt

■ **MANCHESTER, MO**
Frederick & Jo Ann Biere

■ **MARCELINE, MO**
Mrs. Delmar Foley

■ **MARSHALL, MO**
Bill B. Berlin
Eugene Heinzler
Jackie Keller
Pat R. Paxton
Luetta D. Vardimann

■ **MARTHASVILLE, MO**
Kathie A. Fisher

■ **MARTINSBURG, MO**
Donald & Leona Cope
Francis & Janet Wieberg

■ **MEADVILLE, MO**
Clarence & Thelma Buttman
Wendell Holcer

■ **MEMPHIS, MO**
Junior & Bina Childress
Mike & Sue Myers

■ **MEXICO, MO**
A & B Prescription Shop
Douglas & Joyce Alewel
Bill & Doris Alton
Jerry & Shirley Brauer
Margaret Cole
Edwin & Mary Dubbert
Letha Lochridge
John & Mildred Miller
Lillie Moore & family
Lucille Riney

■ **MIDDLETOWN, MO**
Lowell & Maurine Harness
Robert Nutter Family
Claudia Wells

■ **MOBERLY, MO**
Maxine Huber
Marvin & Carolyn Vogler

■ **MONTGOMERY CITY, MO**
Mary M. Cahall
Everett & Catherine Clark
Mrs. Hugh C. Hollensteiner
Ralph & Gail Leonard

■ **MOUNTAIN GROVE, MO**
Harold & Zona Marshall

■ **NEOSHO, MO**
Zella & Bill Collie

■ **NEW FRANKLIN, MO**
William Dodson
Ladies Auxiliary Patriarch Militant #41
Frances Smothers

■ **NEW HARTFORD, MO**
Hazel V. Worrell

■ **NORBORNE, MO**
Grace West

■ **OAK GROVE, MO**
Richard & Barbara Lyons

■ **OSAGE BEACH, MO**
John & Juda Schell

■ **PALMYRA, MO**
Dwayne & Ellen Goodwin
Marvin & Bonnie Slates

■ **PARIS, MO**
O.E.S. Paris Chapter No. 316

■ **PINEVILLE, MO**
Thelma Carnell
Mr. & Mrs. Raymond Thompson
Al & Marilyn Williams

■ **PLATTE CITY, MO**
Order of the Eastern Star - Grand Chapter

■ **ROCHEPORT, MO**
Ricky, Sandy & Justin Belcher
James & Jean Grossman
Corinne Koenig
L.M. & Marguerite Lohman
Lena Miller
John Old
Friends of Betty Roberts
David & Kay Schnell & family

■ **SALISBURY, MO**
Shirley Ann Biere
Donald Bixenman
John & Bonnie Bixenman
Leonard Henke
Leland & Janiece Linneman
David & Deborah Lyons
Harold & Mildred Morris
Rita Perkins
Alice Schachtele
Glen & Mary Jane Starks
William & Mardella Sweeney
Dorothy Weimer
Morris & Dorena Wills

■ **SCHELL CITY, MO**
Nova Brackenridge
Dale & Dottie Haddix
Margaret Ann Haddix
Frances Z. Lewis
Modern Mothers Club
Schell City Trucking, Inc.

■ **SEDALIA, MO**
Mr. & Mrs. Jim Clark
Margaret Fox & Family
Debbie Friese & Family
Gilbert Glenn
Steve, Ray & Jim Hofheins & Families
Vickie Kennedy & Family
Selvin & Shirley Royal
Sedalia Middle School Faculty & Staff
United Way of Sedalia-Pettis County
LeRoy & Shirley Wimer

■ **SEYMOUR, MO**
Dr. & Mrs. Ron Buening

■ **SHELBINA, MO**
Mr. & Mrs. Bob Greening

■ **SILEX, MO**
Mr. & Mrs. Bob Alloway
Velma Quade

■ **SLATER, MO**
Mrs. A.H. Jones
Rodger Pycke Family
Mrs. L.E. Wilson

■ **SPRINGFIELD, MO**
Bill & Joyce Carnell
Empire Insurance Agency
Elizabeth Gillum
Mary M. Gooch

■ **ST. CHARLES, MO**
Elizabeth E. Russell

■ **ST. JAMES, MO**
Bruce & Yvonne Courtney
Virgil & Pauline Gargus

■ **ST. LOUIS, MO**
Norman R. Albert
H.M. Boegeman Realty Company
Alice Donaldson
Rey Eilers
Mary Frances Fulkerson
Order of the Eastern Star - Special Tea Crew of '92
Jessie M. Smith
Bernice Vuichard

■ **STE. GENEVIEVE, MO**
O.E.S. St. Mary's Chapter No. 338

■ **STEELVILLE, MO**
Helen Barnicle

■ **STOVER, MO**
Bessie E. Wilson

■ **STURGEON, MO**
Leon & Ruby Barnes
Ken & Ruby Halliburton
Wanda Kent
Ruby F. Martin
C.D. & Peggy Richards
Bonnie Sandker
Marion & Shirley Self
Sid & Martha Seymour

■ **SUNSET HILLS, MO**
Bill & Mildred Schmidt
The Wideman Family

■ **THOMPSON, MO**
Mr. & Mrs. Orma E. Mackey, Jr.

■ **TIPTON, MO**
Winifred A. Dueber
Elmer & Sara Miller

■ **TROY, MO**
Jim & Judy DeLorez

■ **UNION STAR, MO**
Mr. & Mrs. Clyde Hutchcraft

■ **URICH, MO**
E. Leroy & Noreta Long & family

■ **VANDALIA, MO**
Mary Bourne
Mabel Goodpasture
Marvin E. Graupman
Mary Hall
Bill & Judy Heim
Charles & Elaine Heim
James E. Heim
Roxie Renner
Vandalia High School Class of 1929

■ **VERSAILLES, MO**
William Caine

■ **WEBB CITY, MO**
Mr. & Mrs. Paul Jackson

■ **WELLINGTON, MO**
Gilbert & Wanda Herrin
Jim & Linda Ricketts

■ **WELLSVILLE, MO**
Dorothy Dubbert
Leta M. Hildebrand
James & Deborah Parsons
Mr. & Mrs. Joe Peery
Mr. & Mrs. Walter Saak

■ **WILLIAMSBURG, MO**
Joe & Marlene Crane

■ **WINDSOR, MO**
Marilyn Chick

■ **WRIGHT CITY, MO**
Mr. & Mrs. Ted Hase

■ **WEST PLAINS, MO**
Lydia Smith

■ **KILLEN, AL**
John & Lynn Ingwersen

■ **HOT SPRINGS, AR**
Marilyn Fountain

■ **BISBEE, AZ**
Frank Meizler

■ **GREEN VALLEY, AZ**
Robert H. Hamilton

■ **HEREFORD, AZ**
John & Susan Finley

■ **HAYWARD, CA**
Mr. & Mrs. Joe White

■ **SONORA, CA**
Virginia White

■ **BERTHOUD, CO**
Janice W. Ellis

■ **FRASER, CO**
Kayleen S. Reeve

■ **ARCADIA, FL**
Regina Schau

■ **MARCO ISLAND, FL**
Mr. & Mrs. H. Hall Trice

■ **AFTON, IA**
Mr. & Mrs. Reed Sale

■ **DELTA, IA**
Gene & Dee Keep

■ **MARSHALLTOWN, IA**
Ray L. McNeece
Jim & Linda Youngblood

■ **MASON CITY, IA**
Amanda E. Ragan

■ **TIPTON, IA**
Mr. & Mrs. Jack Reeve

■ **BERWYN, IL**
Lou Jean Simmons

■ **BRIMFIELD, IL**
Thomas & Sara Malmberg

■ **GALESBURG, IL**
Margaret Coombs

■ **WATERLOO, IL**
Arlen H. Juergens

■ **LIBERAL, KS**
Earl & Clara Sexton

■ **OLATHE, KS**
Avid Outdoor

■ **OVERLAND PARK, KS**
Robert & Debra Baker

■ **PRAIRIE VILLAGE, KS**
Mr. & Mrs. Ray W. Dunn
Andrea Woolcott
Elizabeth H. Woolcott

■ **WICHITA, KS**
Gary, Edith & Amy Kesterson & Anna
Richard & Evelyn Smith

■ **BATON ROUGE, LA**
Jim, Jean, Joan, Janette, Linda & Reed Payne

■ **CHALMETTE, LA**
Willa Liggin

■ **SHREVEPORT, LA**
Mr. & Mrs. Woodrow W. Dunn

■ **MENOMINEE, MI**
Mrs. Robert Kahl

■ **BURNSVILLE, MN**
Gary & Jane McDevitt

■ **OMAHA, NE**
Tim Smith

■ **KITTY HAWK, NC**
Mr. & Mrs. Herbert Wheatley

■ **RALEIGH, NC**
Jim & Jeslyn Wahlbrink

■ **COLEHARBOR, ND**
Duane & Geraldine Brenneise

■ **PRINCETON, NJ**
Champion International Corp. -Matching Gifts Program

■ **ALBUQUERQUE, NM**
Jay & Barbara Johnson

■ **BROOKLYN, NY**
Hattie Porter

■ **RAPID CITY, SD**
Dr. & Mrs. Eldon E. Bell

■ **THE WOODLANDS, TX**
Judy A. Gwyn

■ **ALEXANDRIA, VA**
Seward & Marjorie Jones

■ **WOODSTOCK, VT**
David & Donna Miles

■ **MUKILTEO, WA**
Ruth Ann & David Nasby

■ **MILWAUKEE, WI**
Fraternal Order of Eagles - Grand Aerie

■ **FAIRMONT, WV**
Ted & Lula May Shaffer

■ **UNITED FUNDS**
Glasgow United Fund
Kennett United Fund
Lexington United Campaign Fund
United Way of Alma
United Way of Centralia
United Way of Higginsville
United Way of Sedalia-Pettis County
United Way of Southwest Missouri

■ **IN HONOR OF / TRIBUTE TO**
Cancer Survivors
Darall Darr
Abe Eisenstark
Jim Haskamp
Orville Livingston, PGP
Sam Loethen
Dorothy & Paul Seigel
Janette Payne Simons
Alice W. Wondra
Marilyn L. Woods, PGM

■ **ESTATES**
Ruth Tekotte Estate

■ **FOUNDATIONS & TRUSTS**
Chance Foundation
Selma Klein Trust
J.B. Reynolds Foundation

■ **ORGANIZATIONS**
Baxter Club
Fraternal Order of Eagles - Grand Aerie
Glasgow Co-op Association
Missouri State Employees Charitable Campaign
Order of the Eastern Star - Grand Chapter
Pleasant Dale Club
St. Peters Lutheran Social Club

"The family suggests that memorial contributions be made to the Cancer Research Center."

When people want to honor
a loved one and fight cancer.

Pamela Dunn Legacy of Hope

Many fine minds have contributed to cancer research. At the Cancer Research Center (CRC), we honor the memory of one of our own — Dr. Pamela Dunn. Dr. Dunn died in 1983 from the very disease she sought to conquer through her work in microbiology. She had participated in several important breakthroughs in cancer research. Her work was both scientific and humanitarian, with a genuine concern for the cancer patient and the trauma he or she experienced.

In 1981, Pamela Dunn was diagnosed as having a rare form of breast cancer. For many months, she was both research subject and scientist, adding to our knowledge of the disease which had perversely selected one of its prime opponents.

Despite all possible measures, she lost her personal battle against cancer. However, her work continues through the Pamela Dunn Legacy of Hope. The Pamela Dunn Legacy of Hope was established to honor her commitment in the fight against cancer. This special fund provides the financial backing necessary to ensure that her work can be completed. The gifts to the fund remember and honor not only Dr. Dunn, but the thousands of Missourians who die each year of cancer.

DISTINGUISHED FELLOW
$500,000

Order of the Eastern Star
Blanche A. Snyder *

FELLOWSHIP
$250,000

Fraternal Order of Eagles - Grand Aerie
Lottie Caroline Hardy Trust
Selma D. Klein *
J.B. Reynolds Foundation

CENTURY CLUB
$100,000

Anonymous
Allen & Josephine Green Fdn.

BENEFACTORS
$50,000

Della M. Breid *
Columbia Regional Hospital
Cox Medical Centers
Shirley E. Distler *
Alma Duncan*
Geneva Green *
Hazel P. Howerton *
Nellie P. McDonald *
Verna S. Palmer *
Mary Raley *
Leona Schotte Street *
Webb Foundation

BUILDERS
$25,000

Olive B. Curran *
Lorraine Dowdy
Dr. Ernest & Flo Dickey *
Funk
Ruth Prather Midyette *
Mary V. Sabin *
Forrest * & Leda J. Sears
V.F.W. Auxiliary- Department of Missoui
WCCP Auxiliaries

HALL OF HONOR
$10,000

Mrs. Hartley G. Banks, Sr. *
Valee Burns *
Mabel R. Cavins *
Ruby J. Cline
Commerce Foundation
Mrs. C.S. Danley
Emerson Charitable Trust/ A.B. Chance Company
Grace S. Gilman *
Ross W. Heady *
Kansas City Life Insurance Co.
Hazel Price
Mary Ann Smith *
Mrs. John Sneed, Jr.
Glen * & Mary * Stuart
Russell Walton *
Alta Mae Welch *
Orland Woods

ADVOCATES
$5,000

A & B Prescription Shop
Raymond H. Arnold *
Boone County Community Trust
Boone County National Bank
Ottillie E. Brinkman *
Genevieve R. Byrne Chance Foundation
Conley-Myers Life Ins. Agency
Cosmos Int'l. Luncheon Club
Rey Eilers
Dr. & Mrs. Abraham Eisenstark
Fraternal Order of Eagles - Missouri State Auxiliary
Parker B. Francis Foundation
Raymond W. * & Lee Freese
Joseph B. Fueglein
Gerald Gentry Family & Friends
Bang-Orn Gira, M.D.
Marian Hammett
Bernard & Audrey Irvin
Missouri Grand Assembly, Int'l. Order of Rainbow for Girls & Missouri Grand Cross of Color
Missouri State Employees Charitable Campaign
Joel A. Montgomery
David & Ruth Ann Nasby
Brenda Carol Nicholls
Mr. & Mrs. Dale Nicholls
Order of the Eastern Star - 1963 Retirement Fund
Irene Hansen-W. Grand Matron
Edwin Kettlesen-W. Grand Patron
Mary Banks Parry
Dr. & Mrs. Ralph D. Reynolds
Iva Lee Richards
Berna Deane Rist
Gertrude M. Stein *
Phil Zech

SPONSORS
$2,500

Altrusa Club of Columbia, Mo.
Anonymous
Barry Barkley
Boone County Lumber Company
Don R. Brady
Naomi Braselton
A.B. Chance Company
Jim & Mindy Cherrington
Columbia Auto Parts Company
Sue Dalton
A.J. Drinkwater, Jr.
Woodrow W. & Mary Dunn
Miriam A. Edmonston
Howard & Lucy Eiffert
John & Elizabeth Epple Fdn.
Homer * & Lilburn Feit
Fraternal Order of Eagles - Aerie #2730
Fraternal Order of Eagles - Ladies Aux. #2730
Gentry Realty Softball Teams
Marshel O. Gordon
Mr. & Mrs. Don Green
International Order of Rainbow for Girls
Lelia Pearl Jackson
Theresa Jones
Kermit Kneubuhler
Gerald * & Georgia Linneman
Little Dixie Construction Company
Louse House Pig Roasters
Helen Mark *
Adolf Philip Miller
Kenneth Miller
Missouri Public Service Co.
Modern Mothers Club
Dr. Virginia Norris
Nicholls Buick-Honda
Dr. John F. Patton, III
Ramond E. * & Vaona Peck
Edward J. Petersheim
Roger T. Ray
Shelter Insurance Foundation Board of Directors
State Grand Cross of Color
Adeline B. Storckman
TCI Southeast Inc.
Taylor Unity Foundation
Herb & Terry Taylor
Ruth B. Tekotte *
Mr. & Mrs. H.H. Trice
Trinity Evangelical Lutheran Church of Alma
Robert A. Wahl
Audrey Walton
Don & Nellie Wilhite

PATRONS
$1,000

ABC17
Albert Buick-Honda-GMC
Norman R. Albert
Grace Allardice *
American Investment Co. Fdn.
Pauline Baldwin
Ralph & Laura Baumgartner
Harry A. Baumstark
James L. Beckett
L. Ruth Benson
Mary Kay Kondrick Bird
Dr. Charles W. Blackwell
Harry M. Boegeman
H.M. Boegeman Realty Co.
Boone County Abstract Co.
Alvin J. Borgmann
Raymond & Karen Braun
Robert & Janice Bross
Mrs. Charles G. Buffum, Jr.
Bull Pen Annual Softball Games
Charles & Myrtle Bybee
Columbia Ready Mix
Edmund J. & Martha Cooper
Jim Thurmond Cooper
Joyce Cunningham
Evelyne A. Davis
Rose Dearborn*
Delta Upsilon - Alpha Phi
Jackie & Dave * Dennis
Mr. & Mrs. Robert E. Draffen
Joan DuBose
Ray & Virginia Dunn
J.E. English, Jr.
Nancy Toedebusch Fay
Ray & Kathryn Findley
First National Bank & Trust Company
First National Bank - Staff Charitable Fund
First Security State Bank - Charleston
Bessie A. Foster
Fraternal Order of Eagles - Aerie #2693
Fraternal Order of Eagles - Ladies Aux. #2693
Mrs. Frank H. Fristoe
William & Mary Garnett
General Electric Company
General Telephone Company (Midwest)
Valorie H. Gordon
Fred Griffin
V.E. & Shirley Grimes, Jr.
Cleda A. Hanneman
Rebecca Harrison
Mr. & Mrs. Fred V. Heinkel
Bill * & Virginia Higdon
Leta M. Hildebrand
Mr. & Mrs. Frank J. Hirner
Lorene * & Charles Hofheins
Mr. & Mrs. M.L. Holdeman
Hulett Heating & Air Conditioning
Humphreys Christian Church
IMBIC Corporation *
Donald D. Jarboe
Harry D. Johnson
KRCG-TV 13
Lula Kay
Lake Woodrail Development Co.
Wanda Lewellen
Linn State Bank
R.E. Lucas, Jr.
Joyce Luntsford
Mr. * & Mrs. Joe Marlow, Sr.
Goldie McGlasson
Thelma McKee
Marie Mead
Meadville Coyote Association
James & Sabra Meyer
Mid-City Lumber Company
John E. Moentmann
Ellen G. Morrow
Veta & Bill Moyes
George H. Mudd
Nevada Lions Club
Henry C. Nielsen *
Henry & Barbara Niles, III
Order of the Eastern Star - 1963 Rosette Club
Order of the Eastern Star - Clark Chapter No. 396
Ozark National Life Ins. Co.
Dr. Ben W. Papermaster *
Leland & Peggy Phillips
Ray Polston
Mr. & Mrs. Lawrence Poyser
Mr. & Mrs. Roger F. Rhodes
Edward L. Rodes
Dr. & Mrs. Ned D. Rodes
David & Genie Rogers
Mr. * & Mrs. H. Lang Rogers
Rollarena, Inc.
Jeanne M. Rooney
Gladys Roth
Hadley * & Lois Rulon
Lloyd Sanders
Patsy & John Schaefer
W.F. Shelton, III
Silvey Corporation
Dale & Martha Sims
Mr. & Mrs. John Sneed, Jr.
Mrs. A.B. Soper, Sr. *
St. Paul's Lutheran Church of Concordia
Louise H. Stephens
Stupp Bros. Bridge & Iron Works
Nora B. Thurmond *
Dr. & Mrs. John C. Tinsley
Evangeline Tribble *
Virginia Frances Truesdell
Mr. & Mrs. Ward Truesdell
Avis G. Tucker
V.F.W. Auxiliary #280
Audrey J. Walton
James H. & Martha Ware
Willard C. Warford
Ralph H. Welsh, III *
West End Bunch
Grace West
Mary Kay Whiteaker
Mr. & Mrs. W.C. Whitlow
S.F. * & Barbara A. Williams
Ethel Woodson *
Maxine Woodward
Zeta Tau Alpha - Alpha Psi Chapter

MEMBERS
$500

Cathryn Adams
Mr. & Mrs. Laurence Adams, Jr.
Anonymous
Burleigh Arnold
Tom Atkins
Vernie & Mary Ayres
Mr. & Mrs. Charles Baker
Dr. & Mrs. Charles Baldwin, Jr.
Mr. & Mrs. James E. Baldwin
Thelma Ball
Bank of Knob Noster
Mrs. Donald L. Barnes
Bar-Wan Farms, Inc.
Alice Beard
Barbara A. Beasley
Belgrade State Bank
Bethel United Church of Christ
Boatmen's Bank of Columbia
Boatmen's Bank of Kennett
Clifford & Mary Ann Borgelt
Jack & Ann Bozarth
Clara Branham *
Ernest & Cora Breedlove
Frankie Burnett
Clarence & Thelma Buttman
Muriel Byers
Cannon & Blaylock, Realtors
Mr. & Mrs. Glenn Carr
Mrs. John Casebeer
Centralia Country Club
William L. * & Marilyn Chick
Gertie Cochran *
F.N. & June Colvin
Commerce Bank of Columbia
James B. Cook
Joe K. Crews
Mr. & Mrs. Don S. Crow
Guy Etta Daniel
Daisy Daugherty *
Herman R. Daugherty
Jay B. & Frances Dillingham
Alice Donaldson
Erwin Dothage
Dawn Duessing-Kirchhoff
Harold Duncan
Charles & Mary Dysart
Ervin Eccles
Emerson Electric Company
Mildred & Calvin Emery
Wilbur & Nola Lee Enns
Mr. & Mrs. John B. Ferris
Marjorie S. Ferris
John & Susan Finley
Florence Frame *
Mrs. R.P. Foster, Sr.
Ann Irene Fowle
Fraternal Order of Eagles - District 3
Mary Ellen Frost
James & Maizie Fry
Joe & Loretta Gallatin
Virgil & Pauline Gargus
William Gaut
Hazel Gehrke
Walter F. & Sue Gerard
Gerding, Korte & Chitwood
Jewel B. Glasscock
Richard & Elizabeth Golden
Hazel Grabosch
Marvin E. Graupman
Mr. & Mrs. Elmer Green
Mrs. Carl Griggs
Edith S. Hammann
Mr. & Mrs. Leroy C. Hansen
Charles L. (Sam) Harrison
Mr. & Mrs. Harry H. Henry
Rev. & Mrs. Ralph H. Hicks
Margaret Hinton
Alice Holt
Ethel Hook
Clara Hudson
John & Lynn Ingwersen
Bernard & Audrey Irvin
The Insurance Group
Dana B. & Karen Jacobs
Dr. & Mrs. William Johnston
Leta P. Kidwell
Dr. & Mrs. Charles Kohler
David G. Krehbiel
Ernest L. Lammers
Warren Lawless
Betty O. Leverett
Charles & Lucille Leverett
Lewis County Cancer Research Committee
George & Mariel Liggett
Mr. & Mrs. James R. Linville
Herbert F. Lionberger
Gwen Lucas
Henry J. Lucas
Mary Belle Lynn
Leonard H. Lyons
Joe Machens Ford
Malden State Bank
Markland Funeral Home
Claude & Orpha Maxwell
Mr. & Mrs. John H. Maxwell
Richard McCleery
Charles J. & Mary McCollum
Dr. & Mrs. Glenn L. McElroy
Dr. John E. McEntire
Millersburg Baptist Church Friends
Millersburg Friends
Ruby C. Montgomery
Mr. & Mrs. Walter D. Moore
Charles Morris, Jr.
Vivian M. Morris
Mr. & Mrs. Roger V. Motley
Norman K. Motter
NBC8
W.T. Nine
Northside Business Assoc. *
Geraldine H. Noyes
Mr. & Mrs. Victor A.G. Ohman
Scott Orr
Mr. & Mrs. Wendel Patterson
Charles & Hazel Payne
Edwin M. Payne *
Don Pearson
Hazel F. Pennington
Pepsi-Cola Bottling Company of Columbia
Pioneer Window Works
Janice Plowman
Mr. & Mrs. Robert J. Poage
T.G. "Pete" * & Mary * Powell
Erma Lee Pryor
Mr. & Mrs. Kenneth G. Ray
Donald & Blair Reid
Santa Fe Friends
Mrs. F.S. Sappington
LaRuth Satterwhite
John & Juda Schell
Hazel Schwabe
Mr. & Mrs. Jim Sears
John & Susan Seper
Shelter Insurance Company
Mr. & Mrs. Wm. Sheppard, Jr.
Mr. & Mrs. Wm. Sheppard, Sr.
W. Dale & Ethel Sherman
A.J. Signorelli, M.D. *
Mercedes D. Smith
Flossie Sparks
Lois Sprague
Walter G. Staley
Mary V. Stephens
A.C. Stotler *
Jack & Lillian Sutor
William & Mardella Sweeney
Third National Bank of Sedalia
Kay & Dick Thomson
Helen Timmons
Toastmaster, Inc.
Shirley Transue
Bill & Shirley Troth
Dorris & Flavel Truesdell
Mr. & Mrs. Gene Truesdell
Paul & Mary Turpin
Max E. Tyler
United States Tobacco Company
Luetta D. Vardiman
Esther Y. Voigt
Joe L. & Bonnie L.* Voss
Dr. Charles W. Wahl
Jack Ware
Henry J. Waters, III
Harry & Jane Weitkemper
Ethel White
George Ewing White
Virgil & Mary Ellen Wigham
Robert G. Williams
Mr. & Mrs. Bryan Williamson
Lela T. Williamson
Mrs. W.C. Windsor
Claudia K. Wolf
Friends of Dale R. Wood
W.R. & Irene Wright
Wright Funeral Home, Inc.
Paul & Martha Yager
Ms. Cecil M. Yaeger

* Deceased

MEMORIALS

■ A
Susan M. Albert
James R. Allen
Cecil Amos
Ben Apollo
Violet B. Ary
Lyle R. Auck

■ B
Grace Bailey
Donal, Wayne & Dean Baldwin
Floyd Banks
John L. Barnes
W.H. Barnicle
Archie C. Barton
Melvin Beach
Robert Beach
Helen Beadle
Helen Beckett
Tom Beckmann
Anita Behlmann
Margaret Brady Belt
Judge Ronald Belt
Robert Berry
Ruth Bertles
Elizabeth Bieker
John T. Bishop
Mary Jane Black
Harold Bobbitt
Donald J. Bolli
Billy Boston
Colleen Bottorff
George Boulware
Keith J. Bowles
Lee Bowman
Rickie Brackenridge
Betty Bramblett
Ruth Bremer
Dorothy Brenner
Bonnie M. Bright
Larry Brown Brooker
Gen Bump
Jane Burge
Harold D. Burton
Imogene Buttman

■ C
James Cardwell
Janet Carriker
Eddie Chamberlain
Grace Chandler
Lewis Chandler
Bennie Cherrington
William L. Chick
Danny Christeson
Carl T. Clark
Phyllis Clark
Selden Leroy Clark
Gene Clements
Paul Clemons
Delmer Colbert
Russell Cole
Allen Conner
Linda Kay Conner
Charlie Cooper
Edmund John Cooper
Jeri Cornick
Louise Corum
Guy Cottingham
Thomas Thurston Cox
Eddie Crane
Genevieve R. Culwell
Jean Curtis

■ D
John David's mother
Thelma Davis
Conard Decker
Shonda Dempsey
Sue - Mary Lou Dempsey's sister
Helen Dewey
Nadine Diederich
Barbara Dittmer
L.T. Dozier
Vincent Dubbert
Lorraine Dugan
Mercien Duncan
Nora Durham
John T. Durk
Frances Dyer-Kalb

■ E
Arnold Easterhaus
Lydia Easterhaus
Harold S. Ellis
Richard G. Elston
Lloyd & Lavon Engleman
Roy England
Frances Erdel
Glen Erdel
John Robert Erwin
Sgt. (Ret.) Anthony Evanoski
Theo Ellen Estes

■ F
Jean Farmer
Homer Feit
Mary Ann Felchlin
Bill Ferguson
Oscar Lee Ferguson
George Fetty
Helen Rosalie Fetty
John & Della Fletcher
Lorene Fletcher
Lowell Forbes
Pamela Sue Fortman
B.G. Fountain
J.W. Fox
Leona Franklin
Cora Frazier
Raymond W. Freese
Issy Friedman
A.M. Frising
James Fuchs, Sr.
Albert Ray Fulkerson
Joseph B. Fulkerson

■ G
Barbara Kay Gallatin
Ralph Galloway
Mable Gamblin
Terry D. Gargus
M Gebhardt
Gen George
Evelyn Eileen Gessman
Opal Giles
Joe N. Gilpin
Jack Glenn
Alan Godager
Louis Goethe
Victor W. Gooch
Rita Graham
Grace D. Graupman
Corrine Gregory
Virginia Griego
H. Orville Griffith
Pat Grinstead
John W. Guilford

■ H
Herb Halberstadt
Dan Hale
Mrs. William Haley
Love Long Harden
Betty J. Hardy
Cecelia Harley
Evalyn Harmon
Cora Sue Harnar
Howard E. Harness
Teresa Gunnell Harrill
Josephine Harris
Otis Harrison
Lucy Ann Hartley
Caroline Hausgen's family
Helen
Herb Helmreich
Wilma Lou Helmreich
Robert Lee Heying
Charles Hill
Joseph C. Himberger
Howard Hockman
Clarence L. Hodkin
Charles J. "Uncle Buddy" Hofheins
Lorene Hofheins
Lindell Hollensteiner
Pat Hollingsworth
Marty Lee Holtkamp
Alma Huck
Elizabeth Huhman

■ I
Lucida Isbell

■ J
Frances Jenkins
Rose Johannesman
Gerald John
John Johnson
Wes Johnson
Kenneth Johnson, Sr.
Bud Jones
Tullie Ben Jones
William Leo Jones
Stuart Jones' mother

■ K
Charles E. Keeting
Stanley Kelley
Augusta Kempker
Albert Edward Kena, Jr.
Walter Kenney
Leo J. (Jerry) Kerns
Jim Kidwell
Lloyd Kimmel
Delores "Dee" John Klos
Edna Knox
Art Kobush
Richard E. Koenig
Loren Krebill
Watt Kribbs, Jr.

■ L
Dr. Charles A. Leech
Lela Lehnen
Alma Leon
Ima Jean Lewis
F. James Liegl
Velma Limerick
Freda A. Link
Wernell Linneman
Sherwood Lovelace
R.E. "Bud" Lucas

■ M
Noble Maddox
Allen Mahan
Joe Marshall
Vernon Mason
Charles "Chuck" Maupin
Bonnie McCarty
Evelyn McCowan
Sam McCracken
A. Gaylord McDannold
Goldie McGlasson
Earl McKee
Jessie McMillan
Kathleen L. Newell Meizler
Walter Menge
Mrs. August Meyer
Eddie H. Meyer
Richard Meyer
Willard Middleton
Allen C. Miles
Mrs. Jack Miller
Thomas Mills
Glenwood Mitts
William "Bill" Morrison
Robert Morts
Orland E. Moyer
Donald R. Mueller
Jewel Mullen
Thomas Myers

■ N
Johnny Naysmith
Jeanette Nelson
Winnie Nelson
Larry Newsom
Loretta M. Niekamp
James S. Nixdorf
Zella I. Nutt

■ O
Alice M. Olsen

■ P
Rose Papa
Ben W. Papermaster
George P. Pappas
Ruzy Parish
Mr. & Mrs. Joe Parsons
Dorothy Marie Patton
Richard E. Paxton
Don Payne
Carlos Perez-Mesa
Joe Perkins
Minnie Porter
Patricia Porter
Aubrey Potter
Kyle Matthew Prenger
Lucille Preston
Elizabeth Putnam
Nick & Freda Pyle

■ R
Bill Rader
Harry Ray
Jim Reading
Henry N. Redcay
Ralph S. Reddick, Sr.
Glenn E. Reed
Helen Reeder
Wayne Rehberg
Jessie Renner
Dick Rice
Florence Rice
Howard F. Richards
Erlyne Ridenhour
Betty Lou Roberts
Edna Earl Roberts
Kenneth Roberts
Opal Robertson
Mary Robinson
Roy R. Robinson
Joyce Eileen Roth
Mrs. William Rottman, Sr.
Daniel D. Russell

■ S
Jean Salmons
Helen Santee
Ralph Robert Schlicht
Gail Schutzer
John Scofield
Rosedean Shelby
Barbara Faye Walker Shelnutt
Grace Sherrow
Donald L. Shipp
James Richard Shooter
Rufus Singleton
Nettie Sisson
Gene Sizemore
Camille Smith
Dorothy Smith
Emma "Janie" Smith
J. Tolson "Toley" Smith, Jr.
Jack K. Smith
Lee Smith
Richard A. Smith
Wilmon Smithee, Sr.
Chester L. Smothers
Ruby Snyder
Flavin Squires
Linna Stamper
Robert Straube
Scott Straube, Jr.
Denise Willis Strubel
Clara Mae Sunday
Doris Mae Sweeney

■ T
Harley J. Talley
Don Taply
Albia Tarrants
Andy Taylor
Corrine Taylor
Denny Louis Taylor
Denny Ray Taylor
Lucy Taylor
Robert Test
Lansing Thomas
Mabel Thompson
Corine Bryant Timbrook
James H. Tinsley
Frank & Alberta Toedebusch
Stacia Marie Tonolli
Paul Totten
Marie Dunn Traynor
Mary L. Truby
Ray Truesdell
Mrs. Ray (Bettie) Truesdell
Ward Truesdell
Virginia Tucker
Ronald L. Turner
Terry Turner
Elmer Tyler

■ U
Herman Umpherman

■ V
Margaret Van Buren
Shirley Van Dyke
Robert Von Hoffer

■ W
Kathleen Waas
Martha Wahl
L.C. Waite
Sarah Waters
Lillie Weakley
Louis G. Weathers
John R. Wegeng
Weimer Family members
Ray Wencel
Violet Wendell
Louis & Jeanie White
Ruby M. White
Wilma White
Robert W. Wilhoit
Nova Wilkison
Victor Williams
Bonnie "Sis" Wilson
Eva Wilson
Marietta Wilson
Edith Wingfield
James Wingfield
Vivian Wise
Dorothy Withrow
David Wood

■ Y
Alpha Yager
Ruth Young
Timothy Charles Yung

Continued from page 7

■ **Novel Ways to Inhibit the Growth of Cancer Cells**
Dr. Gary Weisman, CRC award recipient

A major emphasis in the development of new cancer treatments is to devise novel ways to inhibit the growth of cancer cells, thereby preventing tumor formation. Another effective approach is to employ cancer treatments that increase the rate of tumor cell death. We are studying a family of proteins called nucleotide receptors that are present in a variety of tissues. Evidence suggests that a specific nucleotide receptor called P2X, functions to promote tumor cell death. We are investigating this protein at the molecular level to understand how it kills cancer cells. Another nucleotide receptor called P27, functions to increase the growth of blood vessels that accelerate tumor formation. By studying P2Y receptors, we hope to learn how to prevent them from stimulating blood vessel growth, so that we can promote tumor regression. Thus, the nucleotide receptor family offers promising new targets for cancer therapy that require further investigation.

Bottom Line – ***This strategy of blocking blood vessel growth increases the probability of destroying tumor development.***

■ **Exploration of Bacterial Toxins for Use as Chemotherapeutic Agents**
C.W. Caldwell and Kelly Edwards, Postdoctoral Fellow, CRC Laboratory Associate

Bacteria are capable of producing toxins that can be used in beneficial therapeutic applications in both human and animal medicine. Specifically, certain strains of Escherichia coli have been shown to express Shiga toxins that have demonstrated anti-cancer properties. Subsequent investigation has shown that Shiga toxin type I is the agent responsible for the anti-cancer activity. Ovarian carcinoma cell lines were found to be highly susceptible to the killing effects of the toxin in laboratory experiments. The toxin also has the ability to cross the blood-brain barrier in humans, which facilitates the ability to attack certain types of brain tumors. Cancerous cells are specifically targeted for killing through the expression of a unique receptor molecule on the cell surface which is not typically found on normal healthy cells except in the kidney.

The specific aim of this project is to survey various tumor types for expression of the toxin receptor and therefore sensitivity to the killing effects of the toxin. This objective will be accomplished with an interdisciplinary approach. Molecular biology will be utilized for analysis of the purified toxin and the mechanisms involved in targeting the toxin to cancerous tissues. Electron microscopy will facilitate the survey of various cell types for the expression of the toxin receptor using antibodies for detection. Finally, cell culture systems will allow the study of the specific interaction of the toxin with susceptible cells. The exploration of this phenomenon will allow a potent bacterial toxin to be used in a beneficial way as an alternative to other methods of chemotherapy which have potentially devastating effects for cancer patients.

Bottom Line – ***Naturally occurring, highly targeted chemotherapeutic compounds may be less physically harmful to cancer patients.***

4. Development of synthetic vaccines and antibodies.

■ **Chemical and Biochemical Reactions of Dithiolethiones**
Dr. Kent Gates, CRC award recipient

We are seeking to understand the chemical and biological mechanisms by which synthetic and naturally occurring compounds (such as those found in foods like broccoli and cauliflower) can PREVENT cancer in humans.

Bottom Line – ***An understanding of how these "ANTI-carcinogenic" compounds prevent cancer will ultimately allow us to rationally design cancer-preventive diets and dietary supplements.***

■ **Ultrasonic Detection and Characterization of Endocrine Responsive Cancers**
Dr. Steven P. Neal, CRC award recipient;
Thad Wilson, Postdoctoral Fellow

In collaboration with Dr. Boote from Radiology at MU, Dr. Neal will use the CRC Fellowship to support the investigation of ultrasonic scattering processes in cancerous and benign prostate tissue. The long-term goals of the research include improving the effectiveness of ultrasound guided needle biopsies of the prostate and ultrasound based screening for prostate cancer.

Bottom Line – ***This innovative technique will lead to improved diagnostics, as well as to reduce anxiety of the patient.***

■ **Development of Effective Immunological Diagnostic Peptides**
Professor George Smith, CRC award recipient; Leslie Matthews

This research represents an altogether different approach. In brief, we plan to identify small peptides that specifically bind to antigens and antibodies associated with cancer. We call these "diagnostic" peptides because they should serve as diagnostic tests for cancer. Equally important, however, they might in the future provide a network of research paths for discovering unknown antigens. Such antigens could not only help to illuminate the disease process, but also serve as anti-cancer vaccine components.

The underlying supposition of the present research is that even diseases like cancer, which are neither infectious nor conspicuously autoimmune, may nevertheless be marked by the appearance, or a change in form or distribution, of disease-specific substances that we will call generically "neoantigens" (NeoAg's).

Tests for infectious diseases detect the infected subject's antibodies (Ab's) to pathogen antigens. Some autoimmune diseases are similarly diagnosed in part by detecting immunogenic. In using the term in this sense, we are abstracting somewhat from its original meaning; for we mean to include any disease-marking substance that can be specifically detected by a binding ligand, even if that detector molecule is not an antibody.

Bottom Line – ***The use of small peptides as antigen-antibody components, in place of large, natural, immunological components, should lead to earlier diagnosis and treatment that is more effective.***

Please send me more information concerning:

- ☐ 2001 Annual Banquet
- ☐ The Legacy of Hope
- ☐ R. Freese Memorial Fund
- ☐ L. Hofheins Scholarship Fund
- ☐ W. Whitlow Library Fund
- ☐ CRC Newsletter
- ☐ Speaker's Bureau
- ☐ Tribute Envelopes
- ☐ Gift Opportunities

Published annually by the Cancer Research Center, Columbia, Missouri. CRC was founded in 1962 as a non-profit corporation to perform cancer research, early detection and education.

Ron Schmidt, Editor
Karen Schmidt, Design Editor

Additional copies are available upon request. Contents may be reproduced provided appropriate credit is given and MIRROR editor is advised of intent to publish. Address correspondence to:

Ron Schmidt
Cancer Research Center
3501 Berrywood Drive
Columbia, MO 65201

Phone: (573) 875-2255 Fax: (573) 443-1202

MIRROR
Cancer Research Center
3501 Berrywood Drive
Columbia, MO 65201

U.S. Postage
PAID
Columbia, MO
Permit No. 49

RETURN SERVICE REQUESTED