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The Beat



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College of Medicine

JANUARY 1999

DETERMINING MOLECULAR MECHANISMS OF NEOPLASTIC TRANSFORMATION BY TARGETING SIGNAL TRANSDUCTION PATHWAYS

Research conducted in the laboratory of Dr. Richard E. Honkanen, Associate Professor in the Department of Biochemistry and Molecular Biology, is focused on determining the cellular roles of human protein phosphatases and how aberrations in the regulation of certain phosphatases can result in human disease. Dr. Honkanen is currently receiving extramural research support from the American Heart Association, a sponsored research agreement from ISIS pharmaceuticals, and the National Institutes of Health. The competitive renewal of his NIH grant has recently received a 2.5-percentile ranking, with total funding recommendations for five additional years at 1.5 million dollars.

In his laboratory, Dr. Honkanen and his students study a family of phosphatases, which catalyze the dephosphorylation of serine/threonine residues on proteins (serine/threonine protein phosphatases; PPases). Dr. Honkanen directs his research effort towards deciphering the complex cellular roles of individual PPases in the propagation of signals inducing growth, differentiation, and programmed cell death (apoptosis). He is particularly interested in determining the relationship between aberrant PPase activity and neoplastic transformation. By comparing cellular mechanisms influencing the activity or expression of the individual human PPases in "normal" cells with those of tumor cells, Dr. Honkanen hopes to gain insight into the formation and progression of human cancers.

Dr. Honkanen began his research training at the University of Georgia in the Department of Microbiology, where he studied the co-assimilation of lipid soluble carcinogens with dietary fat. After receiving his Ph.D. in 1986, he continued his training in the Department of Cell and Molecular Biology at the Medical College of Georgia, where his interest in protein phosphatases began. "We were studying the signaling cascades associated with the activation of protein kinases (myosin light chain kinase and protein kinase C) that initiate and maintain smooth muscle contraction, when I realized that almost no one was studying the protein phosphatases that induce relaxation. The situation was analogous to a light switch; everyone was trying to figure out how to turn the switch ON (with kinases), but almost no one was studying how to turn the switch back OFF (with phosphatases)."

In 1987, when Dr. Honkanen first became interested in protein phosphatases, there were few available tools and many difficulties in studying human PPases. Therefore, he focused his early efforts on the development of improved methods to study individual PPases, concentrating on the development of better assays for the measurement of PPase activity, the cloning of human PPases, and the identification of compounds that would inhibit the activity of individual PPases. To date, Dr. Honkanen, and students under his direction, have made many contributions to our current understanding of mammalian PPases, including: 1) the identification of two novel families of mammalian PPases, 2) the identification, characterization and chromosomal localization of the human gene encoding a third PPase, and 3) the development of a recombinant PPase based assay for the detection of toxins in seafood. However, Dr. Honkanen is probably best known for his contributions related to the identification and characterization of novel PPase inhibitors.

There are only seven known compounds that inhibit PPase activity. Dr. Honkanen identified two, microcystin-LR and nodularin, and was involved in the initial characterization of two others, cantharidin and fostriecin. He also contributes much of his success in this area to a natural products screening project started when he was a Junior Researcher in the Molecular Oncology Program at the Cancer Research Center of Hawaii and continued when he subsequently accepted a position as an Assistant Member in the Department of Cell and Molecular Biology at the Pacific Northwest Research Foundation in Seattle. To date this screening effort has identified over 100 extracts with potent inhibitory activity against mammalian PPases, and Dr. Honkanen is currently collaborating with scientists at six universities and two pharmaceutical companies to purify and further characterize the compounds contained in these extracts.

After moving to the University of South Alabama in 1993, Dr. Honkanen initiated yet another approach for studying the roles of human PPases. This approach is centered around the use of antisense oligonucleotides, chemically modified synthetic nucleic acids designed to hybridize with single-stranded cellular nucleic acids. The

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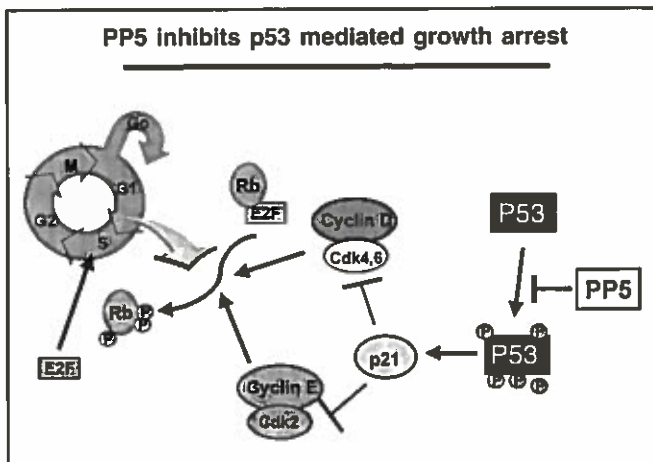
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binding of antisense oligonucleotide to the targeted nucleic acids in cells inhibits the expression of specific human genes by catalyzing RNase H mediated destruction of the target mRNA. This interaction blocks the expression of the protein encoded by the targeted gene and provides the means to 'knock out' specific human genes in a dose-dependent manner. According to Dr. Honkanen, "antisense can be viewed as chemically mediated gene therapy with almost unlimited potential, and recent FDA approval for the use of antisense oligonucleotides in humans has created a great deal of excitement." "We are particularly interested in the development of antisense oligonucleotides that are useful for the treatment of human cancer. We believe that aberrant PPase activity is associated with the progression of human cancer, and fostriecin, a small molecule that acts as a semi-selective PPase inhibitor, has marked antitumor activity in animals. Fostriecin is currently in clinical trials to determine if it also has antitumor activity in humans. However, the initial studies with fostriecin suggest that it may have toxic side effects. Our antisense effort is designed to identify more specific (hopefully less toxic) inhibitors of the PPases that are inhibited by fostriecin."



To develop antisense oligonucleotides targeting human PPases, Dr. Honkanen initiated a collaboration with ISIS pharmaceuticals. "This is an ideal situation. ISIS has the technology and experience with antisense. We have the experience with PPases and were able to provide ISIS with the novel human sequences for three human PPases, PP4, PP5 and PP1_β. It has taken over four years to identify and develop highly effective antisense oligonucleotides targeting PP5, PP4 and PP1_β. However, Dr. Honkanen feels that the effort has already paid off. "We now have the ability to inhibit the expression of all three PPases in cultured human cells, providing us with very powerful tools to study these enzymes. Using ISIS 15534, an oligonucleotide that inhibits the expression of PP5, we have already been able to demonstrate that PP5 plays a critical role in the regulation of cell cycle progression. Our studies indicate that the inhibition of PP5 expression results in the hyperphosphorylation of the p53-tumor suppressor protein. In turn, this increases the ability of p53 to induce the expression of the p21 cyclin dependent kinase inhibitor protein, and increased p21 expression inhibits cell proliferation. Since mutations that affect the function of p53 have been identified in ~ 50% of all human cancers, we are very excited about having a compound that can pharmacologically modulate p53 transcriptional activity in human cells."

BAUGH RETURNS TO THE COLLEGE OF MEDICINE



Charles M. Baugh, Ph.D., will return to the College of Medicine as dean with some additional responsibilities. He has also been named to the top spot in the medical school- vice president for medical affairs. Baugh is no stranger to USA's medical school. He served as dean of the College of Medicine from 1987-1992 and as associate dean for basic sciences from 1976-1987. When Baugh left USA in

1993, he retired to the area near his hometown of Fayetteville, N.C. He is coming out of retirement to assume the duties at South Alabama.

"I have the fire and the energy to do this right," Baugh said, "but I wouldn't consider doing it for any other school than USA." "I am and always have been dedicated to USA and all of its colleges, but in particular the College of Medicine." Baugh said he intended to "keep on doing what we're doing, only better" and that he is anxious to assist the medical school in reaching its full potential.

USA President V. Gordon Moulton said Baugh is indeed the man for job. "This is a particularly critical time in the development of the College of Medicine," Moulton said. "Dr. Baugh brings experience and expertise that we need during this transitional period."

"He is a seasoned administrator who knows USA. He is intimately aware of our educational mission. He brings experience to the table to help us move forward in a high fashion." Baugh's career at USA spanned 20 years before he retired. He came to USA in 1973 as chairman of the department of biochemistry. Prior to that he was a professor in the departments of pediatrics, medicine and biochemistry in the School of Medicine at the University of Alabama at Birmingham, where he was also associate director of the nutrition program.

He has taught in the graduate program in basic medical sciences and the College of Nursing at USA as well as graduate courses in basic medical sciences in the schools of nursing, dentistry and medicine at UAB.

He holds a bachelor's in biochemistry from the University of Chicago, a Ph.D. in biochemistry from Tulane University, and was a postdoctoral fellow under the direction of Professor Elliot N. Shaw in the biochemistry department at Tulane.

He also served four years in the U.S. Navy. Moulton said that Baugh's return to USA is another step forward for the entire University.

Permission to reprint:

Source: Midweek Memo, December 3, 1998

Office of Public Relations

NEW FACULTY



Stephen Greenberg, M.D., *associate professor of medicine*, received a B.S. degree in biology at Brooklyn College and a M.D. degree from Tufts University School of Medicine. He completed an internship and residency at Hartford Hospital. Dr. Greenberg's previous position was assistant professor of medicine at Tufts University.



Richard Gonzalez, M.D., *associate professor of surgery*, received a B.S. degree in chemical engineering and a M.D. degree from Loyola University Stritch School of Medicine. He completed residency training in surgery at the University of Florida. Dr. Gonzalez's previous appointment was assistant professor of surgery at the University of Illinois at Chicago and attending trauma surgeon at Christ Hospital.



George Russell, M.D., *assistant professor of orthopaedic surgery*, received a B.S. degree in biology at Denison University and a M.D. degree from University of Cincinnati. He completed residency training in orthopaedic surgery at the University of Cincinnati. He also completed a orthopaedic trauma fellowship at Harborview Medical Center in Seattle, WA.



Bernard Weiss, M.D., *clinical associate professor of obstetrics and gynecology*, received a B.S. in pre-medicine at the University of Pittsburgh and a M.D. degree from Tulane University. He completed his residency training in obstetrics and gynecology at Touro Infirmary in New Orleans, LA. Dr. Weiss's previous position in medical practice was at the University of Southern California.

FIRST ANNUAL CHARLES M. BAUGH LECTURE IN BASIC MEDICAL SCIENCES

FRANK MALEY, Ph.D., a Senior Research Scientist at New York State Department of Health, Division of Laboratory and Research in Albany, New York, delivered the first annual Charles M. Baugh Lecture in Basic Medical Sciences on October 8, 1998.

Dr. Maley's lecture was entitled "*New Insights into the Mechanism of Action of a Chemotherapeutic Target Enzyme*". Dr. Maley has more than 200 publications and has been an invited speaker at many symposia on glycoprotein biochemistry and pteridines and folates. He is also the recipient of an Outstanding Investigator Award for the National Cancer Institute.

The Charles M. Baugh Lectureship was created by the chairs of the basic science departments as a way to honor Dr. Baugh for his more than twenty years of dedicated service to the College of Medicine as Chair of Biochemistry, Associate Dean of Basic Medical Sciences and Dean of the College of Medicine.

AUBREY E. TAYLOR, PH.D. TEXAN CHRISTIAN UNIVERSITY DISTINGUISHED ALUMNUS AWARD

The Texas Christian University Alumni Association voted Dr. Aubrey E. Taylor to receive the Distinguished Alumnus Award for 1998. "His scientific impact extends worldwide, although in his heart Aubrey is pure Texan." That is how a colleague of Dr. Aubrey Taylor describes one of the nation's most prominent medical school faculty members. Dr. Taylor holds the Louise Lenoir Locke Eminent Scholars Chair and is a Distinguished Professor of Physiology.

Dr. Taylor has received more than 20 major awards from different national organizations - virtually every award in the discipline of respiratory physiology except the Nobel Prize. He had made major contributions to the field of biomedical research, especially in the areas of cardiovascular and respiratory physiology and has been an invited speaker at numerous prestigious meetings and at several medical schools. For more than 38 years, Dr. Taylor has received continuous grant support from the National Heart, Lung and Blood Institute and has been recognized with a merit award from the Institute, a prestigious grant that provides 10 years of research funding.

In spite of so many honors - national and international - Dr. Taylor lists proudly at the top of his accomplishments, "Native Texan."

WERTELECKI TO ESTABLISH UKRAINIAN BIRTH DEFECTS PROGRAM

Dr. Wladimir Wertelecki, Professor and Chair of Medical Genetics, received a \$750,000 grant to create a program in Birth Defects Surveillance and Prevention in Ukraine.

The grant to establish the Ukrainian Birth Defects project is funded by the U.S. Agency for International Development (USAID) Cooperative Agreement, thanks to help from U.S. Congressman Sonny Callahan.

Callahan said about the project, "clearly Dr. Wertelecki is one of the world's foremost authorities on birth defects, and I am pleased USAID has seen fit to participate in his research, especially in an area like Ukraine, where Dr. Wertelecki has a unique advantage".

Wertelecki, who has modeled the Ukrainian program after a pilot Birth Defects Surveillance and Prevention project he established for Alabama in 1995, explains that the need for such a project is critical because birth defects are the number one cause of infant deaths in Ukraine as well as in the United States.

"In Ukraine, where the Chernobyl disaster contaminated 15 percent of the territory, there are profound concerns about the environment and deaths in Ukraine now outnumber births. There has also been a 38 percent drop in the number of children being born in the last five years, and birth defects are a leading cause of infant mortality."

Wertelecki said the goal of the project is to help Ukraine identify birth defects issues, and target programs in terms of specific diseases and affected populations to prevent and/or otherwise respond to birth defects. The program is being piloted in the two regions most impacted by the Chernobyl disaster, Rivne and Volyn.

The Birth Defects Surveillance and Prevention project involves a collaboration between that University of South Alabama College of Medicine, the Ministry of Health of Ukraine, local health authorities and genetic and primary care centers that serve Rivne and Volyn.

The Ukrainian Alliance for the Prevention of Birth Defects will coordinate the project, link health policy and professional education. The Alliance will also serve as a link to similar organizations such as the March of Dimes National Foundation and the European Alliance of Genetic Support Group.

NEW PH.D. GRADUATES IN BASIC MEDICAL SCIENCES

Congratulations to the following:

Christopher P. Baines, sponsored by Dr. James Downey in the Department of Physiology. His dissertation was entitled "The Role of Kinases and ATP-Sensitive Potassium Channels in the Mechanism of Ischemic Preconditioning in the Rabbit Myocardium".



Lesley C. Dupuy, Jr., sponsored by Dr. Sailen Barik in the Department of Biochemistry and Molecular Biology. His dissertation was entitled "Role of the Respiratory Syncytial Virus Phosphoprotein in Viral Transcription with Emphasis on Phosphorylation".

Leah D. Gillis, sponsored by Dr. Jane Funkhouser in the Department of Biochemistry and Molecular Biology. Her dissertation was entitled "Characterization of the 5' Promoter Region of the aminopeptidase N Gene in Pulmonary Type II Alveolar Cells".



Bei Liu, sponsored by Dr. Nathan Aronson in the Department of Biochemistry and Molecular Biology. Her dissertation was entitled "Characterization of the Gene Structures of Lysosomal Di-N-Acetylchitobiase (CTBS) and G Proteins $\gamma 5$ Subunit (GNG5)".



Ronald K. McMillon, sponsored by Dr. Mary I. Townsley in the Department of Physiology. His dissertation was entitled "Effects of Pacing-Induced Congestive Heart Failure on the α -Adrenergic Vasoreactivity of Canine Isolated Intra-Pulmonary Bronchial Vessels".

PRESENTATIONS....

The 71st Scientific Session of the American Heart Association was held in November -- Dr. James M. Downey, Department of Physiology, lectured at a plenary session, "Clinical Applications of Myocardial Preconditioning." Dr. Downey also moderated a session on "Ischemia Preconditioning" and was co-chair of the "Fifth International Symposium on Adenosine, Cardioprotection, and its Clinical Application." Dr. Aubrey Taylor, chair of physiology, was a co-moderator on "Cournand and Comroe Young Investigator Competition and Modulation of Lung Injury" and a speaker for the Cardiopulmonary and Critical Care, Clinical Cardiology Councils "Multiple Organ Failure."

Other participants included Drs. Michael Cohen, Mary Townsley, Guang Liu, Atsushi Nakano, Tilley Pain, Xi-Ming Yang, and Christopher Baines.

Dr. Charles Rich, professor and chair of psychiatry, and assistant professor Dr. Dirk Dhossche, presented papers at the seventh annual European Symposium on Suicide and Suicidal Behavior held in Grant, Belgium.

Rich's paper examined the relationships between suicide methods and the presence of intoxicating drugs at the time of death in separate groups from San Diego and Mobile.

Dhossche reported a correlation between cocaine use and suicidality among emergency room patients on Long Island, N.Y.

Dr. Ian H. Thorneycroft, professor and chair of Obstetrics and Gynecology, was the guest speaker at the Australasian Menopause Society's annual conference in Auckland, New Zealand. His presentation was titled, "The Young Woman with Premature Ovarian Failure - Is A Different Approach Required?" He also addressed the Japanese Congress on Menopause in Tokyo in December. His lecture was entitled "Hormone Replacement Therapy in the USA - Latest Issues."

ANNOUNCEMENTS...

Dr. Jack A. Dipalma, professor of medicine and director of USA's Digestive Health Center, announced the inaugural issue of a new medical journal, On-line Journal of Digestive Health. Dr. Dipalma serves as editor-in-chief of this unique internet journal that features multi disciplinary, peer-reviewed articles about digestive health issues. It can be accessed at <http://www.ojdh.org>.

Other USA faculty participating in the venture are Drs. Jeffrey C. Brandon, Jorge L. Herrera, Charles Rodning, and Steven K. Teplick.

Dr. Amjad Hossain, associate professor of obstetrics and gynecology has been recognized by Conception Technology and Biogenics, two assisted reproduction technology companies, for his new innovative idea of preparing spermatozoa for *in vitro* fertilization.

Albert W. Pearsall, M.D., assistant professor and director of sports medicine in orthopaedic surgery, received a first place award at the 15th Annual Residents and Fellows Essay Competition at the Southern Orthopaedic Association Meeting held in November 1998. Dr. Pearsall's essay was entitled "The Use of Transesophageal Echocardiography in the Quantification of Emboli Observed During Femoral Nailing: A Comparison of Reamed vs. Unreamed Techniques".

Dr. Wladimir Wertelecki, chair and professor of Medical Genetics, and associate professor Dr. Jose Martinez recently coordinated a symposium, "Opportunities in Medical Genetics in Latin America," at the Ibero-American Society of Human Genetics' annual meeting in Denver.

Electron Microscopes Available for Research: two electron microscopes, located in the Electron Microscopy Lab, are being made available to researchers throughout the University, according to Dr. Judy King, assistant professor of pathology. The two state-of-the-art microscopes include a Philips CM100 transmission electron microscope and a Philips XL20 scanning electron microscope with an EDAX Analysis System. The transmission microscope permits a cross section look through cells, while the scanning microscope is used to study the surface of three-dimensional structures. In addition to clinical studies for the department of pathology, the lab is already assisting USA researchers in fossil and fish embryo studies.

The Electron Microscopy Lab is located in the Moorer Building, near USA Medical Center. Preparatory equipment and assistance is available. If you would like more information about the use of the microscopes, call Dr. Judy King or Freda McDonald, histotechnologist, at 471-7827.



Freda McDonald (upper left) and Dr. Judy King (right) prepare to place a sample in the scanning electron microscope.

MEDICAL CURRICULUM UPDATE

The Liaison Committee on Medical Education charges each medical school with the responsibility of providing oversight of the organization, content, implementation, and evaluation of the curriculum that originates from its faculty. The Curriculum Committee of the USA College of Medicine (USACOM) has undertaken this obligation through a process designated Curriculum Review. The goal of curriculum review is to provide course directors and departments with the means of improving the efficiency and efficacy of the medical curriculum in an ever-evolving state of medical knowledge and practice.

The first step in the process has been the enunciation and adoption of a set of objectives for the College of Medicine. Starting with a list of model objectives put forth by the Medical School Objective Program, a national venture, the USACOM Curriculum Committee wrote twenty-three objectives for our medical school that embody the mission, resources, and expectation of our faculty and students. These objectives span a wide range of the education experiences deemed necessary for the preparation of students to practice medicine today and in decades to come. The objectives recognize the scientific prerequisites to a scholarly understanding of medical practice, the clinical experiences necessary to translate principles to practice, and the social and ethical awareness that leads to compassionate and empathetic patient care. The USACOM Executive Council adopted these objectives in the spring of 1998.

The next step in the process is currently underway. Each course and department has been asked to write specific course objectives that identify the contributions of that course to fulfilling the broader medical school objectives. This is an arduous task that requires the distillation of the entire course content into a number of succinct expressions of the goals of the course along with the expected outcomes for the students. Correlated to these objectives will be information regarding the method(s) of instruction and evaluation necessary to implement and assure achievement of the goals. Subcommittees of the USACOM Curriculum Committee will work with the course directors with the aim of having all course objectives complete by the spring of 1999.

With the completion of these first two efforts, actual curriculum review can commence. On a regular schedule, the entire curriculum can be examined to identify areas or subjects that, because of difficulty or importance, need amplification among several courses. Other areas might come to light as shared objectives between courses that would permit closer coordination of instruction between the faculty of the courses to provide a more efficient or more comprehensive presentation of the material. There will also be opportunity to introduce new instructional methods across the curriculum and to assure that the change is properly evaluated so as to insure added value to the education of our students. Altogether, the process of Curriculum Review should provide the means for maintaining the vitality and worth of the USACOM medical curriculum for generations of students yet to come.

Institutional Review Boards (IRBs) Face Major Changes in the Research Environment

Recently, the environment of IRBs has been changing substantially as a result of the expansion of managed-care, the growing commercialization of research, the proliferation of multi-site trials, new types of research, the increased number of research protocols, and the rise of patient consumerism. Each of these developments has presented major disruption and challenges for IRBs.

*Source: CenterWatch, Inc. Publication
August 1, 1998, Vol. 5, Issue 8*

A Changing Environment for IRBs		
Change	Explanation	Key Implications For IRBs
Expansion of Managed Care	Emphasis on cost control and competition. Squeeze on research support for academic health centers.	<ul style="list-style-type: none"> • Pressures to accommodate research sponsors who can provide research-related revenues for the parent institution. • Increased difficulty in obtaining staff and other resources. • More pressure on staff physicians to generate income, with less time available for voluntary commitments to IRBs.
Increased Commercialization of Research	Heightened industry role in sponsoring research. Sponsor emphasis on rapid product development.	<ul style="list-style-type: none"> • Institutional and sponsor pressures for quick reviews. • Sponsor shopping for customer-focused IRBs. • Added complexity on issues involving liability, academic freedom, and patient disclosure.
Proliferation of Multicenter Trials	Proliferation of trials spread across hundreds of sites, even across the world.	<ul style="list-style-type: none"> • Diminished influence of "local" review. • Flood of adverse-event reports to review. • Lack of access to significant information concerning the status of ongoing research.
New Types of Research	Advances in biomedical research in the areas of gene testing and gene therapy; increased research on mental health issues.	<ul style="list-style-type: none"> • Need for new, highly specialized areas of expertise. • Emergence of thorny ethical issues involving informed consent and appropriate research. • Increased importance of having noninstitutional board members.
Increased Number of Proposals	Intensified efforts to obtain government funding and to develop new products.	<ul style="list-style-type: none"> • Significant increase in workloads. • Without sufficient increases in staff and/or efficacy, less time is available to review initial protocols and to conduct continuing reviews of approved research.
Rise of Patient Consumerism	Increased consumer demand for access to research.	<ul style="list-style-type: none"> • Presents major challenges in: <ul style="list-style-type: none"> Ensuring equitable recruitment of subjects. Ascertaining local attitudes and values. Maintaining distinctions between therapy and research.

Source: Office of Inspector General of Health and Human Services

OCCUPATIONAL HEALTH PROGRAM

Beginning in January 1999, the College of Medicine will implement an Occupational Health Program (OHP) for research faculty and staff exposed to animals or animal products. The OHP is designed for personnel who may be required to have direct contact with a variety of live animals, their tissues, wastes or living quarters.

Participants will be assigned into class categories reflecting the specific surveillance and preventive medicine needs for an individual based upon the level of occupational exposure.

The OHP will be incorporated into the Biosafety Manual and Exposure Control Plan for the College of Medicine. The program will be coordinated and administered through the Office of the Senior Associate Dean in cooperation with the Department of Comparative Medicine and the Department of Family Practice and Community Medicine and the Division of Infectious Disease, Department of Internal Medicine.

RETIREMENT

Virginia (Ginny) Harr recently retired from the College of Medicine. A reception was held in her honor with family, students and alumni attending. Pictured below with Ms. Harr are from left, USA College of Medicine Alumni, Drs. Russell Hudgens, Pat Nolan and Patrick Murphy.



Source: *Mobile Register*

If you would like to submit an article for publication, please forward it to:

Dusty Layton
University of South Alabama
College of Medicine
CSAB 170

or

FAX (334) 460-6073

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SUMMER RESEARCH PROGRAM FOR MEDICAL STUDENTS: CALL FOR PROPOSALS

THIS NOTICE IS A REMINDER FOR THE CALL OF PROPOSALS FOR THE SUMMER RESEARCH PROGRAM FOR MEDICAL STUDENTS. ALL FACULTY MEMBERS ARE STRONGLY ENCOURAGED TO SUBMIT WELL DESIGNED AND COMPETITIVE PROJECTS WHICH WILL PROVIDE A QUALITY RESEARCH EXPERIENCE FOR INCOMING AND FIRST YEAR MEDICAL STUDENTS. THE SUMMER RESEARCH PROGRAM WILL BEGIN IN JUNE. DEADLINE FOR RECEIPT OF SUMMER RESEARCH PROPOSALS IS FEBRUARY 5, 1999. PLEASE SEND YOUR PROPOSALS TO THE SENIOR ASSOCIATE DEAN'S OFFICE, CSAB 170.

WEINSTEIN TO DELIVER 8TH ANNUAL E. CLIFFORD TOREN MEMORIAL LECTURE

Dr. Ronald S. Weinstein, M.D., Professor and Chair of the Department of Pathology at the University of Arizona, will deliver the 8th E. Clifford Toren Memorial Lecture on Thursday, February 11, 1999. This presentation will be presented in the Distinguished Scientist Seminar Series at 4:00 p.m. in the Medical Sciences Building Auditorium. The Toren lecture will relate to Dr. Weinstein's research on the multi-drug resistance gene product (p-glycoprotein expression).

Dr. Weinstein is also Director of the Arizona Telemedicine Program which includes the Arizona Rural Telemedicine Network, the Arizona Telemedicine Technology Assessment Center and the Arizona-International Telemedicine Network. In this latter role, he will serve as Consultant to our developing Alabama Telemedicine Program and will also lecture to the Sophomore Medical Students on Friday, February 12, on "Linking Physicians and Medical Students to the Information Superhighway."



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