

CONGRESSIONALLY DIRECTED  
MEDICAL RESEARCH PROGRAMS:  
PARTNERING FOR A CURE

# IX. Other Programs Managed by the CDMRP





Over the past decade, increased public interest in health care issues has influenced the funding of scientific research. From fiscal year 1995 (FY95) to FY06, Congress has directed the Department of Defense (DOD) to manage numerous, targeted research initiatives that fill gaps in research funding. The vision that comprises each program, which seeks to fill an unmet need in cancer or other disease treatment, is fostered by the management of the U.S. Army Medical Research and Materiel Command's (USAMRMC's) Office of the Congressionally Directed Medical Research Programs (CDMRP).

While the goal of the CDMRP in managing these programs is to fund scientifically meritorious research that addresses topic areas specified by Congress, the CDMRP also works with investigators to foster and advance the visionary science that is part of the development of these programs. The scientists and clinicians supported by these other programs work through the CDMRP to impact the health and well-being of our country and the world.

Since 1992, the CDMRP has executed 73 research programs, of which 66 are characterized by a one-time appropriation and/or are institutionally based research programs. Lists of the other programs managed by the CDMRP from FY95 through FY05 and for FY06 can be found at the end of this section. A total of 32 programs are being managed by the CDMRP in FY06. Appendix B, Table B-9, summarizes the directions from Congress and the investment strategy for these initiatives.

## Program Accomplishments

A cross-section of the research accomplishments from some of the unique, more mature institutionally based research programs managed by the CDMRP follows.





## Cancer-related Research Programs

Many of the institutionally based research programs are seeking to understand how cancer begins and progresses and are developing new and innovative cancer therapeutics. The cancer-related, institutionally based research programs span breast, prostate, lung, ovarian, colon, and other cancers.



## Cancer Center of Excellence

The Cancer Center of Excellence at the University of Notre Dame has provided insight into the development of colon cancer through funding by the CDMRP. Using a mouse model of colon cancer, investigators showed that the gene expression profiles from epithelial crypts derived from colon adenomas (a benign tumor) and carcinomas were similar, which is consistent with the theory that most colorectal cancer progresses from adenomas. There were several genes differentially expressed in the carcinoma, and these genes may be relevant to the development of colon carcinomas. Several of these genes later were found to be expressed in human colon carcinoma samples.





## Center for Prostate Disease Research Program

The Center for Prostate Disease Research (CPDR) Program at Walter Reed Army Medical Center (WRAMC) in conjunction with the Uniformed Services University of the Health Sciences conducts multidisciplinary basic and clinical research studies aimed at combating prostate cancer and disease among military health care system beneficiaries. The program's goals are to expand basic science research in gene discovery and molecular biomarkers and continue militarily relevant studies in prostate cancer screening and treatment. To aid in these studies, a triservice, comprehensive Multicenter Prostate Cancer Clinical Database was developed. The database includes nine triservice military medical centers and maintains clinical information on more than 19,000 patients with prostate disease treated in military health care facilities. This database has resulted in landmark studies of the prostate-specific antigen (PSA), including screening for prostate cancer in high-risk African American men. Prostate cancer gene discovery efforts using state-of-the-art, global gene expression profiling and positional cloning strategies at CPDR laboratories are uncovering novel gene alterations in prostate cancer. The current focus is on the identification of the common gene expression and mutational alterations in prostate cancer. The CPDR has identified Ets-related gene proto-oncogene overexpression as one of the most common changes described in prostate cancer thus far. The CPDR also is involved in multicenter cohorts evaluating the diagnostic utility of serum protein profiling.

## Gallo Cancer Center

Work at the Dean and Betty Gallo Cancer Center, part of the Cancer Institute of New Jersey at the University of Medicine and Dentistry of New Jersey (New Brunswick, New Jersey), focuses on understanding prostate cancer, with the goal of eradicating the disease and improving the lives of men at risk for the disease through research, treatment, education, and prevention. Results from laboratory studies are translated into clinical studies for the early detection, treatment, and chemoprevention of prostate cancer. Examples of current research include:

- ❖ The development of transgenic mice that mimic prostate cancer development in humans.
- ❖ The study of insulin-like growth factor binding proteins (IGFBPs), which are necessary for PSA activation, on prostate cancer has shown that prostate cancer can be exacerbated by IGFBP.
- ❖ A clinical trial for hormone-refractory prostate cancer using epothilone and estramustine was initiated. Several genes, including p53, MAP4, and MRP, will be assayed to determine whether they can predict sensitivity to epothilones in the clinic.
- ❖ The Outreach and Education Program has collaborated with the 100 Black Men of New Jersey and several other groups to provide community partnerships for prostate cancer education and outreach.





## Lung Cancer Research Program

The Lung Cancer Research Program at the University of Texas M.D. Anderson Cancer Center (MDACC) (Houston, Texas) seeks to understand the underlying biology of lung tumorigenesis; develop molecular biomarkers for early detection, risk assessment, and therapy; and develop novel preventive and therapeutic strategies for individual patient care so that the overall morbidity of lung cancer is reduced. Accomplishments of this program include:

- ❖ Development of a technique tested to find whether small clonal outgrowths of early lung tumors are present in normal tissue using detection of accumulated genetic abnormalities as cells progress from nontumorigenic to malignant phenotypes. Studies now have begun to determine whether samples from tissue and cell sections can be used for these analyses.
- ❖ Study of agents that change the expression status of genes. The agents are being tested singly and in combination to find whether they induce programmed cell death and inhibit the growth of normal bronchial cells and non-small-cell lung cancer (NSCLC) cells.
- ❖ Exploration of proteins from the apical surface liquid (ASL) of normal, human tracheobronchial epithelial cell cultures and whether the proteins can be used as markers for the development of NSCLC. More than 40 proteins present in ASL have been identified using mass spectrometry and are being analyzed for marker use.
- ❖ Examination of farnesyl transferase inhibitors, a novel class of compounds that inhibit expression of the mutated Ras oncogene.
- ❖ Development of perfluorocarbons (PFCs) to enhance pulmonary gene transfer of gene therapy delivery for lung cancer treatments or preventives. Initial experiments using adenovirus transfection of a reporter gene indicated that PFCs can enhance gene delivery when given endotracheally.
- ❖ Testing of FUS1, a tumor-suppressor gene shown to inhibit the growth of lung tumors and greatly reduce the spread of lung cancer in animals, in a Phase 1 clinical trial in a group of patients with late-stage lung cancer at MDACC to evaluate its anticancer activity and toxicity.

The Lung Cancer Research Program at M.D. Anderson Cancer Center





## Tripler Cancer Care Program

The Tripler Cancer Care Program through the University of Hawaii (Honolulu, Hawaii) seeks to improve cancer screening, treatment, clinical trials, and research programs in the state of Hawaii for the benefit of both DOD and non-DOD health care beneficiaries in Hawaii and throughout the greater Pacific Basin. This is a joint program through the Cancer Research Center of Hawaii at the University of Hawaii and Tripler Army Medical Center.



## Disease-specific and General Research Programs

Some of the institutionally based research programs target specific diseases. Some diseases are rare diseases that are underfunded by conventional funding agencies. Other diseases are relevant to the performance of active military service members. While some programs support research for specific diseases, other programs examine research problems that are common to many different diseases and provide new techniques for their analysis.





## Alcoholism Research Program

The Alcoholism Research Program received congressional appropriations totaling \$32.85M in FY00 through FY05 and \$5.6M during FY06. The Alcoholism Research Program focuses on the addictive properties of alcoholism, the inherent changes in brain function that lead to craving, tolerance, and withdrawal, as well as identification of treatments at the neurochemical level. FY00 through FY05 funds were used to support 29 research projects at the Ernest Gallo Clinic and Research Center, a part of the Neurology Department of the University of California, San Francisco (Emeryville, California). Research from the Ernest Gallo Clinic and Research Center is recognized nationally and internationally. Highlights of this research include:

- ❖ Investigators have shown that the proteins dopamine and adenosine work synergistically in a region of the brain known to be important in alcohol and other addictions. This finding suggests that low-dose combinations of drugs, each of which affects one of these proteins, could be highly specific in altering human drinking behaviors.
- ❖ A population of 937 subjects, mostly pairs of siblings, is being used to study the genetic-related response to alcohol. The subjects are the offspring of families with a history of alcoholism. A subset of candidate genes was sequenced in the group to find genetic variants not previously known through the public sequence databases. The study has found 219 DNA genetic variants for specific genes. Preliminary analysis has shown 14 of these variants to be associated with one or more alcohol-related behaviors.
- ❖ Investigators have shown that Ibogaine, a drug known to be helpful in treating addiction that has severely detrimental side effects, activates a specific signaling pathway in the brain. This discovery may lead to the development of new drugs that have Ibogaine's therapeutic characteristics but not its negative side effects.
- ❖ A gene (slo-1) was identified in a model organism, the nematode *Caenorhabditis elegans*, which when inhibited creates resistance to alcohol. Work continues to identify and characterize slo-1 gene variants in the mouse and human.
- ❖ Investigators have developed a neurosteroid that prevents relapse drinking in rats. The discovery of this drug suggests a pathway to the development of a new generation of drugs that could be helpful in long-term recovery from alcoholism.

The Alcoholism Research Program at Ernest Gallo Clinic and Research Center





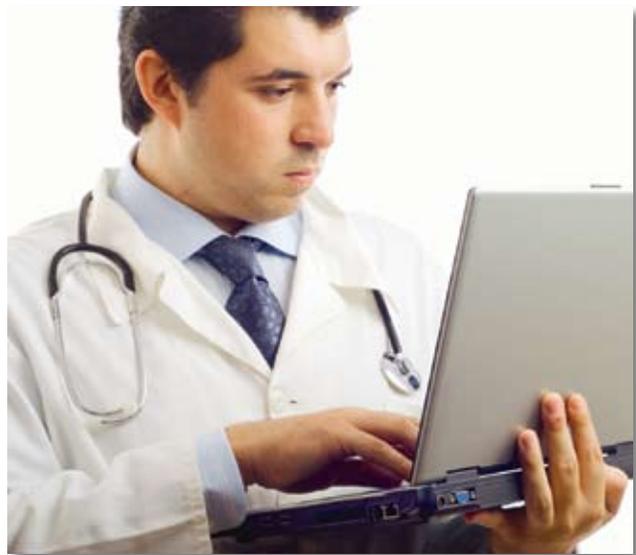
## Fragile X Research Program

The Fragile X Research Program was developed at the Children's Hospital of Pittsburgh (CHP; Pittsburgh, Pennsylvania). Fragile X (FX) syndrome is a genetic disease that causes behavior disturbances such as labile mood, anxiety states, hyperactivity, and aberrant behavior response to stress. Affected patients may suffer from learning disabilities, attention deficit disorders, retardation, or autism. The FX Research Program was developed to address the most effective methods of treatment, both pharmacological and nonpharmacological, for the symptoms and behavioral problems associated with FX syndrome. A CHP FX Center website ([http://www.chp.edu/clinical/03a\\_fragilex.php](http://www.chp.edu/clinical/03a_fragilex.php)) was developed in collaboration with CHP Public and Government Affairs that provides access to information about the center and provides links to other FX local and national resources. A multidisciplinary provider network consisting of genetics, ophthalmology, dental, and psychiatry specialists within CHP and the University of Pittsburgh Medical Center was established. These specialists are committed to providing improved access to appropriate and necessary health care follow-up for patients with FX, including neurobehavioral assessment, behavioral consultation, comprehensive medical evaluation, and psychopharmacology evaluation.



## Genomic Medicine Research Program

The Genomic Medicine Research Program is a recently funded program being developed through the Guilford Genomic Medicine Initiative (GGMI), a consortium of institutions in Guilford County, North Carolina, consisting of the Moses Cone Health System (Greensboro, North Carolina), the Center for Human Genetics at Duke University (Durham, North Carolina), and the University of North Carolina at Greensboro. GGMI is developing a model for physicians and medical staff at U.S. military and civilian health care institutions to establish and apply a uniform standard of care using genetic information in evaluating risk, testing, education, and treatment of patients to improve health outcomes. GGMI has developed a website ([www.genomic-medicine.org](http://www.genomic-medicine.org)) providing information to the public and health care professionals about its services. Two continuing medical education (CME) modules are being developed for physicians: (1) taking and understanding family histories and (2) breast cancer genetic risk. Additional CME modules are in development. Community focus groups within Guilford County are being used to understand and design general education modules for genomic medicine.





## Gulf War Veterans' Illnesses Research Program

The Gulf War Veterans' Illnesses Research Program (GWVIRP) was established in FY06 with a congressional appropriation of \$5M. The CDMRP worked with the Research Advisory Committee on Gulf War Veterans' Illnesses to develop a vision and investment strategy. The priority of the GWVIRP is identification of beneficial treatments for 1991 Gulf War veterans that are affected by Gulf War illnesses. Gulf War illnesses include a broad range of conditions and are characterized by multiple symptoms. Common symptoms associated with Gulf War illnesses include, but are not limited to, the following: asthma, chronic fatigue, skin rashes, muscle and joint pain, and memory loss and confusion. A supplement to the BAA will be released October 2006. Following scientific peer and programmatic review, it is anticipated that approximately 30 awards will be made by September 2007 to support this very important area of research.



## Muscular Dystrophy Research Program

The Muscular Dystrophy Research Program seeks to develop advanced technologies in stem cell and gene therapy methods to alleviate the muscle weakness attributable to muscular dystrophy. CHP (Children's Hospital of Pittsburgh, Pennsylvania) also is extending the research to improve the healing of tissues damaged by combat injuries. Much of the research focuses on the study of muscle-derived stem cells (MDSCs) found in certain adult muscles and whether they can be used to reconstitute damaged muscle. MDSCs have been shown to expand in culture for more than 200 population doublings without senescence. Other studies examine the transfer of specific genes into muscle cells or MDSCs to lower immune response against the cells and increase their chance for engraftment.



Dr. Johnny Huard of the  
Muscular Dystrophy Program



## National Prion Research Program

The National Prion Research Program (NPRP) was developed to decrease the risk of prion diseases or transmissible spongiform encephalopathies in the food supplies for the military and civilians. These diseases refer to several apparently related diseases including Creutzfeldt-Jacob disease (CJD) and its new variant (nvCJD), kuru, bovine spongiform encephalopathy (mad cow disease), and others. The priority of the NPRP is the development of a reliable antemortem diagnostic for the detection of prion diseases. The FY02 NPRP received a \$42.5M appropriation that was used to fund 38 extramural applications related to prion detection and prion diseases. The work from these investigators has resulted thus far in more than 50 publications that have increased the understanding of prion disease diagnosis and detection and provided new methods to undermine prion resistance. In FY05, an additional appropriation of \$1.5M was awarded to the McLaughlin Research Institute (Great Falls, Montana) to develop an in vitro bioassay for the treatment of prion infection.



## Pediatric Hospice Research Program

The Pediatric Hospice Research Program is developing programs to meet the unique needs of children with life-threatening diseases where palliative care for children requires an integrated, interdisciplinary approach involving the child, the family, and care providers that can span the spectrum of physical, emotional, psychosocial, and spiritual needs for children and their families. The goal of this program is to develop and promote a model of care that enhances the quality of life for DOD children with life-threatening conditions and their families. The program has established a parent advisory group to review focus group and interview questions for use with newly recruited parents and health care providers and to adapt a quality-of-life survey for care providers for this population. The program also is analyzing the health care benefits most likely to be used by a military family with a child with a life-threatening illness. These benefits include respite care, home health care, custodial care, skilled nursing care, prescription drugs, dental care, counseling, bereavement care, care coordination, nursing case management, hospice, child life services at home, massage therapy, music therapy, acupuncture, durable equipment and durable medical equipment, structural alterations to dwelling, and medical transportation. The Principal Investigator has

initiated talks with the Tricare Management Activity to present the analysis of these data and possible recommendations related to TRICARE coverage.





## Other Programs Managed by the CDMRP, FY95–FY05

3D Imaging and Genomic Analysis for Breast Cancer Management, FY04, \$1.7M, General Electric Global Research (Niskayuna, New York)

Advanced Cancer Detection, FY97–FY99, \$10.5M, Navy Medical Research and Development Command (Bethesda, Maryland) and University of South Florida (Tampa, Florida)

Advances in Breast Cancer Therapy Research, FY05, \$1.3M, Precision Therapeutics, Inc. (Pittsburgh, Pennsylvania)

Alcoholism Research, FY00–FY05, \$32.85M, Ernest Gallo Clinic and Research Center (Emeryville, California)

Arthropod-borne Infectious Disease Control Research, FY02, \$2.5M, University of Connecticut Health Sciences Center (Farmington, Connecticut)

Breast Cancer Imaging Research, FY03, \$6M, Eight awards made

Cancer Center of Excellence, FY01–FY02, \$3.1M, Notre Dame University (South Bend, Indiana)

Cancer Research, FY01, \$5.5M, State University of New York at Stony Brook (Stony Brook, NY)

Cancer Vaccine Research, FY05, \$3.4M, Cerus Corporation (Concord, California)

Cancerous Brain Tumors Drug Research, FY05, \$1M, Targepeutics, Inc. (Hershey, Pennsylvania)

Center for Prostate Disease Research, FY97–FY05, \$52.4M, Uniformed Services University of the Health Sciences for Walter Reed Army Medical Center (WRAMC) (Bethesda, Maryland)

Coastal Cancer Control, FY95, \$5M, Navy Medical Research and Development Command (Bethesda, Maryland)

Comprehensive Bioactive Products for Breast Cancer Research, FY05, \$2M, University of Nevada at Las Vegas (Las Vegas, Nevada)

Computer-aided Diagnosis, FY97, \$3M, Navy Medical Research and Development Command (Bethesda, Maryland)

Computer-assisted Cancer Device, FY04–FY05, \$2.1M, Henry M. Jackson Foundation (HMJF) (Rockville, Maryland) for the WRAMC (Bethesda, Maryland) and Windber Research Institute (Windber, Pennsylvania)

Cooperative Department of Defense/Veterans Affairs Medical Research, FY99–FY00, \$6.8M, Nine awards made

Defense Women's Health Research, FY95, \$40M, 69 awards made to intramural and extramural research institutions

Diagnostic and Surgical Breast Imaging, FY99, \$2M, Four awards made

Diagnostic and Therapeutic Cancer Care Equipment, FY05, \$7.5M, Boston Medical Center for the Joe Moakley Hospital (Boston, Massachusetts)

Donor Cord Blood Demonstration, FY04, \$1M, Wayne State University (Detroit, Michigan)

Electrical Impedance Scanning Device, FY04, \$1M, HMJF (Rockville, Maryland) for TranScan Medical (Ramsey, New Jersey) and WRAMC (Bethesda, Maryland)

Fragile X Research, FY02, \$1M, Children's Hospital of Pittsburgh (Pittsburgh, Pennsylvania)

Gallo Cancer Center, FY00–FY01, FY03–FY05, \$10.05M, University of Medicine and Dentistry of New Jersey (New Brunswick, New Jersey)

Genetic Cancer Research, FY04–FY05, \$3.5M, Cold Spring Harbor Laboratory (Cold Spring Harbor, New York)

Genomic Medicine and Gene Therapy, FY04–FY05, \$6.8M, Moses Cone Health System (Durham, North Carolina)

Hepatitis C Research, FY02, \$3.4M, Uniformed Services University of the Health Sciences (Bethesda, Maryland)

Life Sciences Research Initiative, FY05, \$0.5M, Pioneer Valley Life Sciences Institute (Springfield, Massachusetts)

Lung Cancer Research, FY00–FY05, \$43M, University of Texas M.D. Anderson Cancer Center (Houston, Texas)

Molecular Medicine, FY04, \$1M, General Electric Global Research (Niskayuna, New York)

Monoclonal Antibodies, Massachusetts Biological Laboratory, FY02, \$1M, University of Massachusetts Medical Center (Worcester, Massachusetts)

Muscle Research Consortium, FY04–FY05, \$4.5M, Children's Research Institute (Washington, DC)

Muscular Dystrophy Research, FY03–FY05, \$10.15M, Children's Hospital of Pittsburgh (Pittsburgh, Pennsylvania)

Myeloproliferative Disorders Research, FY04, \$4.25M, Nine awards made to research institutions

National Prion Research, FY02, FY05, \$44M, 38 awards in FY02 to universities, hospitals, nonprofit institutions, private industry, and state and federal agencies; 1 award in FY05 to McLaughlin Research Institute (Great Falls, Montana)

Neurogenetic Research and Computational Genomics, FY04, \$1M, University of Southern California (Los Angeles, California)

Neutron Therapy Research, FY05, \$0.9M, Northern Illinois University (DeKalb, Illinois)

Orphan Disease Drug Discovery Research, FY05, \$2M, University of Pittsburgh (Pittsburgh, Pennsylvania)

Osteoporosis Research, FY95, \$5M, Five awards funded

Pediatric Brain Tumor and Neurological Disease Research, FY05, \$1.5M, Miami Children's Hospital (Miami, Florida)

Pediatric Hospice, FY03–FY04, \$2.5M, HMJF for the Children's Hospice Program at WRAMC (Bethesda, Maryland)

Post-polio Syndrome Research, FY99–FY00, \$2.3M, Albert Einstein Medical Center and Moss Rehabilitation Research Institute (Philadelphia, Pennsylvania)

Preventive Medicine Research Institute, FY05, \$1.5M, Preventive Medicine Research Institute (Sausalito, California)

Preventive Medicine Research for Prostate Cancer, FY04–FY05, \$2.4M, Preventive Medicine Research Institute (Sausalito, California)

Spinal Muscular Atrophy Research, FY05, \$2.25M, Lexicon Genetics, Inc. (The Woodlands, Texas)

Targeted Nano-therapeutic for Advanced Breast and Prostate Cancer, FY04–FY05, \$2M, Triton Biosystems, Inc. (Chelmsford, Massachusetts)

Tripler Cancer Care, FY05, \$8.5M, University of Hawaii and Tripler Army Medical Center (Honolulu, Hawaii)

Veterinary Manpower Development, FY05, \$0.3M, Tufts University (Boston, Massachusetts)



## Other Programs Managed by the CDMRP in FY06

Advances in Breast Cancer Therapy Research, \$1.7M, Develop and validate host and tumor genetic factors that can predict response to chemotherapy, thus allowing better selection of the most effective chemotherapy for the individual patient.

Alcoholism Research, \$5.6M, Conduct multidisciplinary research to understand the addictive properties of alcohol; the inherent changes in brain function that lead to craving, tolerance, and withdrawal; and the identification of treatments at the neurochemical level.

Amyotrophic Lateral Sclerosis Research, \$2.6M, Explore the basic biological mechanisms of the disease so that new neuroprotective agents and prevention strategies might be developed.

Anderson Cancer Center Prostate Cancer Study, \$0.5M, Conduct multidisciplinary basic and clinical research studies aimed at combating prostate cancer.

Biological and Immunological Infectious Agent and Cancer Vaccine Research, \$2.3M, Develop ways to help an individual's body recognize tumor cells as life-threatening, foreign cells that should be fought and destroyed.

Biomedical Sciences and Technology, \$1.8M, Develop novel diagnostics, treatments, and cures for disease to enhance human health and quality of life through interdisciplinary research.

Cancer Biomolecular Markers Research, \$1M, Evaluate the prognostic significance of new biomolecular markers in primary breast, ovarian, and prostate tumors.

Cancer Prevention through Remote Biological Detection, \$1M, Develop a program for cancer detection and prevention using implanted wireless sensors, complex computing, and nanotechnology-based drug delivery.

Center for Targeted Cancer Therapy, \$1M, Facilitate the development of new treatments for patients with cancer through integration of the translational and clinical sciences.

Center for Women's Cancer Genetics (formerly Genetic Cancer Research), \$1.5M, Identify the genetic changes that cause cancer susceptibility or occur during the development, progression, and metastasis of cancer, particularly for ovarian and breast cancers.

Childhood Cancer Research Program, \$2.375M, Investigate better therapeutics for childhood cancers that are more tolerated and provide lower risk for patients with cancer that decrease the risk of side effects both during treatment and later in life.

Diagnostic and Therapeutic Cancer Care Equipment, \$4.3M, Examine the diagnostic and therapeutic effect of emerging technologies in imaging and radiation oncology and how equipment access can affect the quality of care received by patients with cancer.

Early Diagnosis, Treatment, and Care of Cancer Patients Research Program, \$2.5M, Develop new approaches to cancer diagnosis and treatment while maintaining high standards of patient care.

Early and Rapid Analyzer for Heart Attack Diagnosis, \$0.5M, Develop new methods to diagnose heart attacks.

Gallo Cancer Center, \$2M, Study prostate cancer with the goal of eradicating prostate cancer and improving the lives of men at risk for the disease through research, treatment, education, and prevention. Results from the laboratory are translated into clinical studies for early detection, treatment, and chemoprevention of prostate cancer.

Genomic Medicine and Gene Therapy, \$2.2M, Develop a model to inform physicians and medical staff at U.S. military and civilian health care institutions about the concepts and practices of genomic medicine.

Life Sciences Research Initiative, \$0.5M, Identify new cancer susceptibility genes and discover nutritional supplements that have chemopreventive properties for the treatment of breast cancer.

Lung Cancer Research Program, \$6.7M, Explore multiple avenues of prevention, diagnosis, and therapy for lung cancer.

Military Asthma Research, \$1M, Improve the health of military families through evaluation and resolution of asthma-related risk factors in military housing units and installations.

Molecular Switching Vaccines for Biodefense (formerly Cancer Vaccine Research), \$2.1M, Develop vaccines that will prevent primary or secondary occurrences of some cancers and infectious diseases. The vaccines also will have applications in biodefense, primarily involving genetically modified *Listeria* bacteria.

Muscle Research Consortium, \$2.4M, Increase the number and quality of clinical trials for patients with muscle-related disease to improve muscle structure and function.

Muscular Dystrophy Research, \$1.7M, Develop advanced technologies in stem cell and gene therapy methods to alleviate the muscle weakness attributable to muscular dystrophy. The research also will result in technologies to improve the healing of tissues damaged by combat injuries.

Neutron Therapy Research, \$1.8M, Develop applications of neutron therapy beyond its current uses through additional basic and clinical research.

New Radiation Therapy Systems, \$1.5M, Advance current radiation therapy modalities into more tumor-targeted, health tissue-sparing procedures.

Noninvasive Nanodiagnostics of Cancer, \$2M, Develop noninvasive diagnostics to detect cancer in its earliest, most easily treatable stage.

Orphan Disease Drug Discovery Research, \$1.7M, Identify and develop small-molecule inhibitors for the treatment of orphan and neglected (rare) diseases for patients in the military and civilian sectors. Orphan drugs are products that have demonstrated some promise for the diagnosis and/or treatment of rare diseases or conditions.

Pediatric Brain Tumor and Neurological Disease Research, \$1.5M, Develop novel diagnostics and therapeutics for brain tumors.

Preventive Medicine Research Institute, \$1.4M, Develop better preventive medicine aimed at prostate cancer.

Prostate Cancer DNA Detection Initiative, \$2.8M, Develop a urine-based early detection test for prostate cancer using nucleic acid biomarker detection technology that will eliminate the need for biopsy after an elevated prostate-specific antigen test.

Respiratory Biodefense, \$1.85M, Develop new treatments for radiation exposure, sulfur mustard toxicity, and infectious diseases.

Scleroderma Research, \$0.5M, Develop better treatments or a cure for the disease.

Spinal Muscular Atrophy Research, \$2.5M, Identify the protein defects causing spinal muscular atrophy that will lead to potential therapeutics for patients.



Targeted Nano-therapeutic for Advanced Breast and Prostate Cancer, \$1M, Identify and characterize targeted therapy for breast and prostate cancers using nano-therapeutics.

University of Tennessee Cancer Institute, Cancer Care Initiative Research Program, \$1M, Develop a statewide system offering cancer education, prevention, and treatment through multiple centers, hospitals, and practice groups for Tennessee and the surrounding region.

Veterinary Manpower Development, \$0.5M, Develop training for veterinarians in public health skills so that they may plan and implement responses to bioterror outbreaks.