# XIII. Other Programs Managed by the CDMRP

# VISION

Over the past decade, increased public interest in health care issues has influenced the funding of scientific research. From fiscal year 1995 (FY95) to FY07, 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 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 81 research programs, of which 70 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 FY06 and for FY07 can be found at the end of this section. A total of 27 programs is being managed by the CDMRP in FY07. Appendix B, Table B-12, summarizes the directions from Congress and the investment strategies for the FY06 and FY07 programs.

# Program Accomplishments

A cross-section of the research accomplishments from some of the 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 or are developing new and innovative cancer therapeutics. The cancer-related institutionally based research programs span breast, prostate, lung, ovarian, colon, and other cancers.

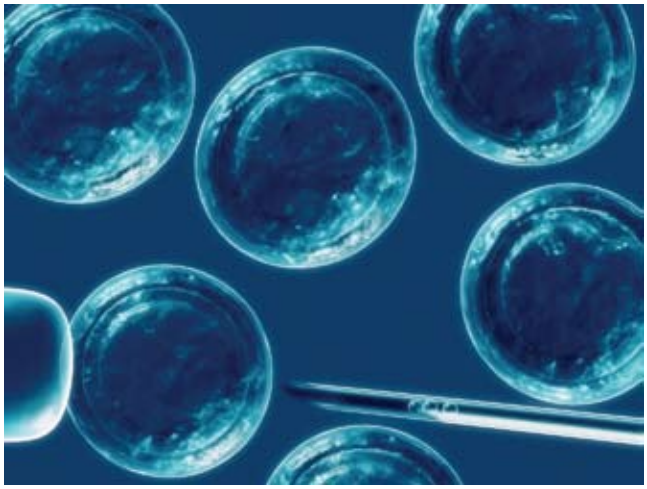
### Cancer Vaccine

Dr. Thomas Dubensky, Principal Investigator (PI), and his team at the Cancer Vaccine Research Program (Cerus Corporation, Concord, California) are testing the potential cancer protective activity of proprietary live, attenuated strains of Listeria monocytogenes (Lm) that have been modified to reduce virulence, which increases the lethal dose of the bacteria by a thousandfold. The investigators will test the Lm vaccine in several different animal models of diseases. The Lm vaccine will be tested in a mouse model of liver metastizing colon cancer. Pancreatic and ovarian cancers will be targeted with a Listeria/mesothelin/ras (ras is a virus oncogene family) vaccine in transgenic mice with a plan to test the same in patients with pancreatic or ovarian cancer. Another vaccine containing antigens associated with myeloid leukemia will be tested in acute myeloid leukemia and chronic myeloid leukemia (AML/CML).

## Lung Cancer Research

The Lung Cancer Research Program at the University of Texas M.D. Anderson Cancer Center (MDACC) (Houston, Texas) led by Dr. Waun Ki Hong 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:

- A clinical trial program was established that uses biomarkers to select individualized targeted therapy for previously treated, chemorefractory, advanced non-small cell lung cancer (NSCLC) patients. After screening, eligible patients are enrolled in the umbrella trial, and tumor biopsies are taken for biomarker analyses. Patients will participate in one of several clinical trials: (1) Erlotinib, an inhibitor of epidermal growth factor receptor (EGFR); (2) ZD6474, an inhibitor of vascular endothelial growth factor receptor, EGFR, and RET tyrosine kinase; (3) bexarotene and erlotinib, an activator of retinoid X receptors and repressor of cyclin D1; and (4) sorafenib, a multikinase inhibitor whose targets include the Ras/Raf signaling pathways. The molecular mechanisms of response and resistance to the targeted agent(s) will be studied in each trial.



- MDACC investigators are studying the mechanism behind radiation resistance in NSCLC. Tumor cells often have an enhanced survival response that involves increased capacity for DNA repair and suppressed apoptosis. Some control over apoptosis and DNA repair may be provided by activation of EGFR. Investigators also are examining whether responses of NSCLC to radiation can be improved through the use of inhibitors of EGFR signaling.
- In collaboration with MDACC, investigators at Emory University (Atlanta, Georgia) are examining the change in balance between the Ras-dependent survival and death pathways that occurs in cancer, leading to loss of control and aberrant cancer cell proliferation. This work will target the PI3K/Akt/mTOR pathway using mTOR inhibitors alone or in combination to restore activation of the Ras-dependent death pathway.

**Dr. Basil Rigas, M.D.**
**Stony Brook University Hospital**

## Cancer Prevention through Remote Biological Sensing

One of the major impediments to cancer prevention is the inability to detect transformed cells at their earliest stages and the lack of safe and effective drugs. Biomarkers that currently can be detected in the blood are found in relatively large quantities, and these biomarkers often are generated by tumors already dangerously large. Also, most anticancer drugs carry severe, sometimes fatal, side effects. Thus, there is a need to detect biomarkers early and to minimize anticancer drug toxicity. Dr. Basil Rigas of the Cancer Prevention through Remote Biological Sensing Program (Stony Brook University) will develop wireless sensor technology that can be implanted in the body, identify biomarkers associated with cancer, and deliver medication in situ to eliminate cancer cells.

## New Radiation Therapy Systems

A significant number of men with prostate cancer develop locally advanced or metastatic disease. For many of these men, neither surgery nor radiation therapy provides long-term remission. While the cause of a few prostate cancers can be pinpointed to a basic, underlying genetic change, many more cancers show subtle modifications (epigenetic alterations) that influence the cell's overall characteristics without altering its normal genetic makeup. A promising area of cancer research with therapeutic potential focuses on identifying the role of epigenetic alterations such as histone modifications and DNA methylation in cancer. The New Radiation Therapy Systems Research Program (Nevada Cancer Institute, Las Vegas, Nevada), led by Dr. Nicholas Vogelzang, is investigating whether a combination of radiation therapy with DNA methylation inhibitors or combinations with histone deacetylase inhibitors, anti-angiogenic, or pro-apoptotic therapies will improve the treatment success of prostate cancer initiated by epigenetic changes.

**Nicholas Vogelzang, M.D.**
**Nevada Cancer Institute**

"I served on DOD peer review panels for almost 10 years and saw many outstanding grants and investigators receive funding. This opportunity to work closely with the DOD and its contractors allowed me to experience firsthand what other DOD grantees experience. I found efficiency, speed, a commitment to translational science, and most importantly a respect for peer-reviewed scientific inquiry. I now understand why so many of my colleagues repeatedly turn to the DOD for research funding."

## Prostate Cancer DNA Detection Initiative Program

Serum prostate-specific antigen (PSA) levels are used to determine if cancer is present in the prostate. However, upon biopsy it is often determined that many men with elevated serum PSA levels do not have prostate cancer. The urologist is then faced with a dilemma of whether to repeat the biopsy every 6–12 months. Through the Prostate Cancer DNA Detection Initiative Program (Gen-Probe, San Diego, California), Dr. Harry Rittenhouse and colleagues will develop a more specific molecular diagnostic test for prostate cancer. A molecular marker, PCA3, was identified that is overexpressed in 95 percent of prostate cancers tested, with a median 66-fold upregulation compared with adjacent non-neoplastic prostatic tissue. The marker can be detected in the urine of men with prostate cancer, and its levels can be correlated with subsequent positive biopsy. Other molecular markers that also exhibit overexpression in prostate cancer cells will be evaluated with PCA3 to determine if a combination or panel approach will provide significant improvement to the sensitivity and specificity of the PCA3 molecular urine test for prostate cancer.

## Tripler Cancer Care

The Tripler Cancer Care Program is a collaborative program through the Cancer Research Center of Hawaii at the University of Hawaii (Honolulu, Hawaii) and Tripler Army Medical Center (Honolulu, Hawaii). The joint studies, directed by Dr. Carl-Wilhelm Vogel, will improve cancer screening, develop new treatment, provide access to clinical trials, and develop novel research programs for the benefit of both DOD and non-DOD health care beneficiaries in Hawaii and throughout the greater Pacific Basin. In one of the studies from the Tripler Cancer Care Program, investigators are developing different chemical versions of prostaglandins from marine invertebrates and fungal phytopathogen-derived products for laboratory evaluation as anticancer agents.

# Disease-Specific and General Research Programs

Several of the institutionally based research programs target specific diseases. Some diseases are rare diseases where research is 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.

## Amyotrophic Lateral Sclerosis (ALS)

ALS, also known as "Lou Gehrig's disease," is an incurable, degenerative neurological disorder. For reasons that are not understood, the nerve cells of the brain and spinal cord that control voluntary muscle movement gradually deteriorate. Men and women who have served in the U.S. military are 60 percent more likely to develop a fatal muscle-wasting disease such as ALS than civilians. Moreover, retrospective studies of ALS risk found that veterans of the 1991 Gulf War were twice as likely as their nondeployed era counterparts to develop ALS. Several different programs within the Institutionally Based Research Programs focus on improving therapy to ALS patients. Dr. John Reed of the ALS Research Program (The Burnham Institute, La Jolla, California) will generate neuroprotective chemicals for testing in human clinical trials for ALS, other neurodegenerative diseases, and battlefield injuries including head trauma, spinal cord compression, and ischemia-reperfusion injury due to massive blood loss. The ALS Research Program also will begin an effort to locate, identify, and offer clinical services to every veteran as well as every person currently serving in the military in central and southern California who has a suspicion or diagnosis of ALS. The ALS Therapy Development Program (ALS Therapy Development Foundation, Inc., Cambridge, Massachusetts), led by Dr. Gerard de Zutter, is developing an ALS therapeutic biomarker panel and a new drug delivery methodology to circumvent the blood-brain barrier, often a hindrance to ALS therapies. Using the SOD1G93A transgenic mouse model of ALS, which accurately recapitulates many of the pathological hallmarks of the disease, a set of biomarkers was found that showed changes in expression as disease progressed in the spinal cord. An intrathecal drug delivery device was tested that successfully delivered drugs to the brain and spinal cord that previously had been stopped at the blood-brain barrier. Also, several small molecule compounds were successfully tested for their ability to cross the blood-brain barrier after intraperitoneal or oral administration. Finally, the investigators studied the signals that cause motor neuron degeneration and whether these signals were caused by the denervated muscle.

## Alcoholism

The Alcoholism Research Program received congressional appropriations totaling $38.45M in FY00 through FY06 and $5.5M in FY07. The Alcoholism Research Program, led by Dr. Ray White, 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 FY06 funds were used to support 37 research projects at the Ernest Gallo Clinic and Research Center (EGCRC), a part of the Neurology Department of the University of California, San Francisco (Emeryville, California). Research from the EGCRC is recognized nationally and internationally. Highlights of this research include:

- The fly *Drosophila melanogaster*, a genetic model organism, was used to find genes that may be related to exposure to alcohol. These flies were used to examine if learning and memory and alcohol-induced behavior share common molecular pathways. The principal investigator analyzed the collection for behaviors induced by acute and long-term alcohol exposure. The principal investigator found that the learning/memory mutant collection was enriched (five- to tenfold) for alcohol mutants, supporting the idea that alcohol-induced behavior and learning and memory share common mechanisms. The genes related to these mutants are currently under investigation.
- Little is understood about the neural firing patterns that may guide the initiation of a bout of alcohol consumption. Opioids are known to enhance alcohol intake in part through their action in the nucleus accumbens, which is part of the brain reward circuit. Investigators at EGCRC recently discovered that neural firing in a specific subset of neurons in the rodent nucleus accumbens was inhibited prior to and during bouts of sucrose consumption. This firing pattern was consistent with a role for these neurons in initiating a bout of sucrose consumption. Investigators now are studying how these neurons influence alcohol consumption and how blockades of these areas change alcohol consumption.
- The physiology behind alcohol withdrawal is not well understood. EGCRC investigators have observed behavioral effects associated with the withdrawal from prolonged ethanol exposure in the worm *Caenorhabditis elegans*. Screening of worms with known mutations has identified five mutant strains with behavioral changes after alcohol withdrawal. The investigators are now seeking the genes involved with these changes.
- Corticotropin releasing factor (CRF), which modulates anxiety, is reduced in expression in the central nucleus of the amygdala of protein kinase (PKC) null mice and contributes to reduced anxiety-like behavior in these mice. PKC null mice also consume less alcohol than normal mice. In studies with these mice, both anxiety-like behavior and high levels of alcohol consumption evoked by repeated exposure to alcohol in a limited access paradigm were controlled by PKC signaling in the amygdala. These findings identify a new signaling pathway in the amygdala whereby PKC, through local regulation of CRF, controls anxiety-like behavior and alcohol self-administration. The results provide support for development of an inhibitor of PKC for the treatment of anxiety and alcohol use disorders.

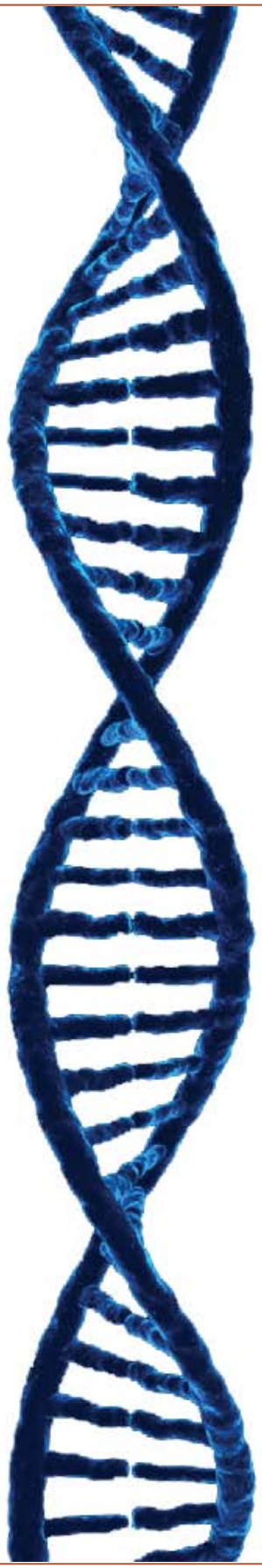
## Children's Hospice

Few hospice programs are dedicated solely to hospice care for children, and many programs are unable to address the unique needs of children and their families. 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 of the children and their families. The goal of the Children's Hospice Program was to develop and promote a model of care that enhances the quality of life for service members' children with life-threatening conditions and their families. Based on an extensive review of potential resources for children with life-threatening conditions, Dr. Cheryl Naulty, principal investigator of the Children's Hospice Program, found that there appeared to be an abundance of possible sources of support available to military families. However, there often are barriers to availability associated with lack of awareness of the resource, accessibility issues, eligibility requirements, quality of the service provided, limited knowledge of how services could be applicable, or financial restrictions. Many of these barriers and challenges could be alleviated or obviated by consistent support through care coordination. Analysis of the military health care benefits revealed that certain services important to the provision of pediatric palliative care, such as proactive care coordination, respite care, and home health care, are either not included in the benefit or were not available in a way that would best help this population. Discussions with officials from the TRICARE Management Activity have led to preliminary interest and support for a focus on care coordination and recommendations on how to improve this service in the military health care system.

**Margaret Pericak-Vance, Ph.D.**
**Duke Center for Human Genetics**

## Genomic Medicine

The Genomic Medicine Program seeks to integrate genomic medicine services into a community health system while developing a comprehensive and transferable model for others to follow. This project strives to lay a foundation for the application of knowledge gained as research into the genetic causes of human diseases advances. Dr. Margaret Pericak-Vance, PI of this program, found that for genetic discoveries to truly improve the health care system, physicians and the public must grasp the importance of their family history to determine their own genetic risk for several diseases. Although physicians reported a desire to incorporate genomic medicine and family history into their practices, several acknowledged barriers. To achieve the goals of the project, focus groups were convened in the community to assess the general public's knowledge of genomic medicine and how this knowledge was obtained. The focus groups showed that patient concerns and misconceptions about genetic information were the most important challenge to overcome. The production and dissemination of educational materials emphasizing the connection between family history and the risk of common diseases using lay terminology were offered as the most efficient response to this obstacle.



## Muscle-Related Research Programs

Muscle research funded through the Institutionally Based Research Programs supports research aimed at developing therapeutics for muscle-degenerative diseases such as muscular dystrophy and healing of muscle wounds. Dr. Johnny Huard of the Muscular Dystrophy Research Program (MDRP; Children's Hospital of Pittsburgh, Pittsburgh, Pennsylvania) is seeking to develop advanced technologies in stem cell and gene therapy methods to alleviate the muscle weakness attributable to muscular dystrophy. The MDRP 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.

The Muscle Research Consortium (Children's Research Institute, Washington, DC), led by Dr. Eric Hoffman, has developed data-sharing and data-mining programs for its protein expression database. The database is available to all researchers. In conjunction with the database, the investigators also are developing an interdisciplinary approach toward translational and preclinical research in Duchenne muscular dystrophy (DMD), the most common type of muscular dystrophy. The projects for this program were chosen through a nationally based consensus-building approach. A conference of parents, biotechnology and pharmaceutical company representatives, and researchers was held, and a "status of the field" was developed. Gaps in the national research portfolio were identified, and this program was designed to help fill these gaps. CDMRP-supported investigators will investigate the mechanisms behind the loss of effective repair and growth in aging muscle and in muscle subjected to persistent or severe damage, study the loss of function that occurs in DMD, and develop new antisense oligonucleotide therapies against DMD.

"The CDMRP funding has functioned something like a 'Special Forces' unit within the general attack on muscular dystrophy," said Dr. Eric Hoffman. CDMRP has funded the first broad research on understanding why glucocorticoids are the only drug to date to slow the progression of the disease. CDMRP has also funded clinical trials and clinical trial infrastructure through the Cooperative International Neuromuscular Research Group (see http://www.cinrgresearch.org).

One of the easiest quantified effects of the CDMRP in supporting muscular dystrophy research has been the "Public Expression Profiling Resource" (PEPR; http://pepr.cnmcresearch.org). This highly advanced Oracle web server provides enormous genomics data sets on the muscular dystrophies at an easily accessible and free site on the Internet. "Each microarray image is about a million data points, and we have about 8,000 microarrays freely available to the public," said Dr. Hoffman of the CDMRP-funded PEPR. Since establishing PEPR in 2003, there have been 52,000 downloads of muscle microarrays from scientists worldwide. "If each scientist would have had to generate these data they download on their own, this would have cost $52 million for what they now obtain for free through the Internet." Importantly, many of the data sets that are necessary for understanding

**Eric Hoffman, Ph.D.**
**Research Center for Genetic Medicine**
**Children's National Medical Center**

muscular dystrophy are also important for understanding muscle damage and repair resulting from trauma in battle.

"The FY07 CDMRP funding has focused on the most promising molecular therapeutic for Duchenne muscular dystrophy, namely exon skipping," said Dr. Hoffman. Exon skipping involves synthesizing small molecular patches out of highly synthetic DNA-like material that effectively causes the patient's gene to skip over the gene mutation. The CDMRP Program Project includes researchers at University of California, Los Angeles, Carolinas Medical Institute, and Children's National Medical Center in Washington DC. "Human trials on exon skipping are under way, and there is considerable optimism regarding this approach" stated Dr. Hoffman. "There remain some fairly significant hurdles to widespread implementation of exon skipping, but the CDMRP is giving us the research support to clear these hurdles as quickly as possible."

## Platelet Transfusion Therapy

Platelet transfusions are used in the treatment of several diseases that produce low platelet counts. The majority of patients are receiving chemotherapy or stem cell transplants for cancer. In addition, large numbers of platelets may be required to control bleeding following trauma or during open heart surgery. The number of platelet transfusions has increased more than transfusions of other blood components. While platelet transfusions often rescue patients with very low platelet levels, they are associated with the risk of the patient generating an immune response against the donor platelets, called alloimmunization. Alloimmunization against platelet transfusions is primarily characterized by the development of anti-donor human leukocyte antigen (HLA) antibodies that enhance the destruction of the transfused platelets. Dr. Sherrill Slichter through the Platelet Transfusion Therapy Program seeks to understand the immune mechanisms leading to alloimmunization and to develop efficacious therapies that circumvent this adverse response.

**Dr. Sherrill Slichter, M.D.**
**University of Washington School of Medicine**

"Platelet transfusions are required to prevent bleeding in patients with low platelet counts. Alloimmunization can result in life-threatening bleeding if compatible donors cannot be identified. Because of the complexity of the HLA system, compatible donors are often not identified. Therefore, it is highly desirable to prevent platelet alloimmunization by modifying the donor platelets prior to transfusion to prevent them from being recognized as foreign by transfused recipients. Understanding how to modify platelets to reduce their immunogenicity is the focus of our studies."

**Dean Ornish, M.D.**
**Preventive Medicine Research Institute**

## Preventive Medicine Research Institute

Dr. Dean Ornish of the Preventive Medicine Research Program (Preventive Medicine Research Institute, Sausalito, California) studies the role of lifestyle in the progression of coronary heart disease (CHD). Men and women across socioeconomic boundaries that are enrolled in the Preventive Medicine Research Institute's studies adhere to a comprehensive lifestyle modification program that includes making dietary changes (whole food plant-based diet; <10 percent fat, 15 percent protein, 75 percent complex carbohydrates), engaging in moderate aerobic and strengthening exercise, practicing stress reduction techniques, and attending support group sessions. CHD patients enrolled in the study, irrespective of educational levels were able to make comprehensive lifestyle changes with clinically and statistically significant improvements in medical and psychosocial status. The observed changes and subsequent improvements suggested that accessibility to insurance-sponsored lifestyle programs may benefit patients with CHD across all socioeconomic levels. Diverse groups of patients, from those with angina to those with a high risk of heart disease, benefited from the changes in lifestyle through the lifestyle modification program. Lifestyle changes also improved patients' psychological well-being for 1 year and 5 years (for those with high adherence to the program) and remain associated with improved cardiac status after 5 years. The study also showed the importance of including social support groups in cardiac rehabilitation, not only for benefits in lowering blood pressure and increasing program adherence but also for improvements in health behaviors and quality of life. Improvements in stable CHD patients enrolled in comprehensive lifestyle change programs could drastically reduce the need for costly and risky revascularization procedures in the future.

## Respiratory Biodefense Research

The Respiratory Biodefense Research Program at the National Jewish Medical and Research Center (Denver, Colorado) focuses on immunology and respiratory disease. This program is being led by Dr. Robert Mason who is addressing issues in respiratory disease important to the military. Areas of focus include radiation injury, as would occur after a dirty bomb blast; sulfur mustard, a toxic gas that has already been used in battlefield situations; anthrax, the ideal bioterrorism weapon that has previously been deployed within the United States; and influenza, which is the most likely pandemic to hit the military in the next decade. The Respiratory Biodefense Research Program will identify drug targets for novel therapeutic interventions for these areas.

## Spinal Muscular Atrophy

Spinal muscular atrophy (SMA) is a genetic, motorneuron disease caused by mutations in the survival of motor neuron (SMN1) gene that is characterized by the wasting of skeletal muscles due to progressive degeneration of nerve cells in the spinal cord. The disease leads to increasing muscle weakness and atrophy and premature death. The SMA Foundation estimates that there are currently over 50,000 people suffering from SMA in the United States, Europe, and Japan. Because disease severity in patients has been shown to directly correlate with the amount of SMN protein produced, increasing its expression has become an important focus for ongoing research and one of the most promising SMA treatment strategies. The FY05–FY06 Spinal Muscular Atrophy Program (Lexicon Pharmaceuticals, Inc., The Woodlands, Texas, headed by Dr. Brian Zambrowicz) is applying proprietary gene knockout technologies and mammalian gene function analyses to efficiently identify potential drug targets that alter intracellular levels of SMN protein. Targets that have potential for therapeutic treatment for SMA may also have implications for the treatment of other neurological diseases of high importance to the military, such as spinal cord injury and neurotrauma, ALS, and Parkinson's disease.

## Other Programs Managed by the CDMRP, FY95–FY06

3D Imaging and Genomic Analysis for Breast Cancer Management, FY04, $1.7M, General Electric Global Research (Niskayuna, New York), PI: Dr. Collin McCulloch

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

Advances in Breast Cancer Therapy Research, FY05–FY06, $3.0M, Precision Therapeutics, Inc. (Pittsburgh, Pennsylvania), PI: Dr. Holly Gallion

Alcoholism Research, FY00–FY06, $38.45M, Ernest Gallo Clinic and Research Center (Emeryville, California), PI: Dr. Ray White

ALS Therapy Development, FY05, $2M, ALS Therapy Development Institute (Cambridge, Massachusetts), PI: Dr. Gerard De Zutter

ALS Research, FY06, $2.6M, The Burnham Institute (La Jolla, California), PI: Dr. John Reed

Anderson Cancer Center Prostate Cancer Study, FY06, $0.5M, M.D. Anderson Cancer Center (Houston, Texas), PI: Dr. Lovell Jones

Arthropod-borne Infectious Disease Control Research, FY02, $2.5M, University of Connecticut Health Sciences Center (Farmington, Connecticut), PI: Dr. Stephen Wikel

Biological and Immunological Infectious Agent and Cancer Vaccine Research, FY06, $2.3M, Dana-Farber Cancer Institute (Boston, Massachusetts), PI: Dr. Ellis Reinherz

Biomedical Sciences and Technology, FY06, $1.8M, University of Texas at Dallas (Dallas, Texas), PI: Dr. Steven Goodman

Breast Cancer Imaging Research, FY03, $6M, Eight awards made to multiple institutions

Cancer Biomolecular Markers Research, FY06, $1M, Sbarro Health Research Organization (Philadelphia, Pennsylvania), PI: Dr. Antonio Giordano

Cancer Center of Excellence, FY01–FY02, $3.1M, Notre Dame University (South Bend, Indiana), PI: Dr. Rudolph Navari

Cancer Prevention through Remote Biological Detection, FY06, $1M, State University of New York, Stony Brook (Stony Brook, New York), PI: Dr. Basil Rigas

Cancer Research, FY01, $5.5M, State University of New York at Stony Brook (Stony Brook, New York), PI: Dr. Wadie Bahou

Cancerous Brain Tumors Drug Research, FY05, $1M, Targepeutics, Inc. (Hershey, Pennsylvania), PI: Dr. Carmella Moody

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), PI: COL David McLeod

Center for Targeted Cancer Therapy, FY06, $1M, Cancer Therapy and Research Center (San Antonio, Texas), PI: Dr. John Cole

Childhood Cancer Research Program, FY06, $2.375M, National Childhood Cancer Foundation (Bethesda, Maryland), PI: Dr. Gregory Reaman

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), PI: Dr. Stephen Carper

Computer-Aided Diagnosis, FY97, $3M, Navy Medical Research and Development Command (Bethesda, Maryland), PI: Dr. Lyn Yaffe

Computer-Assisted Cancer Device, FY04–FY05, $2.1M, Henry M. Jackson Foundation (HMJF) (Rockville, Maryland) for WRAMC (Bethesda, Maryland) and Windber Research Institute (Windber, Pennsylvania), PI: Dr. Albert Porambo

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

Defense Women's Health Research, FY95, $40M, 69 awards made for intramural and extramural research at multiple institutions

Diagnostic and Surgical Breast Imaging, FY99, $2M, Four awards made to different institutions

Diagnostic and Therapeutic Cancer Care Equipment, FY05–FY06, $11.8M, Boston Medical Center for the Joe Moakley Hospital (Boston, Massachusetts), PI: Dr. Lisa Kachnic

Donor Cord Blood Demonstration, FY04, $1M, Wayne State University (Detroit, Michigan), PI: Dr. Voravit Ratanatharathorn

Early and Rapid Analyzer for Heart Attack Diagnosis, FY06, $0.5M, Minneapolis Medical Research Foundation (Minneapolis, Minnasota), PI: Dr. Fred Apple

Early Diagnosis, Treatment, and Care of Cancer Patients Research Program, FY06, $2.5M, University of Rochester (Rochester, New York), PI: Dr. Richard Fisher

Electrical Impedance Scanning Device, FY04, $1M, HMJF (Rockville, Maryland) for TranScan Medical (Ramsey, New Jersey) and WRAMC (Bethesda, Maryland), PI: Dr. Alexander Stojadinovic

Fragile X Research, FY02, $1M, Children's Hospital of Pittsburgh (Pittsburgh, Pennsylvania), PI: Dr. David Perlmutter

Gallo Cancer Center, FY00–FY01, FY03–FY06, $12.05M, University of Medicine and Dentistry of New Jersey (New Brunswick, New Jersey), PI: Dr. Robert DiPaola

Genetic Cancer Research (also funded with an appropriation titled Center for Women's Cancer Genetics), FY04–FY06, $5.0M, Cold Spring Harbor Laboratory (Cold Spring Harbor, New York), PI: Dr. Robert Lucito and Dr. Michael Wigler

Genomic Medicine and Gene Therapy, FY04–FY06, $9.0M, Moses Cone Health System (Durham, North Carolina), PI: Dr. Margaret Pericak-Vance

Hepatitis C Research, FY02, $3.4M, Uniformed Services University of the Health Sciences (Bethesda, Maryland), PI: COL Maria Sjogren

Life Sciences Research Initiative, FY05–FY06, $1.0M, Pioneer Valley Life Sciences Institute (Springfield, Massachusetts), PI: Dr. Lawrence Schwartz

Lung Cancer Research, FY00–FY06, $49.7M, University of Texas M.D. Anderson Cancer Center (Houston, Texas), PI: Dr. Waun Ki Hong

Military Asthma Research, FY06, $1M, Le Moyne-Owen College (Memphis, Tennessee), PI: Dr. Cheryl Golden

Molecular Medicine, FY04, $1M, General Electric Global Research (Niskayuna, New York), PI: Dr. John Schenck

Molecular Switching Vaccines for Biodefense (formerly Cancer Vaccine Research), FY05–FY06, $5.5M, Cerus Corporation (Concord, California), PI: Dr. Thomas Dubensky

Monoclonal Antibodies, Massachusetts Biological Laboratory, FY02, $1M, University of Massachusetts Medical Center (Worcester, Massachusetts), PI: Dr. Donna Ambrosino

Muscle Research Consortium, FY04–FY06, $6.9M, Children's Research Institute (Washington, DC), PI: Dr. Eric Hoffman

Muscular Dystrophy Research, FY03–FY06, $11.85M, Children's Hospital of Pittsburgh (Pittsburgh, Pennsylvania), PI: Dr. Johnny Huard

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

National Prion Research, FY02, FY05, $44M, 38 awards in FY02 to universities, hospitals, nonprofit institutions, private industry, and state and federal agencies; one award in FY05 to McLaughlin Research Institute (Great Falls, Montana), PI: Dr. George Carlson

Neurogenetic Research and Computational Genomics, FY04, $1M, University of Southern California (Los Angeles, California), PI: Dr. Xia Jiang Chen

Neutron Therapy Research, FY05–FY06, $2.7M, Northern Illinois University (Dekalb, Illinois), PI: Dr. John Lewis

New Radiation Therapy Systems, FY06, $1.5M, Nevada Cancer Institute (Las Vegas, Nevada), PI: Dr. Nicholas Vogelzang

Noninvasive Nanodiagnostics of Cancer, FY06, $2M, University of Nebraska Medical Center (Omaha, Nebraska), PI: Alexander Kabanov

Orphan Disease Drug Discovery Research, FY05–FY06, $3.7M, University of Pittsburgh (Pittsburgh, Pennsylvania), PI: Dr. John Lazo

Osteoporosis Research, FY95, $5M, Five awards funded at different institutions

Pediatric Brain Tumor and Neurological Disease Research, FY05–FY06, $3M, Miami Children's Hospital (Miami, Florida), PI: Dr. Prasanna Jayakar

Pediatric Hospice, FY03–FY04, $2.5M, HMJF for the Children's Hospice Program at WRAMC (Bethesda, Maryland), PI: Dr. Cheryl Naulty

Platelet Transfusion Therapy, FY06, $1M, Puget Sound Blood Center (Seattle, Washington), PI: Sherrill Slichter

Post-Polio Syndrome Research, FY99–FY00, $2.3M, Albert Einstein Medical Center and Moss Rehabilitation Research Institute (Philadelphia, Pennsylvania), PI: Dr. Mary Klein

Preventive Medicine Research Institute, FY05–FY06, $2.9M, Preventive Medicine Research Institute (Sausalito, California), PI: Dr. Dean Ornish

Preventive Medicine Research for Prostate Cancer, FY04–FY05, $2.4M, Preventive Medicine Research Institute (Sausalito, California), PI: Dr. Dean Ornish

Prostate Cancer DNA Detection Initiative, FY06, $2.8M, Gen-Probe, Inc. (The Woodlands, Texas), PI: Dr. Harry Rittenhouse

Respiratory Biodefense, FY06, $1.85M, National Jewish Medical and Research Center (Denver, Colorado), PI: Dr. Robert Mason

Scleroderma Research, FY06, $0.5M, Medical University of South Carolina (Charleston, South Carolina), PI: Dr. Mee Keong Beon; Stanford University (Stanford, California), PI: Dr. Howard Chang; and University of California, Los Angeles (Los Angeles, California), PI: Dr. Ruth Baxter

Spinal Muscular Atrophy Research, FY05–FY06, $4.75M, Lexicon Genetics, Inc. (The Woodlands, Texas), PI: Dr. Brian Zambrowicz

Targeted Nano-Therapeutic for Advanced Breast and Prostate Cancers, FY04–FY06, $3M, Triton Biosystems, Inc. (Chelmsford, Massachusetts), PI: Dr. Robert Ivkov

Tripler Cancer Care, FY05, $8.5M, University of Hawaii and Tripler Army Medical Center (Honolulu, Hawaii), PI: Carl-Wilhelm Vogel

University of Tennessee Cancer Institute Cancer Care Initiative, FY06, $1M, University of Tennessee Health Science Center (Memphis, Tennessee), PI: Dr. Gabor Tigyi

Veterinary Manpower Development, FY05–FY06, $0.8M, Tufts University (Boston, Massachusetts), PI: Dr. M. Sawkat Anwer

# Other Programs Managed by the CDMRP in FY07

**The following programs received appropriations in FY07:**

ALS Therapy Development for Gulf War Research, $1M, Identification of disease risk factors, development of diagnostic tools, elucidation of mechanisms that regulate disease progression, and the identification and development of definitive therapeutic interventions for ALS.

Alcoholism Research (listed in FY07 with an appropriation entitled "California Gallo Center Neurological Research"), $5.5M, Focuses on the addiction properties of alcoholism and the inherent changes in brain function that lead to craving, tolerance, and withdrawal, as well as the identification of treatments at the neurochemical level.

DOD Biological and Immunological Infectious Agent and Cancer Vaccine Research, $1.9M, Develop ways to help an individual's body recognize tumor cells as life-threatening, foreign cells that should be fought and destroyed using cancer cell proteins to tag the cells as intruders and alert the immune system.

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

National Center for Cancer Prevention through Remote Biological Sensing, $1.1M, Develop systems for cancer detection and prevention through the use of implanted wireless sensors, complex computing, and nanotechnological drug delivery.

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

Military Dependent Childhood Cancer Research (USOC/COG), $3M, Investigate better therapeutics for childhood cancers.

Diagnostic and Therapeutic Cancer Care Equipment, $3M, Examine the diagnostic and therapeutic effect of emerging technologies in imaging and radiation oncology on cancer and the effect of equipment access on the quality of cancer patient care.

Early and Rapid Analyzer for Diagnosis of Heart Attacks, $1M, Develop new methods to diagnose heart attacks.

Early Diagnosis, Treatment, and Care of Cancer Patients Research Program (listed in FY07 with an appropriation entitled "CIC Interdisciplinary Research for Prevention, Diagnosis, and Treatment of Cancer"), $2.25M, Develop new approaches to the diagnosis and treatment of cancer while maintaining high standards of patient care.

Genetic Cancer Research (listed in FY07 with an appropriation entitled "Cancer Genomics Center for Women in the Military"), $1.8M, Identification and characterization of causative genetic defects in human cancers and in particular for ovarian and breast cancers.

Genomic Medicine and Gene Therapy, $1.8M, Develop a model for the introduction of genomic medicine concepts to the U.S. military and civilian health care institutions in preparation for the future of personalized medical practice.

Life Science Research Initiative, $1M, Identify new cancer susceptibility genes and discover nutritional supplements that have chemopreventive properties for the treatment of breast cancer.

Muscle Research Consortium (listed in FY07 with an appropriation entitled "Cooperative International Neuromuscular Research"), $1.9M, Increase the number and quality of clinical trials in muscle-related disease patients with the goal of improving muscle structure and function.

Muscular Dystrophy Research (listed in FY07 with an appropriation entitled "Duchenne Muscular Dystrophy (DMD) Repair and Regeneration Clinical Trials"), $1.5M, Develop advanced technologies in stem cell and gene therapy methods to alleviate the muscle weakness attributable to muscular dystrophy.

Neutron Therapy Research (listed in FY07 with an appropriation entitled "Neutron/Hadron Particle Therapy"), $3.3M, Develop applications of neutron therapy beyond its current uses through additional basic and clinical research.

NVCI New Radiation Therapy Systems, $1M, Develop new practices that advance current radiation therapy modalities into more tumor-targeted, healthy tissue-sparing procedures.

Military Dependent Pediatric Brain Tumor and Neurological Disease Research, $1.2M, Develop novel diagnostics and therapeutics for brain tumors and neurological diseases specific to children.

Prader-Willi Syndrome (PWS) Research, $1M, Improve understanding of the molecular and cellular mechanisms underlying PWS with the ultimate aim of developing new interventions to improve the quality of life of individuals with PWS and their families.

Preventive Medicine Research Institute, $1.8M, Develop, implement, and evaluate dietary and lifestyle changes that will serve as a means to prevent cardiovascular disease.

Prostate Cancer DNA Detection Initiative, $1.2M, 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 PSA test.

Respiratory Biodefense, $2.65M, Develop and test new drugs, vaccines, and immunomodulatory approaches to protect civilians and military personnel against the adverse health effects of radiation, toxic chemicals, and biological agents.

SMA Research, $3.3M, Identify the protein defects causing SMA that will lead to potential therapeutics for SMA patients.

Targeted Nanotherapy for Advanced Breast and Prostate Cancers, $1M, Identify and characterize targeted therapies for breast and prostate cancers using nanotherapeutics.

Targeted Radiation Therapy for Cancer Initiative, $2M, Enhance targeted radiation therapy modalities to improve target localization, spare normal tissue, and increase tumor control in cancer patients.

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

Warfighter Cancer Care Engineering, $1.2M, Use a systems engineering approach to provide more successful prevention strategies, more effective treatments, and more efficient care delivery.