

ANNUAL REPORT

OF THE

TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

FISCAL YEAR 2005

NATIONAL CENTER ON SLEEP DISORDERS RESEARCH (NCSDR)
NATIONAL HEART, LUNG, AND BLOOD INSTITUTE
NATIONAL INSTITUTES OF HEALTH

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Michael J. Twery, PhD
Acting Director, National Center on Sleep Disorders Research
National Heart, Lung, and Blood Institute

Al Golden, MPH
National Center on Sleep Disorders Research
National Heart, Lung, and Blood Institute

Andrew Monjan, PhD, MPH
National Institute on Aging

Ellen Witt, PhD
National Institute on Alcohol Abuse and
Alcoholism

Deborah Ader, PhD
National Institute of Arthritis and
Musculoskeletal and Skin Diseases

Ann O'Mara, PhD, RN
National Cancer Institute

Marian Willinger, PhD
National Institute of Child Health and
Human Development

Nancy Pearson, PhD
National Center for Complementary and
Alternative Medicine

Harold Gordon, PhD
National Institute on Drug Abuse

William T. Riley, PhD
National Institute of Mental Health

Merrill M. Mitler, PhD
National Institute of Neurological Disorders and
Stroke

Kathy Mann Koepke, PhD
National Institute of Nursing Research

Eleanor Z. Hanna, PhD
Office of Research on Women's Health

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INTRODUCTION

The Trans-NIH Sleep Research Coordinating Committee (SRCC) was established in 1986 by the Director, National Institutes of Health (NIH) for the purpose of facilitating interchange of information on sleep and sleep-related research. The SRCC meets every 2-3 months to discuss ongoing activities in NIH sleep-related programs and to develop new programs. In conjunction with the creation of National Center on Sleep Disorders Research (NCSDR) in 1993, the Director of NIH transferred responsibility for the Trans-NIH SRCC to the NCSDR, and the NCSDR Director serves as Chair of the Trans-NIH SRCC. The SRCC membership in Fiscal Year 2005 included the following NIH Institutes and Centers:

National Heart, Lung, and Blood Institute (NHLBI)
National Institute on Aging (NIA)
National Institute on Alcohol Abuse and Alcoholism (NIAAA)
National Institute of Arthritis and Musculoskeletal and Skin Diseases (NIAMS)
National Cancer Institute (NCI)
National Institute of Child Health and Human Development (NICHD)
National Center for Complementary and Alternative Medicine (NCCAM)
National Institute of Diabetes and Digestive and Kidney Diseases (NIDDK) *
National Institute on Drug Abuse (NIDA)
National Institute of Mental Health (NIMH)
National Institute of Neurological Disorders and Stroke (NINDS)
National Institute of Nursing Research (NINR)
Office for Research on Women's Health (ORWH)

** New SRCC member in Fiscal Year 2005*

In addition, the National Center for Research Resources (NCRR), the National Institute of Biomedical Imaging and Bioengineering (NIBIB), the National Institute of Environmental Health Sciences (NIEHS), the National Institute of Dental and Craniofacial Research (NIDCR) and the National Institutes of Health RoadMap each has a sleep-related portfolio in Fiscal Year 2005 and this information is included in the Financial Summary and Grant Listings at the end of this Report.

The NCSDR was established within The National Heart, Lung, and Blood Institute (NHLBI) in 1993. As an advocacy and coordinating center, it is responsible for supporting and facilitating basic and clinical research, research training, health information dissemination, and other activities related to sleep disorders. The NCSDR also coordinates sleep-related programs within NIH and with other federal agencies and public organizations. The NCSDR maintains a complete file of Trans-NIH SRCC Annual Reports from the initiation of the SRCC in 1986.

THE NATIONAL CENTER ON SLEEP DISORDERS RESEARCH

MICHAEL TWERY, PH.D., ACTING DIRECTOR
AL GOLDEN, MPH, PUBLIC HEALTH ADVISOR

The NCSDR is a component of the National Heart, Lung, and Blood Institute (NHLBI) and is charged with the conduct and support of research, training, health information dissemination, and other activities with respect to sleep disorders, including biological and circadian rhythm research, basic understanding of sleep, chronobiological and other sleep related research. The NCSDR also coordinates the activities of the Center with similar activities of other Federal agencies, including the other agencies of the NIH, and similar activities of other public and nonprofit entities. Community input is obtained through a Sleep Disorders Research Advisory Board which meets twice a year. A list of selected coordination activities and programs in which NCSDR participated during Fiscal Year 2005 is outlined below.

Fiscal Year 2005 Initiatives, Conferences and Reports

PA-05-046: Research on Sleep and Sleep Disorders
<http://grants.nih.gov/grants/guide/pa-files/PA-05-046.html>

Sponsors: NHLBI; NIA; NIAAA; NIAMS; NCI; NICHD; NCCAM; NIDA; NIMH; NINDS;
NINR; ORWH/OD

Release Date: February, 2005

Objectives: Encourage research to advance biomedical knowledge related to sleep or sleep disorders, improve understanding of the neurobiology or functions of sleep over the life-span, enhance timely diagnosis and effective treatment for individuals affected by sleep-related disorders, or implement and evaluate innovative community-based public health education and intervention programs.

State of the Science Conference: Manifestations and Management of Chronic Insomnia in Adults
<http://consensus.nih.gov/2005/2005InsomniaSOS026PDF.pdf>

Coordinating Agency: NIH Office of Medical Applications and Research (OMAR)

Date: June 13-15, 2005
Location: Natcher Center, NIH

NIH Sponsors NIMH (Lead Institute), NCSDR, NCCAM, NIA, NIAAA, NIDA, NINDS, NINR, ORWH

Other Federal Sponsors Veterans Administration; Food and Drug Administration (FDA); Federal Railroad Administration, Department of Transportation (DOT); Agency for Healthcare Research and Quality (AHRQ)

Outcome: The two day Conference on the Manifestations and Management of Chronic Insomnia in Adults included an analysis of existing evidence in the medical literature, and expert presentations on the latest scientific knowledge about

chronic insomnia and available treatments. An independent panel prepared and presented conference statement that addressed questions listed below.

1. How is chronic insomnia defined, diagnosed, and classified, and what is known about its etiology?
2. What are the prevalence, natural history, incidence, and risk factors for chronic insomnia?
3. What are the consequences, morbidities, comorbidities, and public health burden associated with chronic insomnia?
4. What treatments are used for the management of chronic insomnia, and what is the evidence regarding their safety, efficacy, and effectiveness?
5. What are important future directions for insomnia-related research?

Online access to the Final Statement, the literature review, the Program and Abstract book, and the archived videocast of the conference is at <http://consensus.nih.gov/PREVIOUSSTATEMENTS.htm>

State of the Science Conference Related Publications

- National Institutes of Health. State of the Science Conference Statement on Manifestations and Management of Chronic Insomnia in Adults, June 13-15, 2005. *Sleep*. 2005 Sep 1;28(9):1049-57.
- Buscemi N, et al., Manifestations and Management of Chronic Insomnia in Adults. Evidence Report/Technology Assessment No. 125. (Prepared by the University of Alberta Evidence-based Practice Center, under Contract No. C400000021.) AHRQ Publication No. 05-E021-2. Rockville, MD: Agency for Healthcare Research and Quality. June 2005.

State of the Science Conference Related Commentaries

- NIH State-of-the-Science Conference on Chronic Insomnia. Regina T. Dolan-Sewell, Ph.D.; William T. Riley, Ph.D.; Carl E. Hunt, M.D. *J Clin Sleep Med*. 2005;1(4): 233-4
- Insomnia State of the Science: An Evolutionary, Evidence-Based Assessment. Daniel J. Buysse, MD. *Sleep*, Vol. 28, No. 9, 2005: 1045-6.
- The Diagnosis and Treatment of Chronic Insomnia in Adults. Alexandros N. Vgontzas, MD. *Sleep*, Vol. 28, No. 9, 2005: 1047-8.

Development of Strategies and Recommendations for Enhanced Support of Sleep Medicine and Sleep Research in Academic Health Centers (Institute of Medicine (IOM) Study
<http://www.iom.edu/?id=23160>

Sponsors: NIH Office of Evaluation, American Academy of Sleep Medicine, Sleep Research Society, National Sleep Foundation

In follow-up to recommendations put forward by the Sleep Disorders Research Advisory Board, the NIH, NCSDR, members of the Trans-NIH Sleep Research Coordinating Committee, and other public, nonprofit entities commissioned an IOM study to develop strategies and

recommendations addressing the fragmentation of sleep-related research and clinical care currently typical of academia. This 18-month study brought together experts in public health, academic and medical administration, and health sciences research for a series of public and closed session discussions that began in Fiscal Year 2005. The committee report is expected in April 2006.

2003 National Sleep Disorders Research Plan

http://www.nhlbi.nih.gov/health/prof/sleep/res_plan/index.html

The National Sleep Disorders Research Plan continues to serve as a resource that summarizes advances in knowledge since 1996, current gaps in knowledge, and a broad range of recommendations for future sleep research. The 2003 National Sleep Disorders Research Plan can be accessed online (in html and pdf versions) at the website listed above. Printed copies of the Plan can be obtained by contacting the NCSDR.

Community Outreach, Education, and Coordination

NCSDR maintains a website (<http://www.nhlbi.nih.gov/sleep>) with information on sleep disorders for patients and health care providers. A special area of emphasis is educating youth. The NCSDR Sleep Well, Do Well, Star Sleeper Campaign (<http://www.nhlbi.nih.gov/health/public/sleep/starslp/>) was launched in 2001 and continues to educate America's children – and their parents, educators, and healthcare providers – about the importance of adequate night time sleep. Another innovative development is the high school curriculum module on Sleep, Sleep Disorders, and Biological Rhythms produced in partnership with the NIH Office of Science Education (<http://science.education.nih.gov/customers.nsf/HSSleep>). The module includes a teacher's study guide, suggested student activities, and web-based simulations available from the NIH at no cost to high school educators.

Following-up on public interest in sleep is another major NCSDR activity. In Fiscal Year 2005, the NCSDR prepared over a thousand responses to individual queries from the public, health care professionals, and lay publications (newspapers, internet, radio, and television). In the spirit of coordination, the NCSDR partners with professional organizations such as the American Academy of Pediatrics (AAP) which published guidelines on Sleepiness in Adolescents and Young Adults in June 2005.

In addition, the NCSDR convened two meetings of the Sleep Disorders Research Advisory Board including representatives from other Federal agencies in Fiscal Year 2005 to discuss the status of sleep disorders research. These meetings are videocast live and accessible in an online archive (<http://videocast.nih.gov/ram/sleep120605.ram>, <http://videocast.nih.gov/ram/sleep060905.ram>)

Selected NIH News Releases concerning Sleep and Sleep Disorders in Fiscal Year 2005

Panel Calls for a New Look at Treatments Commonly Used for Chronic Insomnia - NIH State-of-the-Science Panel Also Recommends Broader Use of Cognitive and Behavioral Therapies

<http://www.nih.gov/news/pr/jun2005/od-15.htm>

Breathing Problems During Sleep May Affect Mental Development in Infants and Young Children (jointly prepared by NHLBI and NICHD)

<http://www.nhlbi.nih.gov/new/press/04-10-07.htm>

Study Finds Possible Mechanism for Link Between Sleep Disturbances and Metabolic Syndrome (jointly prepared by NIA, NHLBI, NIDDK)

<http://www.nhlbi.nih.gov/new/press/05-04-21.htm>

News Release: Sleep Apnea and Risk for Stroke and Death

<http://www.nhlbi.nih.gov/new/press/05-11-09.htm>

**ACTIVITIES OF TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE
MEMBER INSTITUTES AND CENTERS**

NATIONAL HEART, LUNG, AND BLOOD INSTITUTE (NHLBI)

MICHAEL TWERY, PHD - NHLBI REPRESENTATIVE TO THE TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

The NHLBI sleep research program covers a spectrum of sleep research related to heart, lung, and blood diseases. The research programs are aimed at understanding the molecular, genetic, and physiological underpinnings of sleep and sleep disorders through basic, clinical, and epidemiological research. A major focus is sleep disordered breathing (SDB) as a potential risk factor for cardiopulmonary disease, stroke, and weight gain. NHLBI is a major supporter of investigator-initiated sleep research at NIH.

Mounting evidence indicates that SDB is a chronic disease condition associated with serious cardiovascular outcomes. Evidence suggests that SDB is relatively common affecting at least 3% of children, 2% of middle-aged women, 4% of middle-aged men, and 10-20% of the elderly. The incidence of new sleep disordered breathing cases has been estimated to be 3-6%. However, less than 10% of adult SDB cases are diagnosed. If left untreated, SDB predisposes to an increased risk of new hypertension and heart attack through sympathetic activation, hyperleptinemia, insulin resistance, elevated C reactive protein (CRP) levels, and oxidative stress. Since the treatment of SDB may ameliorate the severity of cardiovascular disease risk factors, studies of the relationship between SDB and cardiovascular outcomes are clinically important.

Stroke

New findings from two independent studies associate SDB with a 2-4 fold increased frequency of stroke in middle age adults. A 3 year prospective clinical study of 1,000 middle age adults found that the frequency of stroke and all-cause mortality was doubled among participants diagnosed with moderate to severe sleep apnea. The association was independent of common risk factors including age, sex, race, smoking status, body-mass index (BMI), and the presence or absence of diabetes mellitus, hyperlipidemia, atrial fibrillation, and hypertension. This is the first longitudinal study indicating that the relationship of sleep apnea severity to stroke and all-cause mortality is independent of common cardiovascular and cerebrovascular risk factors.

A cross sectional community based study of 1,500 participants associated a diagnosis of moderate-severe apnea with a 4 fold increased frequency of stroke. A prospective sub study of 1,200 participants in the same community also indicated that the frequency of first time stroke over four years was 4 fold greater if initially diagnosed with moderate to severe apnea, but was dependent on BMI. These findings are the first evidence that sleep disordered breathing precedes stroke and may, in fact, contribute to the development of stroke.

Left Ventricular Function in Children

A recent study evaluated heart function in a sequential sample of 60 children (ages 5-18) referred to a pediatric sleep clinic using echocardiographic imaging and blood pressure at rest. Left ventricular (LV) diastolic function was decreased in apneic children (apnea hypopnea index > 5) compared to children with very mild sleep disordered breathing (snoring). The decrease in LV function was proportional to apnea severity and independent of age, gender, race, and blood pressure. Follow-up of 10 children in which the apnea was treated and managed for one year

(tonsillectomy, uvulopalatopharyngoplasty, or CPAP dictated by standard of care) revealed an 18% improvement in LV function. Follow-up of 9 untreated snoring children revealed a trend toward decreased LV function at one year which did not reach significance.

Short Sleep Duration, Metabolism Impairment, and Elevated Risk of Obesity.

New findings from a study of 1,500 participants in the Sleep Heart Health Study indicate that sleep duration of 6 hours or less is associated with an increased frequency of diabetes and impaired glucose tolerance (IGT). At 5 hours of sleep or less, the odds ratio for diabetes presence increased to 2.5, and with 6 hours of sleep the odds ratio for diabetes presence increased to 1.6 compared to those with 7-8 hours of sleep. The association between sleep duration and IGT and diabetes persists after excluding insomnia and adjusting for girth, demographic factors, caffeine, and cardiovascular disease risk factors. Sleep duration longer than 9 hours per night was also associated with a greater risk of poor glycemic control.

New findings in a mutant mouse model link insufficient sleep to abnormalities in the regulation of hunger, satiety, and metabolism. Mice with a mutation in the Clock gene sleep less, expend less energy, consume more calories, and gain as much weight on a regular diet as normal mice fed a high-fat diet. Overall daily activity levels in mutant and normal mice are similar. Short sleeping mutant mice fed a high-fat diet gained about 50 % more weight than normal mice on this diet. Weight gain in short sleeping mutants fed a regular diet was associated with a 65% increase in lean mass and a 35% increase in fat mass, whereas mutants fed the high-fat diet exhibited a 25% increase in lean mass and a 75% increase in fat mass relative to normal mice. The adult short sleeping mutant mice had high levels of blood cholesterol, triglycerides, and glucose, and insulin resistance indicative of metabolic disease. High leptin blood levels and reduced levels of ghrelin and orexin in brain indicate that abnormalities in signaling satiety and hunger to brain are associated with weight gain in the short sleeping mutant mice.

Clinical Trials, Observational Studies, and Specialized Centers of Research

A diverse program of clinical trials and observational studies is underway to elucidate the specific cardiopulmonary risks and excessive sleepiness associated with sleep disordered breathing. The Apnea Positive Pressure Long-Term Efficacy Study (APPLES) seeks to determine whether using a continuous positive airway pressure (CPAP) device during sleep decreases excessive daytime sleepiness and improves daytime cognition and performance. The Sleep Heart Health Study (SHHS) is investigating how sleep disordered breathing affects the risk of heart attack, stroke, hypertension, and total mortality over a 14 year period. A substudy of the LookAhead clinical trial is characterizing sleep disordered breathing severity in a population with pre-existing obesity and diabetic conditions. Sleep disorders and cardiovascular outcomes are also being evaluated in children and elderly populations. Other ongoing studies are focused on elucidating genetic risk factors and gene-environment relationships coupled to the occurrence of sleep disordered breathing. An ongoing NHLBI Specialized Centers of Research (SCOR) program brings together a critical mass of multidisciplinary sleep expertise at three centers that has led to many fundamental discoveries and translational findings.

Future Directions

Voluntary sleep curtailment (habitual short sleep duration) is a pervasive lifestyle and untreated sleep disorders are also common. Average sleep duration in adults has declined from 8.5 to less than 7 hours/night over the last 40 years. Typical sleep durations of six hours are now common and the proportion of young adults sleeping less than seven hours has increased from

16 to 37%. Declines in sleep duration have occurred concurrent with an upward trend in obesity prevalence, but only recently have sufficient data emerged to suggest that these two epidemics may have mechanistic interrelationships. Studies are needed to elucidate cause-and-effect relationships and mechanisms to explain associations between short sleep duration and increased risk of obesity or overweight due to altered metabolism, appetite, or inflammation. Recent advances using genomic analyses have also led to the discovery that the genetic program comprising the molecular clock mechanism in brain is regulating genomic expression and cellular function in peripheral tissues associated with heart, lung, and blood diseases. Studies are needed to elucidate the specific molecular pathways through which the genetic program of the biological clock influences peripheral tissue function, and how mutations in the molecular clock components contribute to heart, lung, and blood disease, as well as sleep disorder related health consequences.

NATIONAL INSTITUTE ON AGING (NIA)

ANDREW MONJAN, PHD - NIA REPRESENTATIVE TO THE TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

Significance of Program Activity

Sleep is essential to well-being and occupies about a third of our lives. Without enough sleep, fatigue, clouded thinking, possible metabolic dysregulation leading to diabetes and obesity, and diminished quality of life can occur. For older people, these symptoms can be more than a matter of discomfort; they can lead to more serious complications. Falls resulting from fatigue and confusion, for example, can result in debilitating, costly injuries in this vulnerable population. The importance of recognizing and treating age-associated health problems, such as sleep disorders, takes on new dimension as the Nation's elderly population grows to record numbers. In the next fifty years, the aged will make up a progressively greater proportion of the general population. Many older people are very healthy and have normal sleep. Many people believe that poor sleep is a normal part of aging, but it is not. In fact, many healthy older adults report few or no sleep problems. Sleep patterns change as we age, but disturbed sleep and waking up tired everyday are not part of normal aging. However, many older adults have sleep problems, which are often linked to underlying medical conditions. Abnormal sleep can cause disease; but diseases can cause abnormal sleep. Changes in daily sleep patterns are some of the most prominent behavioral and symptomatic changes that occur with aging. Understanding the age-related changes in the nervous system that underlie changes in sleep can lead to better means of primary and secondary prevention of these disorders and, thus, reduce the economic and social impacts of sleep disturbances in the older population.

Program Activities

The NIA Sleep portfolio was about \$16.3 million for 50 grants in Fiscal Year 2005, compared with 38 grants totaling about \$16.4 million in Fiscal Year 2004. NIA is represented on the Trans-NIH Sleep Research Coordinating Committee and on the Sleep Disorders Research Advisory Board of the National Center on Sleep Disorders Research, NHLBI. A new section of the NIH SeniorHealth web-site on sleep and aging was issued in the spring of 2005. In addition, two trans-NIH PAs on sleep were reissued for Fiscal Year 2005: "Research on Sleep and Sleep Disorders" and "Restless Legs Syndrome and Periodic Limb Movement Disorder". The NIA also was a co-sponsor of a State-of-the-Science Conference "Manifestations and Management of Chronic Insomnia in Adults", with NIMH as the lead, which was held June 13-15, 2005 in Bethesda. In conjunction with the Trans-NIH Sleep Research Coordinating Committee, a workshop on Neuroimaging in Sleep Deprivation and Sleep Disorders is planned for March 29-30, 2006 in Bethesda. Planning assistance also has been provided to the International Longevity Center-USA in the development of a "Sleep and Healthy Aging Scientific Consensus Conference" that took place in New York City on November 2-4, 2005.

Highlights of Research Advances

Health Disparities Related Research

Sleep disordered breathing (SDB) is a highly prevalent sleep disorder in older persons. It is known to be associated with reductions in cognitive function. As part of a larger study examining SDB in African-Americans and Caucasians, it was examined whether racial background. Community-dwelling African-American and Caucasian elderly at high risk for SDB were tested at two time points. During each visit, subjects were interviewed in their homes about their sleep

and medical condition. The Mini-Mental Status Examination (MMSE) was used to assess cognitive function. Objective sleep studies were recorded in the subjects' homes and scored for sleep, apneic events, and oxygen saturation levels. Night-to-night variability of sleep and respiratory parameters did not differ between African-Americans and Whites. Increases in respiratory disturbance index (RDI) were associated with decreases in cognitive performance over time, after controlling for gender and education level. There were no differential effects of race on this relationship. There was no relationship between declining cognitive function and hypoxemia. Analyses of the data confirm that declining cognitive function in older persons with mild to moderate SDB is related to the amount of respiratory disturbances occurring at night, and suggest that the effect of SDB on cognitive decline is unrelated to race and measured hypoxemia. The large number of community-dwelling elderly with mild to moderate SDB may accrue considerable benefits (both cognitively and medically) from the treatment of SDB, even if they are not markedly hypoxemic.

Differences in SDB between hypertensives with or without a family history of hypertension were studied in African Americans who were referred to the clinic because of a sleep complaint; 91% of the patients received an SDB diagnosis. Of these patients, 25% were hypertensives without a family history, 20% were hypertensives with a family history, and 55% were normotensives. Increasing weight was accompanied by increasing severity of SDB. Hypertensives with a family history are likely to show a profile of greater blood pressure, higher BMI, and more severe SDB, which are more common among African Americans.

The likelihood of insomnia and insomnia-related health consequences among individuals of different socioeconomic status in individuals of lower individual and household education were significantly more likely to experience insomnia even after controlling for ethnicity, gender, and age. Additionally, individuals with fewer years of education, particularly those who had dropped out of high school, experienced greater subjective impairment because of their insomnia.

Neuroimaging

The use of neuroimaging technologies to study sleep is relatively new. A review of the literature found only 19 papers in the last 14 years that have used neuroimaging methods (PET, SPECT, and fMRI) to view brain activity during normal NREM and REM sleep. In general, these studies have found that there is a global decrease in brain activity, especially the thalamus and the frontal and parietal cortices, during NREM sleep, suggesting a down-regulation of the CNS with deepening sleep. During REM sleep, however, there appears to be an increase in metabolic activity within the limbic system, the pons, basal ganglia, and the auditory and occipital cortices, which could be linked to the dream activity that is concentrated during REM sleep. Using PET technology, it has recently been reported that patients with insomnia show greater global glucose cerebral metabolism during sleep and while awake, than do normal sleepers, and that there is a smaller decline in the metabolism of the wake-promoting regions of the brain during the transition from wake to sleep, suggesting that the disturbed sleep of insomnia is associated with a failure of arousal mechanisms to decrease sufficiently while transitioning to sleep. Furthermore, there was reduced daytime metabolic activity in the prefrontal cortex resulting from the insomnia.

Hypertension

Some sleep disorders have been linked to hypertension, but few studies have examined the relationship between daytime sleepiness and blood pressure (BP). A recent study determined that scores on a short questionnaire assessing daytime sleepiness (Epworth Sleepiness Scale -

ESS) were associated with BP and could be used to predict hypertension after 5 years in healthy older adults, men and women 55 to 80 years of age, who had not previously been diagnosed with hypertension. Compared to individuals with low ESS scores, those scoring high had increased casual and sleep BP as well as higher systolic BP levels and diastolic BP variability during waking hours, and reported higher levels of anger, depression, anxiety, and intensity of psychological symptoms as well as lower defensiveness. Individuals with high ESS scores were more likely to be diagnosed with hypertension 5 years later. Groups with high and low ESS scores did not differ significantly on any other variables. The ESS, a simple measure of daytime sleepiness, identified individuals at risk for hypertension. Future studies should investigate the possibility that diagnosis and treatment of daytime sleepiness could aid in BP reduction and ultimately in decreased morbidity and mortality from cardiovascular disorders. Reduction of sleep times may lead to metabolic dysfunctions leading to obesity, hypertension, insulin resistance, and a diabetic phenotype.

Metabolism

Leptin and ghrelin are two hormones that provide the brain information about energy balance. Leptin, produced by adipocytes (fat cells), rapidly increases when there is an excess of caloric intake and decreases appetite. In contrast, ghrelin, produced primarily in the stomach, stimulates appetite. In experimental studies carbohydrate metabolism, endocrine function, and gastrointestinal balance in young, healthy adults were studied after restricting sleep to 4 hours per night for 6 nights as compared to a fully rested condition. Leptin levels were decreased, ghrelin levels were increased, and there was an increase in hunger and appetite under the short sleep condition with levels of activity and caloric intake the same for both conditions. This was associated with decreased glucose tolerance and insulin sensitivity and elevated evening cortisol levels. These alterations were qualitatively and quantitatively similar to those observed in normal aging.

Similar findings were found in a population-based longitudinal study of over a 1,000 participants now between 45 and 75 years of age. In those who slept less than 8 hours per night (about 75% of the sample), body mass index increased as sleep time decreased. Short sleep also was associated with reduced leptin and elevated ghrelin levels in the blood.

A study using mice with a mutation that disrupts their circadian rhythms and produces fragmented sleep found a link between sleep disturbances and metabolic syndrome, a cluster of conditions shown to increase risk of heart attack, stroke, and diabetes, suggesting that the brain system controlling the sleep-wake cycle might play a role in regulating appetite and metabolism. The mice, with this mutation, when fed a regular diet gained about as much weight as normal mice that were fed a high-fat diet, and showed even greater weight gain and changes in metabolism when fed a high-fat diet. This study in mice has brought to light the importance of the circadian clock on the regulation of processes regulating body weight and metabolism. As has been found in human studies, it shows that disruptions of the normal sleep-wake cycle alter the body's ability to regulate its energy balance, especially when there is an overloading of fat in the diet.

There has been an increasing trend towards shorter sleep times over the last century, and this has been mirrored by an increasing trend of obesity in the U.S. Studies now are showing that chronic sleep restriction is associated with hormonal and metabolic changes leading to the possible development of chronic conditions, such as obesity, diabetes, and

hypertension, leading to increased cardiovascular disease morbidity and mortality. It now is clear that maintenance of proper sleep habits is necessary for the maintenance of health.

Circadian Rhythms

Other factors associated with aging, such as disease, changes in environment, or concurrent age-related processes may contribute to problems of sleep in older persons. Studies on young adults have shown that entrainment of the circadian timing system can be achieved with much lower light intensities than was previously estimated; light of indoor intensity can have a significant phase-shifting effect on the circadian pacemaker, and can suppress plasma melatonin secretion. Therefore, awakening early in the morning, such as when associated with nocturia (nighttime voiding), and turning on a lamp, may lead to an earlier entrainment of the circadian clock and contribute to the early morning awakenings of older individuals.

Older adults with dementia often have disruptions in circadian rhythms, including disruptions of the rest-activity rhythm. Sleep disturbance is a symptom shared by all neurodegenerative, dementing illnesses, such as Alzheimer's disease (AD) and dementia with Lewy bodies (DLB), and its presence frequently precipitates decisions to seek institutional care for patients. The circadian variation of core-body temperature and motor activity was studied in institutionalized patients with dementia (AD or DLB) prior to death and the dementia confirmed by neuropathology. Circadian variables generally had greater deviations from normal associated with increasing AD pathology, as measured by postmortem-determined Braak stage, supporting the hypothesis that the consequences of the disease processes may mediate the circadian disturbances in AD and DLB. The differences from normal in the circadian rhythms of the AD and DLB patients were qualitatively similar, and differed significantly from non-demented age-matched institutionalized controls. These disruptions are a product of internal neuronal activity and external environmental influences, both of which are deficient in dementia. However, the consequences of disturbed rhythms are unknown. Another study examined the relationship between rest-activity rhythms and death in patients with dementia and found that although rest-activity rhythms as a whole were not related to survival, the timing of the rhythm was. Patients with dementia appear to develop an abnormal timing of their rhythms, which is predictive of shorter survival.

Basic Mechanisms

An interesting recently discovered molecule is hypocretin (Hcrt), a hypothalamus-specific peptide that is restricted to neuronal cell bodies in the dorsal and lateral hypothalamic areas. Two forms have been identified, Hcrt1 and Hcrt2, with the latter proposed as a peptide neurotransmitter. The brain cells that secrete the hypocretins make connections with many of the brain regions involved in regulating the sleep-wake cycle. The hypocretins may act as chemical signals involved in the mechanisms of homeostasis and alertness. Its functions have been proposed as involved in coordination of autonomic functions and homeostasis, including feeding, blood pressure regulation, neuroendocrine regulation, thermoregulation, and the sleep-wake cycle. In young rats and monkeys, levels of Hcrt1 are highest at the end of the wake-active period and lowest toward the end of the sleep period. The effects of age on the diurnal rhythm of Hcrt1 levels in the cerebrospinal fluid (CSF) were determined by radioimmunoassay. In old rats there was a 10% decline in CSF Hcrt1 over the 24-hour period, compared to young adult rats. Functionally, if there was less Hcrt1, and there also was a decline in Hcrt receptor mRNA, as had been previously found. The overall consequence in aging would be diminished action of Hcrt at target sites. This would diminish the waking drive, which in the elderly could contribute to the increased tendency to fall asleep during the normal wake period.

Little is known about the molecular mechanisms underlying sleep. Recently, it has been shown that the induction of key regulatory proteins in a cellular protective pathway involves the unfolded protein response (UPR). Using C57/B6 male mice maintained on a 12:12 light/dark cycle, it was found that, in cerebral cortex, the protein expression of BiP/GRP78, a chaperone and classical UPR marker, increased with increasing durations of sleep deprivation. UPR helps the endoplasmic reticulum (ER) restore function in response to cellular stress by up-regulating the expression of chaperones and promoting preventing the aggregation of misfolded proteins and helping to properly fold the protein. PERK, the transmembrane kinase responsible for attenuating protein synthesis, which is negatively regulated by binding to BiP/GRP78, was activated by dissociation from BiP/GRP78 and by autophosphorylation. There was phosphorylation of the elongation initiation factor 2 α and alteration in ribosomal function, all components of the UPR. These changes are first observed after 6 hours of sleep deprivation following the onset of the dark cycle when the mice normally would sleep. The longer the length of sleep deprivation (up to 12 hours), the greater was the expression of BiP/GRP78. Thus, prolonging wakefulness induced the UPR indicating that extending wakefulness produces ER stress .

Nursing Homes

Sleep disturbances and decline in neuropsychological performance are common in older adults. Reduced social and physical activity, commonly seen in nursing homes and assisted care facilities, is likely a contributing factor for these age-related changes in sleep and cognition. A pilot study determined whether a single daily morning or evening activity session (sessions consisted of stretching, low-impact aerobics, and game playing) for 2 weeks would also improve sleep and neuropsychological function and whether these effects were dependent on the timing of the activity sessions. Twelve older men and women participated in 14 days of structured activity sessions in the morning or evening. Exposure to either morning or evening activity significantly improved performance on a neuropsychological test battery over baseline levels. Subjective sleep-quality ratings, measured by the Pittsburgh Sleep Quality Index, improved following activity sessions in either the morning or the evening, although objective measures of sleep did not improve when measured by actigraphy or polysomnography. Similar findings were seen in a larger nursing home study of 118 residents randomized to a multidimensional, nonpharmacological intervention versus usual care. A significant decrease was found in daytime sleeping compared to usual care controls, which may translate to an improvement in quality of life. These results suggest that short-term exposure to either morning or evening social and physical activity improves objective measures of neuropsychological performance and subjective sleep quality in the elderly. Increasing exposure to social and physical activity may be a useful intervention to improve sleep quality and daytime function in older adults

Future Directions

Although there is a growing body of research on the aging circadian system, relatively little exists on the aging sleep homeostatic mechanisms. The brain mechanisms underlying age-dependent changes in the sleep homeostatic mechanisms are beginning to be understood. New studies are pursuing leads into the genetics of sleep. The relevance of the genetics of sleep to the problems of the older individual needs further stimulation. Similar to other recent findings that neuronal loss is not an inevitable consequence of aging, these data indicate that there is little evidence of an age-related loss of neurons that have been identified as playing a key role in the maintenance of sleep homeostasis. Thus, the age-related alterations in the control of sleep appear to not be due to loss of critical neurons but to subtle changes within the cells and in their interactions with other brain cells involved in the control of sleep and alertness.

The elucidation of these factors, such as the role played by adenosine in the induction of sleep, can lead to the development of more effective and targeted pharmacological approaches to alleviate some of the problems of sleep that afflict over half of our older population.

Research also needs to be directed at the development of new and more effective therapeutic modalities that are targeted at correcting the underlying pathological mechanisms of sleep disorders rather than treating them symptomatically. However, until that time, clinical trials on the safety and efficacy of hypnotic and somnolent agents are needed.

A large proportion of older nursing home residents have problems in nighttime sleep and daytime wake. They often are treated for their sleep problems with hypnotic agents that may put them at risk for falls and confusion. Behavioral and environmental approaches may be more effective at dealing with these sleep problems, along with the identification of undiagnosed sleep apnea that could underlie some of these problems.

Research needs to further elucidate how the state of sleep debt is associated with decreased glucose tolerance and insulin sensitivity, elevated evening cortisol levels, and increased sympathetic activity. It appears that there are distinct changes in sleep quality that occur through the adult age span, and these changes also mark specific alterations in hormonal systems that are essential for metabolic regulation. Sleep loss may increase the stress load, possibly facilitating the development of chronic conditions, such as obesity, diabetes, and hypertension, which have an increased prevalence in low socio-economic groups.

Another exciting area of newly developing research is the understanding of the relationships between sleep and cognitive functioning. This may be especially important in the older individual, given the increased risks for disturbed sleep and disturbed cognition. This is an exciting window of opportunity as research on the relationships between sleep, cognition, aging, and the neurophysiologic and molecular mechanisms is just beginning to coalesce.

[NATIONAL INSTITUTE ON ALCOHOL ABUSE AND ALCOHOLISM \(NIAAA\)](#)

ELLEN WITT, PHD - NIAAA REPRESENTATIVE TO THE TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

In Fiscal Year 2005, The National Institute on Alcohol Abuse and Alcoholism (NIAAA) funded a total of 15 research projects, including regular Research Project Grants and Career Development Awards, and Cooperative Agreement components, on the topic of alcohol and sleep. The specific areas of sleep-related research supported by NIAAA during the past year include: 1) the neural mechanisms of alcohol-induced sleep disturbances; 2) adolescent sleep/arousal patterns as a pathway to alcoholism in early adulthood; 3) the effects of prenatal and adult alcohol exposure on circadian clock function; 4) assessment and treatment of sleep disturbances in recovering alcoholics; 5) pharmacotherapy of alcoholism and comorbid insomnia; 6) sleep and immune function in African Americans; and 7) effects of acute alcohol intake on performance and alcohol abuse liability in insomniacs.

Published research highlights during Fiscal Year 2005 from currently funded projects are summarized below:

Alcohol Consumption and the Circadian Clock Function

Circadian clocks are mechanisms by which an organism synchronizes its internal and external environments. These circadian rhythms oscillate within a 24-hour cycle and provide a temporal framework by which an organism can program its physiological tasks and optimize survival. At the molecular level, circadian rhythms are originated by genetic elements known as clock genes. At the systems level, circadian oscillations in mammalian tissues are synchronized by a central pacemaker in the brain, referred to as the suprachiasmatic nucleus (SCN) of the hypothalamus. This master clock is entrained or synchronized by external cues, the most critical being light stimulation. However, the SCN also can be entrained through internal signal such as the hormone, melatonin. Normal circadian rhythmicity is critical for health, and disruption in circadian rhythms is associated with abnormalities in several processes, including sleep. Alcohol consumption and abuse leads to problems falling asleep, decrease in total sleep time, and disruptions in other biological rhythms. Recent research has investigated the effects of prenatal and adult alcohol exposure on circadian rhythmic output and the mechanisms underlying these changes.

Effects of Alcohol on Circadian Activity Rhythms

Two studies examined the effects of chronic alcohol consumption and alcohol withdrawal on circadian rhythms of free-running activity and light responsiveness of the circadian pacemaker in adult rats. In one study, free-running circadian activity was monitored for several weeks before, during and after exposure to either 10% or 20% concentrations of alcohol. Individual differences in response to alcohol concentrations were found -- both lengthening and shortening of the free running period was observed. Furthermore, following termination of alcohol, animals receiving the 10% concentration of alcohol returned to their normal circadian running cycle, while animals consuming 20% alcohol displayed an exacerbation of alcohol's effect on circadian activity. These results indicate that both chronic alcohol intake and alcohol withdrawal may produce changes in a fundamental parameter of the circadian pacemaker and its free-running period.

In addition to their effects on circadian free-running activity, chronic treatment with alcohol may also affect the response of the circadian pacemaker to light signals. Male rats were given 24

hour periods of constant darkness interspersed with a brief 15 minute light pulse. The brief light pulses shortened the running periods for normal animals, but not those exposed to alcohol. Recent research has shown that prenatal exposure to alcohol (on postnatal days 4-9) produces permanent changes in circadian regulation of rat activity rhythm and entrainment to light/dark cycles.

Alcohol Effects on Central Clocks Controlling Neuroendocrine Function

Endogenous opioids are small proteins molecules, referred to as peptides, that are produced primarily in the pituitary gland and in the brain. These peptides are involved in a variety of physiological processes, including the rewarding and reinforcing effects alcohol. The protein proopiomelanocortin (POMC) is a precursor to the opioid peptide, β -endorphin. Recent studies have shown that alcohol consumption affects the circadian functions of endorphin-containing neurons that are involved in control of reward and reinforcement in alcohol drinking. Chronic alcohol administration to rats abolishes the circadian rhythm of POMC mRNA expression in β -endorphin neurons and circadian expression of the clock-governing *Period* genes (*rPer1* and *rPer2*) in the arcuate nucleus of the hypothalamus. Alcohol consumption also disrupts the circadian rhythms of the *rPer2* and *rPer3* gene expression in the SCN, suggesting a deficit in the function of the central pacemaker. The POMC system is integrated with the hypothalamic-pituitary-adrenal axis and the mesolimbic dopamine system, which have important roles in mediating the behavioral, neuroendocrine and pathologic responses to alcohol. Thus, chronic alcohol exposure causes major alterations in the central and internal clocks governing neuroendocrine functions, and may have significant pathological consequences.

Clock Genes and Alcohol

Recent research in mice has found a link between the clock gene *mPer2* and responses to acute and chronic alcohol intake. It was found that *mPer2* mutant mice, e.g., animals with a deficit in function of the *Per2* gene, exhibit enhanced alcohol intake and preference. Furthermore, *mPer2* mutant mice show a deficit in removal of the neurotransmitter, glutamate, from the brain due to a down regulation of the glutamate transporter GLAST. The resulting elevation in glutamate levels leads to a "hyperglutamatergic" state. Acamprosate, a drug thought to act by dampening a hyperglutamatergic state in the alcohol dependent brain, reduces alcohol consumption and normalizes extracellular glutamate levels in *mPer2* mutant mice. In humans, variations in the *hPer2* gene are associated with regulation of alcohol intake. These findings taken together support a relationship among abnormal functioning of the circadian clock gene *Per2*, glutamate, and increased alcohol intake.

Sleep Disturbance, Alcoholism Risk, and Remission

Two recent prospective epidemiological studies, using data from a community sample, investigated the association of sleep disturbance with the following: 1) risk for alcohol-related problems, and 2) chronic dependence or remission of alcohol dependence. In the first study, it was found that individuals who report sleep disturbances because of worry are at increased risk of developing alcohol-related problems after an extended interval (median 12.6 years later). Risk is highest among those with a history of anxiety disorders or mood symptoms. The exact pathway between sleep disturbances and alcohol-related problems is unknown. However, these findings emphasize the need to assess and treat sleep disturbances in those with psychiatric disorders, because of the potential to increase alcohol intake for self-medication of sleep problems.

In the second study, it was found that alcohol dependent individuals who reside in the community are twice as likely to self-report insomnia compared to those without a history of dependence. In addition, remission of alcohol dependence in this community sample is associated with a lower risk of sleep disturbance that is similar to those who have never been dependent on alcohol. These findings underscore the importance for evaluation and treatment of sleep disturbances in individuals with persistent alcohol dependence, since sleep difficulties may be an important factor in relapse to drinking.

Sleep Deprivation and Cardiovascular Problems in Abstinent Alcoholics

Alcohol dependence is a major risk factor for cardiovascular disease, with alcoholic men showing an increased prevalence of hypertension and cardiac arrhythmias. Increased sympathetic activity in response to stress is a potential mechanism for these harmful cardiovascular effects. Therefore, a recent study measured cardiovascular responses and levels of two sympathetic hormones, norepinephrine and epinephrine, in response to a behavioral stressor, sleep deprivation, in abstinent male alcoholic patients. Sleep deprivation induces elevated heart rate and levels of epinephrine and norepinephrine in male alcohol-dependent patients compared to healthy nonalcoholic individuals. These elevations in heart rate and sympathetic hormone levels do not recover even after a full night of recovery sleep. Abstinent alcoholic individuals show an extended course of sleep problems that can persist for months or years. Therefore, increased sympathetic nervous system activity that occurs along with habitual sleep loss could play a role in tremor, anxiety, hypertension, and cardiac arrhythmias of abstinent alcoholic subjects.

NATIONAL INSTITUTE OF ARTHRITIS AND MUSCULOSKELETAL AND SKIN DISEASES (NIAMS)

DEBORAH ADER, PHD - NIAMS REPRESENTATIVE TO THE TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

NIAMS funded 5 grants in sleep or sleep-related research in Fiscal Year 2005 in the areas of fibromyalgia (FM), rheumatoid arthritis, and bone fracture. One investigator's 3-year high-risk (R21) grant found cognitive-behavioral insomnia therapy (CBT) to be a promising intervention for reducing sleep difficulties and other key symptoms in FM sufferers. Post-hoc analyses of these data suggested that addition of sleep hygiene (SH), education regarding CBT strategies might enhance treatment efficacy, and pilot regression analyses suggested the usefulness of sleep disturbance measures as mediators and moderators of FM pain improvement. In Fiscal Year 2005, funding was awarded via an R01 grant to confirm and extend these findings in a moderately large FM sample. In addition to evaluating the CBT/SH intervention, this study will analyze additional measures to identify sleep-based mediators and moderators of improvements in key non-sleep FM symptoms (e.g., pain, fatigue). Results of this trial should provide insights into the pathophysiology and management of FM.

In addition, NIAMS is funding an ongoing study investigating behavioral treatments for rheumatoid arthritis, with sleep quality as one of the outcome variables, and research investigating the role of impaired sleep as a major cause of fractures, disability and cognitive decline in older women.

NIAMS has no sleep-specific initiatives active at this time.

NATIONAL CANCER INSTITUTE (NCI)

ANN O'MARA, PHD - NCI REPRESENTATIVE TO THE TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

NCI supports a variety of sleep-related research in patients diagnosed with cancer. Sleep disturbances in this population can occur at any point in the cancer trajectory, from diagnosis through survivorship to end of life. Often, the problem occurs in conjunction with other symptoms, most notably pain and fatigue and may be the result of treatment for the disease or for one or more symptoms, such as pain. During Fiscal Year 2005, the NCI supported 61 investigator-initiative projects (R03, R21, R01, and R43), four cooperative agreements (U10, U54, U56) and two conferences (R13) in sleep or sleep-related research. Projects include longitudinal studies aimed at capturing incidence and prevalence of the problem; clinical trials testing behavioral interventions, pharmacologic agents, and complementary and alternative approaches; studies investigating underlying mechanisms; and studies testing new approaches to measuring sleep disturbances. Some examples of research that NCI currently supports in these areas are summarized below.

Sleep Disturbances across the Cancer Continuum.

The majority of investigator initiated projects are exploring sleep disturbances as a co-occurring symptom with pain, fatigue, hot flashes, and depression. Patients and their caregivers are often reluctant to communicate their symptoms to clinicians and a number of studies are underway that are testing interventions to help patients and their caregivers communicate their sleep disturbances to clinicians, as well as assist clinicians in routinely assessing these symptoms. Family and informal caregivers are assuming increasing responsibilities for the care of their loved ones with cancer. NCI is supporting several studies investigating how the burden of caregiving, such as sleep disturbances, is affecting informal caregivers.

Complementary and Alternative Approaches

Currently, NCI is supporting research projects that are testing hypnosis, acupuncture, exercise, meditation, massage, yoga, and healing touch to relieve the primary symptom of insomnia or to relieve co-occurring symptoms, which may, in turn, alleviate sleep disturbances.

Bio-behavioral Research

There is increasing attention on understanding the underlying biological mechanisms, e.g., cytokines, underlying cancer- and treatment-related symptoms, such as sleep disorders. One example of this is an exploratory study of the role of cytokines in pancreatic cancer patients experiencing depression. Although depression is the primary symptom under investigation, it is well known that other symptoms (sleep disorders, pain, and anxiety) co-exist within this population and an analysis of these symptoms is included in the study.

[NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT \(NICHD\)](#)

MARIAN WILLINGER, PHD - NICHD REPRESENTATIVE TO THE TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

NICHD supports and promotes sleep research in infants, children, adults, and in animals with early development resembling that of humans. These studies are designed to gain an understanding of the processes that may be involved in the normal development of behavioral state and physiologic control during sleep, as well as those that accompany Sudden Infant Death Syndrome (SIDS), learning deficits, and mental retardation, and changes across the lifespan in reproductive health. Highlights from a few of the projects follow.

Research Highlights

The pathogenic process that leads to SIDS has been under investigation for many years. One major theory is that infants who are vulnerable to SIDS do not respond appropriately during sleep to low oxygen levels and high carbon dioxide levels in the air during sleep. In animal models, these asphyxiating conditions result in a rapid decrease of oxidative metabolism in tissues. This leads to slow heart rate (bradycardia), episodes of prolonged cessation of breathing (apnea), and hypoxic coma.

NICHD supports studies of how the brain controls breathing during sleep, in animal models and in human Congenital Central Hypoventilation Syndrome. In Fiscal Year 2005, a program project grant studying SIDS pathogenesis in animal models examined the role of the neurotransmitter serotonin in the regulation of breathing responses to high carbon dioxide. Researchers found that if serotonin levels are raised in the medullary raphe, an area of the brain that has been shown to have deficits in serotonin receptors in SIDS infants, the breathing response to elevated carbon dioxide is augmented. In addition, inhibition of serotonergic neurons in the medullary raphe caused a decrease in the breathing response to high carbon dioxide, but not to low oxygen. Inhibiting these neurons also decreased body temperature and increased the time the animal spent awake model. Therefore, neurons in the medullary raphe that are activated by serotonin, are involved in the brain's control of breathing in response to elevated carbon dioxide, and the brain's controls of body temperature and arousal. All of these control mechanism have been implicated in SIDS pathogenesis.

Patients with Congenital Central Hypoventilation Syndrome (CCHS) have a reduced drive to breathe during sleep, a reduced breathing response to elevated carbon dioxide, and impaired autonomic nervous system regulation, such as control of the cardiovascular and respiratory systems. By comparing the biology of CCHS patients with healthy subjects, we learn about the parts of the brain involved in these functions. Functional magnetic resonance imaging techniques provide researchers with tools to examine the activation of brain areas in response to particular stimuli. When breathing low oxygen, certain brain areas were activated in normal subjects but not in CCHS patients. These include the midbrain, where the medullary raphe is located, as well as thalamic, limbic and cerebellar structures. The participation of the limbic areas has not been previously observed in animal models and suggest future lines of research.

Sleeping on the stomach increases the risk for SIDS. Babies are at much higher risk if they sleep on the back and are placed to sleep on the stomach, without the experience of stomach sleeping. It has been proposed that stomach sleep position increases the likelihood that the infant will become face down in the bedding and rebreathe expired air, which is low in oxygen (hypoxia) and rich in carbon dioxide. Researchers examined the protective behaviors of babies who were either experienced in sleeping on their stomachs or inexperienced. The infants were placed to sleep face

down in bedding and as a result began breathing in expired air, and all of the infants aroused. If the babies lifted and turned their head, then the carbon dioxide they breathed in dropped more for a longer time than if they just moved their head and nuzzled the bedding. Infants with experience in stomach sleeping had the best protective responses, with more head lifting and turning. In addition, the inexperienced stomach sleepers spent more time with their face down in the bedding. These studies suggest that protective behaviors are learned, and support the theory that some SIDS infants die because they do not acquire the ability to learn protective behaviors. This could be due to a deficit in the nervous system substrate for learning, or to a deficit in the ability to sense carbon dioxide that does not allow them to develop a learned response to elevated carbon dioxide. The latter is consistent with findings by researchers studying brains from SIDS babies, of unique abnormalities in a network of nerve cells that use serotonin as a transmitter and are responsible for sensing carbon dioxide.

Another theory of SIDS is that some babies have a problem with arousal mechanisms during sleep and don't wake up in response to life-threatening stimuli. Sleep has two main components, active sleep or REM and quiet sleep, which is a deep sleep. Scientists have found that infants who sleep on the stomach spend more time in quiet sleep than infants who sleep on their back. Also, babies take longer to wake up to arousing stimuli in the stomach position compared to the back. In Fiscal Year 2005, researchers extended this finding by showing that even when the babies who sleep on their stomachs are in active sleep, the brain wave activity is slower in frequency than babies who sleep on their backs. The active sleep in stomach sleepers shows more resemblance to quiet sleep. This may explain the increased arousal thresholds observed in babies who sleep in their stomachs.

Prenatal Alcohol in SIDS and Stillbirth Network (PASS)

In Fiscal Year 2003, NICHD and NIAAA funded four cooperative agreements to create a network for the development of community-linked studies to investigate the role of prenatal alcohol exposure in the risk for SIDS and adverse pregnancy outcomes such as stillbirth and fetal alcohol syndrome (FAS), and how they may be inter-related. The network is composed of two Comprehensive Clinical Sites, a Developmental Biology and Pathology Center and a Data Coordinating and Analysis Center. The Comprehensive Clinical sites are working in the Northern Plains, including American Indian communities, and in the Western Cape of South Africa. The investigators are working collaboratively with NICHD and NIAAA over a three-year period to plan and pilot multidisciplinary investigations using common protocols, within communities at high risk for prenatal maternal alcohol consumption. The long-term goals of this initiative are to decrease fetal and infant mortality and improve child health in these communities.

The network has developed a study design that will combine prospective and retrospective data collection in order to meet these objectives. In order to firmly establish and understand the role of prenatal alcohol in SIDS and stillbirth, prospective collection of behavioral and clinical data during pregnancy is necessary. In addition, in order to understand how fetal development is affected, fetal physiological measurements must be done. The mothers and babies will be followed through birth and through year one, with continuity in physiological and clinical assessments. In addition, specific genetic studies, biochemical and structural studies of the placenta, and neurochemical studies of the brain are planned to link alcohol exposure and genetic predisposition, with structural and functional development. The PASS Network began enrolling pregnant women phase 1 protocols in Fiscal Year 2005, and developed the study design for a large prospective cohort in phase 2.

[NATIONAL CENTER FOR COMPLEMENTARY AND ALTERNATIVE MEDICINE \(NCCAM\)](#)

NANCY PEARSON, PHD - NCCAM REPRESENTATIVE TO THE TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

Many individuals use complementary and alternative medicine (CAM) therapies to treat sleep disorders. For example, it has been estimated that approximately 1.6 million adults (3.1% of all adults who used CAM) used CAM specifically for sleep problems in 2002. These CAM therapies include the use of dietary supplements such as melatonin and valerian; mind/body approaches such as meditation, and therapies that are part of non-western traditional medical systems, such as acupuncture and yoga. NCCAM's mission is to investigate CAM therapies and train CAM researchers in the context of rigorous science. As part of this mission, we support research and research training related to the use of CAM therapies for sleep disorders. Some examples of research that NCCAM currently supports in this area are given below.

Insomnia

Chronic insomnia is a significant health problem for many individuals, is often difficult to treat, and can last for years. Furthermore, conventional therapeutics can produce unwanted side effects. As a result, many individuals have turned to alternative therapies in search of more effective treatments with lesser side effects. NCCAM is interested in determining whether or not these alternative treatments, which are already in the public domain, are effective. Currently, NCCAM supports a study using yoga as a treatment for insomnia. Although yoga has been recommended for treatment of insomnia by yoga practitioners, its effectiveness has not been scientifically established. The main goal of this ongoing clinical study is to establish whether a regimen of yoga practice will improve sleep onset latency measured by both subjective and objective criteria. In addition, NCCAM funds an ongoing trial on melatonin for insomnia in the elderly. A significant portion of elderly individuals with insomnia have low endogenous levels of melatonin, which is a normally occurring neurohormone as well as a popular dietary supplement sold to treat a variety of sleep disorders. This clinical study will investigate whether dietary supplements of melatonin will relieve insomnia in these individuals.

Another dietary supplement often used for insomnia and other sleep disorders is valerian. Valerian is derived from the root of the plant *Valeriana officinalis* and is commonly sold as a dietary supplement in the United States and Europe. It is often advertised as having hypnotic properties effective in treating sleep disorders. However, insufficient scientific data exists to determine its true effectiveness. NCCAM is currently supporting a study to evaluate its efficacy for insomnia in healthy older adults.

Finally, NCCAM has recently funded a study to investigate whether homeopathic remedies for insomnia are effective. While quite controversial, homeopathy is widely used to treat a variety of conditions in many countries throughout the world, including Great Britain, Germany, France, Belgium, India, and Mexico. A major aim of this study is to determine whether homeopathic treatments for insomnia, compared to placebo, actually have a physiological effect on stages of sleep using polysomnography and sleep electroencephalography.

Sleep Deprivation Related to other Diseases

Neurodegenerative diseases, such as Parkinson's disease and Alzheimer's disease, are often accompanied by sleep disturbances due to pain and/or neurological changes related to the progression of the disease. NCCAM currently supports an ongoing clinical study investigating the efficacy and safety of valerian for the treatment of sleep disturbances in Parkinson's

disease. Some evidence does exist in a mouse model to suggest that valerian reduces spontaneous locomotor activity, which is a problem in Parkinson's disease, where excessive nocturnal motor activity is related to sleep deprivation. The results of this study should clarify whether valerian is effective in treating sleep disturbances in Parkinson's disease patients.

In addition, NCCAM supports a study on the use of high intensity light therapy for Alzheimer's disease patients in nursing homes. The long term care of Alzheimer's disease patients and patients with other dementias is a growing public health issue and economic burden. Among the most difficult long term care management issues for these patients are treatment of sleep/wake disorders, depressive symptoms, and agitation. This study will investigate whether high intensity lights installed in nursing home common rooms for various periods of time will contribute to a lessening of these problems. If results are positive this could provide a low-risk alternative treatment that is relatively inexpensive once the lighting is installed.

Finally, NCCAM has recently funded an investigation of the effect of valerian root on sleep disturbances for individuals with rheumatoid arthritis. This clinical study will investigate whether valerian taken an hour before bedtime will improve sleep outcomes.

Basic Science Research

NCCAM supports basic science research aimed at understanding the underlying biological mechanisms of CAM therapeutic modalities including those used to treat sleep disorders. For example, as part of an initiative in Basic and Preclinical Research on Complementary and Alternative Medicine (PA-05-141), NCCAM continues to encourage and solicit research on interactions between CAM and conventional therapeutics, including but not limited to interactions between dietary supplements and drugs. This would include the interactions between drugs used to treat sleep disorders and dietary supplements such as valerian and melatonin. In addition, NCCAM currently supports a study to investigate whether the active constituents of hops modulate a lipid signaling pathway believed to induce sleep in mammals.

Circadian Biology

Perturbations of the biological sleep-wake regulatory cycle may cause sleep disturbances. Light, neurohormones, such as melatonin, produced in the pineal gland, and other substances affect this cycle. NCCAM supports a study investigating the effect of blue light on sleep-wake regulatory cycles in humans. In addition, we recently funded research to determine the effect of vitamin B12 on the human circadian pacemaker.

NATIONAL INSTITUTE ON DRUG ABUSE (NIDA)

HAROLD GORDON, PHD - NIDA REPRESENTATIVE TO THE TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

NIDA has a primary research goal to understand brain systems affected by psychoactive drugs of abuse. Sleep disturbances both during use of, and following withdrawal from, such drugs among individuals who are addicted strongly suggest the value of sleep studies for the Institute. Indeed, sleep disturbances often outlast other withdrawal symptoms and may be a cause for relapse. NIDA supports sleep studies' focus on the neurobiology associated with sleep, sleep and circadian cycles, and sleep architecture because some of the neural systems involved in the addiction process are also involved in the sleep architecture. In addition, it is important to study how sleepiness on the one hand and insomnia on the other contribute to drug abuse and to relapse following withdrawal.

Several sleep studies of interest to NIDA are at the molecular level. Fatty acid amide hydrolase (FAAH) is an enzyme that degrades fatty acid amides (FAAs) such as the endocannabinoid, anandamide, and the sleep-inducing substance oleamide. FAAs are implicated in several functions including sleep. For example, oleamide has been isolated from the cerebral fluid of sleep-deprived cats. In addition, FAAH knock-out mice demonstrate increased behavioral responses to administered anandamide and oleamide, including hypomotility, catalepsy, and analgesia, as well as increased endogenous brain levels of FAA. These results suggest that discovery of FAAH inhibitors may be used therapeutically for analgesic effects as well as sleep treatments. In Fiscal Year 2005 NIDA grantees continued to study the structure and function of FAAH, and reported on the discovery of a potent, selective, and efficacious class of reversible FAAH inhibitors.

NIDA supports several studies that focus on benzodiazepines and non-benzodiazepine hypnotics, most of which are concerned with mechanisms of action and the potential for abuse. One of these, flunitrazepam, is marketed internationally (but not in the U.S.) for treating insomnia and inducing anesthesia. Unfortunately, it has also become popular as the club drug rohypnol, sometimes referred to as a "date-rape" drug. In a double-blind, placebo-controlled trial comparing flunitrazepam to the standard hypnotic triazolam, NIDA funded researchers found that users' self-reported they liked flunitrazepam significantly more than even high doses of triazolam thus confirming a high abuse potential and therefore a more risky treatment for insomnia.

Because of the overlap in the neural systems involved in sleep and drug abuse, there is reason to hypothesize that sleep disturbances influence efforts to treat drug abuse or conversely, that drug abuse induces sleep disturbances that exacerbate other health problems. Accordingly, it is possible that treatments for sleep disorders may prove effective in the treatment of drug abuse as well. The relationship between sleep disturbances and elevated inflammatory markers (notably IL-6) was reported this year in patients with depression. The Investigator is now conducting an ongoing study assessing the relationship between increased cytokines in abstinent cocaine abusers and sleep disturbances. Sleep disturbances are also reported by smokers withdrawing from nicotine.

Significantly, treatments for those wishing to quit smoking, bupropion and/or the nicotine patch also cause sleep disturbances. Accordingly, the Investigator is currently administering a project to formally assess the impact of state-of-the-art treatments including either or both medical and behavioral techniques on sleep quality and daytime sleepiness.

A major thrust of research is how using drugs of abuse and withdrawing from drugs of abuse affect sleep cycles and sleep efficiency; how cognitive efficiency is affected either by drugs themselves, or loss of sleep because of drugs; and importantly, are the effects on sleep following drug withdrawal part of the cause in cases of relapse? In a study of cocaine abusers residing on an inpatient unit, sleep duration, efficiency, and onset latency worsened across three days of binge use followed by 15 days of abstinence. By contrast, the patients did not report subjective differences in sleep quality. In this study it was concluded that this dissociation between objective and subjective sleep quality is related to disruption of the sleep homeostat and may be contributory to relapse. An ongoing, polysomnographic study of sleep quality following abstinence of marijuana abuse is also being carried out where reported sleep disturbances are systematically documented in heavy users. Finally, a study using phosphorous magnetic resonance spectroscopic imaging following sleep deprivation in withdrawing cocaine or heroin abusers seeks to determine metabolic changes in the anterior cerebrum compared to sleep deprivation in non-users. Continuing studies in these areas promise to inform on biological mechanisms underlying drug abuse vulnerability as related to sleep architecture.

[NATIONAL INSTITUTE OF MENTAL HEALTH \(NIMH\)](#)

WILLIAM RILEY, PHD - NIMH REPRESENTATIVE TO THE TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

Sleep disorders and sleep disruption associated with various mental disorders produce significant distress and impairment, contributing to the burden of mental illness in our society. As a result, NIMH supports a rich portfolio of sleep-related research that spans the basic to clinical research continuum and includes research in sleep disturbances of children, adults, and the elderly. Sleep-related research supported by NIMH includes cellular and molecular mechanisms of circadian and sleep-wake systems, effects of sleep on learning and memory, nosology and epidemiology of sleep disorders, the relationship of sleep disruption to mental illness, and development and evaluation of treatments for sleep disorders. NIMH also provides career development grants to increase both the number and scope of sleep researchers. A few recently published studies supported by NIMH are highlighted below.

Restricted Sleep Reduces Hippocampal Cell Survival and Neurogenesis

A body of current research indicates that sleep helps consolidate memories by providing a brain state conducive to structural and functional neural changes, or brain plasticity. A recent study shows that the impact of sleep on memory depends upon the type of memory and the brain structures involved. Laboratory rats were trained in one of two water maze tasks. In the nonspatial or hippocampus-independent task, a visible platform was moved to a different quadrant of the maze after every four trials. In the spatial or hippocampus-dependent task, a submerged or hidden platform remained in the same location throughout all trials. Half of the animals in each learning task were sleep restricted. As expected, sleep restriction impaired spatial or hippocampus-dependent learning and resulted in reduced cell survival and neurogenesis in the hippocampus. In the nonspatial or hippocampus-independent task, however, sleep restriction actually improved performance. Further analysis revealed that rested animals used a spatial strategy regardless of the task demands and that this preferred spatial or hippocampus-dependent strategy actually interfered with performance on the nonspatial task.

These findings provide further support for the role of sleep in brain plasticity and memory consolidation, but they also suggest that sleep restriction differentially affects certain memory and performance tasks. The more the hippocampus is activated in learning a task, the more neurogenesis occurs in this region and the more severe the effects of sleep loss are on neurogenesis and hippocampus-dependent learning. The study results further our understanding of the functions of sleep and highlight the complexity of assessing the effects of sleep deprivation on various types of memory and performance.

A Clock Gene Essential for Circadian Rhythms also Regulates Long-Term Memory

Circadian rhythms are cyclic daily patterns of physiological and behavioral activity critical to a normal sleep-wake cycle. Investigators have identified clock period genes that are essential for establishing circadian rhythm and have determined the importance of CREB (cAMP-responsive element-binding protein) in maintaining the normal expression of these clock genes. CREB protein synthesis is also critical to long-term memory. Therefore, these researchers hypothesize that long-term memory may be regulated by the same clock genes that regulate circadian rhythms.

In a study funded in part by NIMH and recently published in the *Proceedings of the National Academy of Sciences* (PNAS), investigators studied the effects of clock gene mutations on long-

term memory performance of fruit flies (*Drosophila melanogaster*). The genes of fruit flies can be easily manipulated to rapidly produce generations of flies with the specific genetic mutation, providing a powerful model system for understanding the role that genes play on regulating basic biological and behavioral processes. In this study, various mutations of fruit flies were trained or conditioned to reduce courtship behaviors in response to specific environmental cues and later observed to assess the effects of the genetic mutations on the long-term memory to this conditioning. The researchers found that fruit flies with a defective copy of only one specific clock gene, *per*, were unable to form and retain this learned conditioning over long periods of time. In addition, the over-activation of the *per* gene resulted in enhanced long-term memory.

The findings of this study show that a clock gene, *per*, originally identified as essential to the regulation of circadian rhythms, appears to also be important for long-term memory. This research provides promising new directions for understanding and eventually treating deficits in long-term memory associated with numerous psychiatric and neurological conditions.

Differences in PET Scans of Depressed Patients During Wake and Non-REM Sleep

Sleep disturbance is common in depression and is an important risk factor for depression onset and relapse. Depression is also associated with disrupted sleep patterns including alterations in Non-Rapid Eye Movement (NREM) sleep. To better understand the brain functions associated with sleep disturbance in depressed patients, researchers performed regional cerebral glucose metabolism assessments (e.g., PET scans) of depressed and healthy participants during wake and NREM sleep.

Compared to healthy controls, depressed patients showed a smaller decrease in metabolism from wake to NREM sleep in broad regions of the brain (e.g., thalamus and frontal, parietal, and temporal cortex). These smaller decreases from wake to NREM sleep, however, appeared to be due primarily to lower metabolism, particularly in prefrontal regions of the brain, during waking periods in depressed patients. Prefrontal hypometabolism may be fundamentally altered in depressed patients or may be the result of sleep disturbance in these patients.

In contrast, depressed patients showed larger decreases in metabolism from wake to sleep in ventral and posterior brain structures including the left amygdala, anterior cingulate cortex, cerebellum, parahippocampal cortex, fusiform gyrus, and occipital cortex compared to healthy controls. These larger decreases from wake to NREM sleep, however, appeared to be due primarily to increased metabolism in these brain areas during waking periods in depressed patients. The hypermetabolism in these regions is consistent with increased arousal that may interfere with sleep onset and maintenance.

The findings from this study offer intriguing possibilities for the complex relationship at the neurobiological level between depression and sleep disturbance. In the ventral and posterior regions of the brain, depressed patients show increased activity compared to healthy controls, both during wake and sleep states, and this hyperarousal may contribute to the sleep disturbance commonly associated with depression. In the prefrontal regions of the brain, depressed patients show decreased activity compared to healthy controls during waking periods, and sleep deprivation may contribute to the altered prefrontal cortex function consistently observed in depressed patients. Additional neuroimaging research in sleep and related disorders could further elucidate the relationship of sleep disturbance and mental disorders such as depression.

A Longitudinal Study of Young Children's Sleep Patterns

During the first five years of life, as many as a third of children have some type of sleep disturbance, yet little is known about the nature, course, or possible risk factors for these sleep disturbances. An NIMH-sponsored study assessed sleep behavior, including video observations of sleep, in 68 families of infants over four years. About a third of the infants were classified as "stable non-self-soothers" who were unable at ages six and nine months to calm themselves back to sleep after awakening. These infants were more likely to have sleep onset problems and to be sleeping with a parent at age two. During the first two years of life, 19% of children had sleep difficulties based on stringent classification criteria. Over time, problems with nighttime awakenings (e.g., sleep maintenance) diminished, but sleep onset problems persisted.

Approximately half of children at 2 years of age required parental presence to fall asleep. A quarter of the children slept with their parent(s), but only a third of these parents reported this behavior to be a problem. Intermittent sleeping with parents was not associated with sleep problems at later time points, but a subgroup of parents (9%) consistently slept with their children up to age four, which may reflect difficulty having the child sleep independently once sleeping with the parent(s) becomes routine.

This study documents the considerable sleep difficulties among young children and the impact on their families. Additional research is needed to better understand the sleep difficulties of young children and how parents should respond to minimize long-term sleep problems and reduce the impact of these difficulties on the family.

NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE (NINDS)

MERRILL MITLER, PHD - NINDS REPRESENTATIVE TO THE TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

NINDS has a long-standing interest in homeostatic mechanisms of the central nervous system including sleep and circadian rhythms. NINDS supports basic and clinical research on the neuroscience of sleep, including studies of fundamental mechanisms of sleep, sleep disorders and associated complications. As listed in this report for Fiscal Year 2005, NINDS funded 88 sleep disorders and circadian rhythms research projects, with support totaling \$20.7 million. The following are some of the significant scientific advances made by NINDS-funded investigators in Fiscal Year 2005.

For most species of mammals, newborns and young spend more of the 24-hour day resting and sleeping than do their elders. Sleep time gradually decreases approaching adulthood. While sleep appears to be essential for life, NINDS supported investigators found some striking exception to this developmental sleep pattern. Unlike terrestrial mammals, baby killer-whales and bottlenose-dolphins as well as their mothers show little or no typical sleep behavior for the first postpartum month, avoiding obstacles and remaining mobile for 24 hours a day. Over the several months after birth, babies and mothers gradually increase the amount of time they spend resting to normal adult levels, but never exceed these levels. These findings indicate either that sleep may not have the developmental and life-sustaining functions attributed to it, or that whales and dolphins somehow accomplish the important functions of sleep without actually sleeping.

Studies on the relationship between sleep and the immune system continue to provide fundamental insights into the reason we sleep and the adverse consequences of not sleeping. We feel sleepy when we have a cold and sick when we have not slept enough. Two substances, tumor necrosis factor alpha and interleukin-1 beta, increase their concentration in the brain after neuronal activity. These substances are proinflammatory and promote immune reactions to clear the brain of themselves along with other unwanted molecules. Tumor necrosis factor alpha and interleukin-1 beta have also been shown to regulate sleep. Recent studies supported by NINDS indicate that these substances are produced in response to activation of brain cells and can cause sleep-like slowing of brain waves, even when they are administered to small areas of the brain. Tumor necrosis factor alpha and interleukin-1 beta are also involved in neuronal growth and plasticity. Since the intense neuronal activity of wakefulness causes the release of these immune system substances, many researchers think that sleep is initiated by the immune system and that sleep's purpose is to: regulate the growth of connections between brain cells, clear the brain of substances produced during previous wakefulness, and prepare the brain to function properly during subsequent periods of wakefulness.

A detailed understanding of circadian timing mechanisms, the body's "clock" on which the sleep-wake cycle depends, is critical for sleep disorders research. Normal functioning of this clock requires a complex interplay of several genes and the neuropeptides these genes produce. Rapid progress understanding the clock has come from studies of the fruit fly in part because it is possible to breed and study large numbers of flies with various genetic make-ups. Two NINDS-funded studies published in 2005 have identified one neuropeptide, pigment dispersing factor, as key in coordinating the circadian clock of the fruit fly. Abnormalities in the gene that produces pigment dispersing factor disrupt the smooth function of the clock and disrupt behavior. Because mammals have a closely related peptide which may have similar functions in the mammalian circadian clock, these findings have implications for insomnia and related sleep problems in humans.

Narcolepsy is a disabling sleep disorder affecting about 200,000 Americans. NINDS supported research on narcolepsy has established the importance of the neurotransmitter, hypocretin, in regulating wakefulness and sleep. Losses and defects in neurons that contain hypocretin cause narcolepsy in humans and animals. However, the mechanisms and extent of damage to hypocretin neurons in narcolepsy is not understood. By conducting post-mortem studies, NINDS-funded investigators found that two neuronal regulating molecules, neuronal activity-regulated pentraxin and prodynorphin, which are normally found in the same neurons as hypocretin, were greatly reduced in patients with narcolepsy compared to normal controls. This finding also indicates that loss of neuronal activity-regulated pentraxin and prodynorphin function contributes to the symptoms of narcolepsy. Studies of this kind may lead to new avenues of therapy that target molecules that are found in hypocretin neurons.

[NATIONAL INSTITUTE OF NURSING RESEARCH \(NINR\)](#)

KATHY MANN KOEPKE, PHD - NINR REPRESENTATIVE TO THE TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

NINR supports sleep research in several areas, including sleep disturbances in people with chronic illness, the effects of sleep deprivation on development and function, and how to manage sleep disturbances in a variety of healthcare settings. NINR-funded scientists are studying sleep-related topics such as: designing behavioral interventions to help people improve their sleep habits; studying the effects of sleep/wake cycle disruptions on premature infant development; and investigating the effects of chemotherapy-related sleep disturbances on the quality of life of cancer patients. The following are a few examples of recent sleep research findings by NINR-funded investigators and currently funded NINR sleep-related research projects.

Recent NINR-Funded Advances in Sleep Research

Getting a Good Night's Sleep May Lead to Easier Labors and Deliveries for Pregnant Women

Women often complain of fatigue and difficulty sleeping during pregnancy, especially as they approach delivery. Researchers studied women who slept less than 6 hours per night or who experienced frequent sleep disturbances during their pregnancy. These women had significantly longer labors and were 3-4 times more likely to have a cesarean delivery than women who slept 7-8 hours a night with fewer disruptions. These results suggest a need for women to get adequate sleep during their pregnancy, and a need for care providers to communicate the benefits of better sleep during pregnancy to their patients.

Promoting Sleep Regulation Helps Reduce Irritability and Crying in Colicky Infants

Infants with colic may cry inconsolably for several hours each day, frustrating both parents and health care providers. New theories link colic to the immaturity of the infant's sleep/wake state regulation. In a controlled trial, NINR-funded scientists tested an intervention that used a program of home visits from nurses to help families cope with infant irritability and promote the development of sleep/wake regulation in the infant. Parents were taught over a 2 week period to establish routine daily activity patterns; provide holding, rocking and other soothing contacts; and establish a period of quiet for themselves to promote rest and recovery. Eight weeks after the intervention began, parents reported that crying had fallen from an average of 5-6 hours to less than 1 hour per day. In the control group, which received standard care, crying was only reduced to 4 hours per day. These results demonstrate that interventions which establish an infant's sleep/wake cycle and educate parents in caring for their colicky infant may help families improve their quality of life.

Bright-Light Treatment of Alzheimer's Patients May Improve Circadian Rhythm

Erratic sleep/wake cycles are a major disabling symptom of Alzheimer's disease sufferers. Light levels in long-term care facilities are often low and may affect the circadian clock of residents with Alzheimer's. In a randomized clinical trial, NINR-funded researchers tested the effect of one hour of bright light exposure on the quality of sleep and wakefulness, and rest/activity cycles, of institutionalized Alzheimer's patients. Bright light exposure significantly improved rest/activity rhythms in these patients, but had no effect on quality of nighttime sleep or daytime wakefulness. This study suggests that timed bright light exposure may help to adjust the circadian rhythms of Alzheimer's patients to a normal 24-hour day.

Current NINR Sleep Research Activity

Improving the Sleep/Wake Cycle of Hemodialysis Patients

The majority of patients with end-stage renal disease undergoing hemodialysis (HD) have problems with sleep that affect their quality of life. Sleep/wake cycles are influenced by body temperature (BT), with relatively low BTs occurring prior to the onset of sleep. HD often causes slight elevations in a patient's BT. Because of these two factors, NINR-funded scientists are currently testing the effects of using cool dialysate during HD instead of the warm dialysate normally used in an effort to lower BT and promote sleep. Dialysate is the cleansing solution composed of salts and glucose used during dialysis. Researchers will monitor the sleep/wake cycles of patients receiving the intervention, as well as patients' behavioral and physiological functioning. Findings from this research may assist care providers in improving the quality of life of patients undergoing HD.

Using Social Activity and Resistance Training to Improve Sleep in Persons with Dementia

Persons with cognitive disorders often suffer from sleep disturbances, especially those in long-term care facilities. Drug treatments often prove ineffective at combating these sleep problems. In a randomized controlled trial, NINR-funded scientists are testing a behavioral intervention for its ability to improve the sleep quality of nursing home residents. The treatment will involve social activities such as listening to music or playing games, progressive resistance training of the hips and arms, or both. A control group will receive usual treatment. Sleep and wake quality will be measured after seven weeks. This intervention may inform clinicians of the usefulness of innovative behavioral interventions in improving the sleep quality and quality of life of patients with dementia.

Recovery of Neurobehavioral Functioning Following Sleep Deprivation

Chronic sleep loss due to medical conditions or other factors is known to affect normal daily functioning and cause health problems. NINR-funded researchers are currently determining the amount and types of sleep (e.g. REM sleep) necessary to recover normal behavioral and physiological function following sleep deprivation. These scientists are testing a group of healthy subjects who have been kept awake and then allowed to sleep, both for varying amounts of time. The investigators are monitoring behavioral and physiological functioning while the subjects are awake and are measuring physiological states while the subjects are asleep. Findings from this research could lead to an improved theoretical understanding of the relationship between sleep and neurobehavioral function, and lead to the development of better interventions and guidelines for the public regarding sleep and health.

OFFICE OF RESEARCH ON WOMEN'S HEALTH (ORWH)

ELEANOR HANNA, PHD - ORWH REPRESENTATIVE TO THE TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

ORWH supported three projects with total costs of \$500,000, that were related to sleep research through their foci on disorders in which sleep disruption is a factor, changes in relevant symptoms across the fluctuating hormonal cycle in women, and changes in relevant symptoms across the natural age span in men and women or studies of relevant basic factors. ORWH also contributed funds for the special Nature Insight Review on Sleep and was actively involved in sponsorship of the State of the Science (SOS) Conference on Insomnia. ORWH has no direct funding authority; therefore, the Institutes to which these dollars have been assigned are noted in the summaries that follow.

1R01DE016212-02 Hormonal Cycles in Women: Effects on TMD Pain & Symptoms

This project studies the interaction of mind and body in pain conditions affecting the temporomandibular joint and muscles of mastication. These pain problems are twice as common in women as in men and prevalence peaks in the reproductive years. Two related studies will investigate the cyclic nature of this pain. Study one assesses the relationship of pain to salivary levels of reproductive hormones and psychological stress across two consecutive menstrual cycles of TMD patients with normal menstrual cycles compared with normal cycling woman with episodic headache pain and with normally cycling women free of all chronic pain problems. Study two will compare the effects among these groups of a continuous oral contraceptive to stabilize the hormonal environment and eliminate menses, a self management intervention focused on and timed to the chronobiology of the TMD symptoms across the menstrual cycle, and usual self management intervention. It is expected that these studies will shed light on the mechanisms underlying the cyclic nature of TMD pain as well as determine which treatment modality yields greatest improvement.

1R01AG021487-03 Health, Illness, and Social Life at Older Ages: National Social Life, Health and Aging Project

An interdisciplinary team of social and medical scientists are conducting a nationally representative longitudinal survey to assess the physical, psychological and social implications of sexual health and behavior in a probability sample of 3,000 independent and assisted-community living men and women aged 55-88. In addition to the information collected in the 2 hour, in home interview, biomarkers will also be collected. These data will be examined in terms of The Interactive Biopsychosocial Model, an extension of Engel's biopsychosocial model and permits examination of both cross-sectional and longitudinal hypotheses. In addition to establishing a baseline description of older Americans with respect to health, illness, social life, etc., the study will also examine the relationship of older adult sexuality to (1) quality of life and health behaviors including physical activity, nutrition, sleep, substance use and preventive health behaviors, (2) the expression of physical illness, disability, pain, and medication use, (3) important life stages, and (4) social embeddedness. This study will build a foundation for medical, psychological and social interventions aimed at maintaining or improving health and independence among older Americans.

5R01NR004142-08 Nursing Management of IBS: Improving Outcomes

This study will further test the effectiveness of comprehensive self-management (CSM) treatment for IBS by comparing the face-to-face intervention with a telephone version relative to

a usual care group of men and women with IBS. Outcome measures will be HRQOL, GI symptoms, sleep disturbance, psychological distress, and sickness impact. The second aim of the study will be to examine the relationship between GI symptom improvement and decrease in psychological stress using self report measures as well as physiological arousal as measures by catecholamine and cortisol levels in men and women. Results will help define the underlying pathology, the possible effects of sex and gender, and provide information on the potential role of serotonin processing in IBS.

FINANCIAL REPORT AND FUNDED SLEEP RESEARCH DETAIL

A Complete Listing of Funded Sleep Research For Each Trans-NIH SRCC Institute and Center for Fiscal Year 2005 is Provided in the Following Pages

	Sleep Disorders Research (Dollars in thousands)										
	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	** 2006 Estimate
NHLBI	16,450	19,219	22,932	31,845	35,128	37,579	45,155	50,328	53,085	50,558	50,811
NIA	7,800	9,179	11,818	13,296	13,034	14,533	14,600	18,178	16,492	16,332	16,200
NIAAA	551	728	766	736	1,132	1,681	4,342	4,553	4,857	3,151	3,119
NIAMS	--	--	--	--	--	--	300	248	161	437	430
NCI	--	--	--	--	--	--	--	--	N/A ^Δ	N/A^Δ	N/A ^Δ
NICHD	7,368	7,217	9,131	7,116	6,797	7,084	7,344	7,367	7,506	9,158	9,100
NCCAM	--	--	--	--	--	177	900	1,121	1,062	1,287	1,275
NIDA	1,201	1,042	1,586	2,163	2,553	2,517	3,235	2,988	3,126	3,196	3,177
NIDDK	--	--	--	--	--	--	--	--	--	--	--
NIMH	27,231	28,601	34,027 [§]	39,219	40,667	50,742	56,647	63,222	59,785	58,471	57,969
NINDS	9,453	11,598	13,639	15,231	12,495*	17,603	22,918	24,588	24,952	20,725	20,607
NINR	2,842	3,565	3,394	3,503	4,635	5,375	8,091	11,030	10,025	8,652	8,582
ORWH	--	--	--	--	--	--	--	--	N/A ^Δ	N/A^Δ	N/A ^Δ
NCRR	3,247	3,570	5,542	6,637	7,117	7,193	11,490	13,204	14,648	15,320	15,476
NHGRI	--	--	--	--	--	599	0	0	0	0	0
NIBIB	--	--	--	--	--	--	--	258	243	65	64
NIEHS	--	--	--	--	--	--	--	--	190	180	179
NIDCR	--	--	--	--	--	--	--	--	99	408	398
NCMHD	--	--	--	--	--	--	--	--	7	--	--
RMAP	--	--	--	--	--	--	--	--	--	728	728
Total	76,143	84,719	102,835[§]	119,746	123,558	145,083	175,022	197,085	196,239	188,668	188,115

§ Revised from Trans-NIH Annual Report for Fiscal Year 1998

* This reduction in Fiscal Year 2000 funding compared to Fiscal Year 1999 was due to a one-time change in the method of identifying sleep-related grants.

Δ Grant and funding data not included in NIH sleep total. Please refer to respective narrative sections for details

** 2006 Estimate as per NHLBI Budget Office

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

NATIONAL HEART, LUNG, AND BLOOD INSTITUTE

Grant No	PI	Title	Institution	Funding
1R01HL077399-01A1	Aeschbach, Daniel	Neurobiology Of Individual Differences In Sleep Duration	Brigham and Women's Hospital	\$315,000
5R01HL075366-02	Aloia, Mark S.	Subcortical Hyperintensities In Sleep Apnea Syndrome.	Brown Medical School	\$378,287
1K24HL078989-01A1	Amin, Raouf S	Pediatric Sleep Research Program	Children's Hospital Med Ctr Cincinatti	\$146,623
5R01HL070907-03	Amin, Raouf S	Mechanisms Mediating C/V Disease In Children With OSA	Children's Hospital Med Ctr Cincinatti	\$372,500
5K24HL004174-07	Badr, M Safwan	Sleep Apnea: Determinants And Consequences	Wayne State	\$84,072
2R01HL053443-10A2	Badr, M Safwan	Central Sleep Apnea: Determinants Of Consequences	Wayne State	\$246,800
5R01HL070848-03	Barrett-Connor, Elizabeth L	Outcomes Of Sleep Disorders In Older Men	University of California San Diego	\$143,826
5R01HL075029-03	Bass, Joseph T	Impact Of Sleep On Feeding And The Metabolic Syndrome	Evanston Northwestern Healthcare	\$376,920
5K23HL075369-02	Beebe, Dean	OSA In Obese Teens And Preteens: Neurobehavioral Effects	Children's Hospital Med Ctr Cincinatti	\$115,893
5R01HL063772-05	Bixler, Edward O.	Prevalence Of Sleep Disordered Breathing In Children	Pennsylvania State University	\$269,325
5R01HL075614-02	Calhoun, David A	Etiology Of Sleep Apnea-Related Hyperaldosteronism	University of Alabama	\$288,425
5R01HL070842-03	Cauley, Jane A.	Outcomes Of Sleep Disorders In Older Men - Pittsburgh	University of Pittsburgh	\$91,611
5F32HL078360-02	Chang, Anne-Marie	Genetic Analysis Of Extreme Circadian/Sleep Phenotypes	Brigham and Women's Hospital	\$48,296
5R01HL080941-06	Chervin, Ronald D	Identification Of Sleep-Disordered Breathing In Children	University of Michigan	\$531,803
1R43HL080804-01	Craine, Brian L	Noninvasive Home Monitor For Sleep Apnea Testing	Western Research Company, Inc.	\$100,000
5R01HL052992-10	Czeisler, Charles A	Bright Light Treatment Of Shift Rotation Insomnia	Brigham and Women's Hospital	\$394,405
5R01HL077453-02	Czeisler, Charles A	Adaptation Of Circadian Responses To Light Treatment	Brigham and Women's Hospital	\$315,000
5T32HL007901-08	Czeisler, Charles A	Training In Sleep, Circadian & Respiratory Neurobiology	Brigham and Women's Hospital	\$309,547
5F32HL078164-02	Dave, Nilesh B	Lung Vascular Responses--Intermittent/Sustained Hypoxia	University of Pittsburgh	\$57,536
1R01HL079937-01	Debaun, Michael R	Asthma And Nocturnal Hypoxemia In Sickle Cell Anemia	Washington University	\$1,870,976
5R01HL072722-04	Decker, Michael J	Episodic Neonatal Hypoxia Impairs Sleep And Cognition	Emory	\$266,000
5U01HL068060-04	Dement, William C	Apples: Apnea Positive Pressure Long-Term Efficacy Study	Stanford	\$3,188,172
5R01HL044915-14	Dimsdale, Joel E	Sleep Apnea And Hypertension: Role Of SNS	University of California San Diego	\$600,927
7R01HL079526-02	Dixon, Denise A	Implications Of Sleep & Fatigue In Pediatric HIV	State University of New York Stony Brook	\$335,660
5R01HL050775-12	Duckles, Sue P	Vascular Reactivity: Gender And Hormonal Influence	University of California Irvine	\$388,398
5R01HL072408-03	Eastman, Charmane I	Effects Of Short And Long Nights On The Circadian Clock	Rush University med Ctr	\$361,150
5R01HL075079-03	Ehrmann, David A	Sleep, Metabolic, And Cardiovascular Dysfunction In Pcos	University of Chicago	\$361,263
5R01HL070847-03	Ensrud, Kristine E	Outcomes Of Sleep Disorders In Older Men-Minneapolis	University of Minnesota	\$84,489
5R01HL075080-03	Epstein, Paul N.	Altered Glucose Homeostasis By Sleep Impairment	University of Louisville	\$330,750
5R01HL070301-05	Foster, Gary D.	Sleep Apnea In Look Ahead Participants	University of Pennsylvania	\$423,534
5R01HL068162-03	Fregosi, Ralph F	Functional MRI Of The Pharyngeal Airway	University of Arizona	\$303,000
5F32HL077066-02	Gottselig, Julie M	Sleep Slow Wave Activity And Waking Function	Brigham and Women's Hospital	\$59,348
5R01HL065270-07	Gozal, David	Neurocognitive Function In Snoring Children	University of Louisville	\$425,982
5R01HL069932-04	Gozal, David A.	Postnatal Brain Susceptibility To Intermittent Hypoxia	University of Louisville	\$357,500

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5R01HL076518-02	Hayward, Linda F	Supramedullary Control Of Respiration	University of Florida	\$363,750
1F32HL082409-01	Herpel, Laura B	COPD, Sleep Disturbances, And Quality Of Life	Johns Hopkins	\$55,352
1R43HL082357-01	Ivanov, Vladimir G	Peer-To-Peer Knowledge Integration Platform For Heterogeneous Data In PSG	Pro-Tech Services, Inc.	\$198,287
7K23HL073238-03	Katz, Eliot S	Upper Airway Motor Control During Sleep In Children	Massachusetts General Hospital	\$125,820
5R21HL076375-02	Khoo, Michael C	Heart Rate Variability In Sleep-Disordered Breathing	University of Southern California	\$154,682
5R01HL059658-08	Kilduff, Thomas S	Neural Gene Expression In Sleep Deprivation And Recovery	SRI International	\$502,044
5R44HL068490-04	Kramer, Kevin M	Polysomnograph On A Chip	Advanced Medical Electronics Corp	\$435,139
5R01HL071123-02	Kripke, Daniel F	Genetic Variants In Circadian Rhythm Sleep Disorders	University of California San Diego	\$548,329
2R01HL047600-12	Kubin, Leszek K	PREMotor Control Of Upper Airway And REM Sleep Atonia	University of Pennsylvania	\$317,000
5R01HL071097-04	Kubin, Leszek K	Hypothalamo-Brainstem Control Of Sleepiness And Arousal	University of Pennsylvania	\$396,250
5R01HL074385-03	Kubin, Leszek K	Episodic Hypoxia, Hypothalamus And Insulin Resistance	University of Pennsylvania	\$369,643
5R01HL068699-03	Leuenberger, Urs A	Sympathetic And Vascular Function In Sleep Apnea	Pennsylvania State University Hershey Med Ct	\$261,975
5R01HL079555-02	Lewin, Daniel S	Sleep Fatigue & Cognitive Correlates In Pediatric HIV	Children's Research Institute	\$383,591
5R01HL070837-03	Lewis, Cora E	Outcomes Of Sleep Disorders In Older Men-Birmingham	University of Alabama at Birmingham	\$83,613
5R01HL075034-04	Liu, Rugao	Ros In Episodic Hypoxia-Induced Cardiovascular Dysfunction	University of North Dakota	\$300,688
1R01HL075630-01A2	Loredo, Jose S	Sleep-Health & Knowledge In U.S. Hispanics	University of California San Diego	\$516,327
5R01HL057120-10	Lydic, Ralph B	Opioid Induced REM Sleep Inhibition	University of Michigan	\$357,653
5R01HL065272-07	Lydic, Ralph B	Cholinergic Phenotype In Murine Models Of Sleep	University of Michigan	\$263,763
5R01HL058585-08	Marcus, Carole L	Pathophysiology Of Childhood Obstructive Sleep Apnea	Children's Hospital of Philadelphia	\$321,325
5R01HL076379-02	Matthews, Karen A	Stress, Sleep And Emerging CVD Risk Factors	University of Pittsburgh	\$661,308
1R15HL080007-01	Mcculloch, Paul F	Does Nasal Stimulation Activate Presympathetic Neurons?	Midwestern Univ	\$212,744
5R01HL071515-04	Mignot, Emmanuel J	Sleep Disordered Breathing, APOE And Lipid Metabolism	Stanford	\$359,279
5R01HL073921-02	Miller, Andrew H	Pathophysiology Of Ifn-Alpha-Induced Sleep Disturbances	Emory	\$229,500
1R43HL076986-01A1	Modarres-Zadeh, Mohammad	Ambulatory Sleepiness & Apnea Propensity Evaluation Syst	Cleveland Medical Devices, Inc.	\$219,526
5R01HL070911-02	Molfese, Dennis L	Sleep And Sleep Disorders In Children	University of Louisville	\$367,500
1R01HL085037-01A1	Mong, Jessica A	Cellular Mechanisms For The Hormonal Modulation Of Sleep	University of Maryland Baltimore	\$323,845
5R01HL074072-02	Morgan, Barbara J	Sleep Disordered Breathing And Vasomotor Regulation	University of Wisconsin	\$363,750
5R01HL075501-03	Mullington, Janet M	Adiposity, BP & The Inflammatory Response To Sleep Loss	Beth Israel Deaconess Hospital	\$411,419
5U01HL077813-02	Newman, Anne B	The Sleep Heart Health Study	University of Pittsburgh	\$93,194
5R01HL075035-03	Nieto, F Javier	SDB, Metabolic Syndrome, And Vascular Function	University of Wisconsin	\$363,750
5U01HL053941-12	O'connor, George T	Sleep Heart Health Study	Boston University	\$113,627
5R01HL080972-02	Opp, Mark R	Sleep, Cytokines And Infection	University of Michigan	\$368,488
5R01HL070838-03	Orwoll, Eric S.	Outcomes Of Sleep Disorders In Older Men-Portland	Oregon Health & Science Univ	\$188,303
2T32HL007953-06	Pack, Allan I	Training In Sleep And Sleep Disorders	University of Pennsylvania	\$190,448
5P50HL060287-08	Pack, Allan I.	SCOR In Neurobiology Of Sleep And Sleep Apnea	University of Pennsylvania	\$2,445,280
5R01HL072067-03	Pack, Allan I.	Family Linkage Study Of Obstructive Sleep Apnea	University of Pennsylvania	\$1,169,711

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5T32HL007713-13	Pack, Allan I.	Training Program In Sleep And Respiratory Neurobiology	University of Pennsylvania	\$497,923
1K08HL081385-01	Patel, Sanjay R	The Genetics Of Metabolic Dysfunction In Sleep Apnea	Brigham and Women's Hospital	\$133,920
1K23HL077137-01A1	Patil, Susheel P	Neuromodulation Of Upper Airway Obstruction During Sleep	Johns Hopkins	\$161,612
5K08HL068715-04	Polotsky, Vsevolod Y	Sleep Disordered Breathing And Glucose Regulation	Johns Hopkins	\$131,490
1R01HL080105-01	Polotsky, Vsevolod Y	Sleep Apnea And Dysregulation Of Lipid Metabolism	Johns Hopkins	\$347,850
5R21HL075014-02	Poon, Chi-Sang	Analysis Of Heart Rate Variability In Sleep Apnea	Massachusetts Institute of Technology	\$160,000
3R21HL075014-02S1	Poon, Chi-Sang	Analysis Of Heart Rate Variability In Sleep Apnea	Massachusetts Institute of Technology	\$8,748
5R01HL059596-09	Ptacek, Louis J. II	Characterization Of Advanced Sleep Phase Syndrome	University of California San Diego	\$465,216
5R01HL075078-03	Punjabi, Naresh M	The Effects Of Sleep Apnea On Metabolic Function	Johns Hopkins	\$408,750
5U01HL053937-12	Punjabi, Naresh M	The Sleep Heart Health Study	Johns Hopkins	\$104,588
2R01HL062373-05A2	Quan, Stuart F.	Impact Of Childhood Sleep Disordered Breathing	University of Arizona	\$413,877
3R01HL062373-05A2S1	Quan, Stuart F.	Impact Of Childhood Sleep Disordered Breathing	University of Arizona	\$37,625
5U01HL053938-12	Quan, Stuart F.	The Sleep Heart Health Study (SHHS)	University of Arizona	\$94,602
5R01HL072702-04	Quattrochi, James J	Cellular And Molecular Mechanisms Of REM Sleep Control	Massachusetts Mental Health Institute	\$200,550
5R01HL070870-02	Radulovacki, Miodrag G	Intertrigeminal Region Control Of Apnea	University of Illinois Chicago	\$376,283
5R01HL046380-15	Redline, Susan S	Familial Aggregation And Natural History Of Sleep Apnea	Case Western Reserve University	\$624,341
5R01HL070839-03	Redline, Susan S	Outcomes Of Sleep Disorders In Older Men- Reading Center	Case Western Reserve University	\$281,641
5R01HL070916-04	Redline, Susan S	Outcomes Of Sleep Disordered Breathing In Adolescents	Case Western Reserve University	\$382,500
5R01HL075077-03	Redline, Susan S	Effects Of Sleep Apnea Treatment On Metabolic Syndrome	Case Western Reserve University	\$371,317
5U01HL063463-07	Redline, Susan S	The Sleep Heart Health Study	Case Western Reserve University	\$175,566
3U01HL063463-07S1	Redline, Susan S	The Sleep Heart Health Study	Case Western Reserve University	\$108,000
5U01HL063429-07	Resnick, Helaine E.	Sleep Heart Health Study	Missouri Breaks Research Inc.	\$195,997
5U01HL053916-12	Robbins, John A	Sleep Heart Health Study	University of California Davis	\$88,140
5U01HL064360-07	Samet, Jonathan M.	Data Coordinating Center For Sleep Heart Health	Johns Hopkins	\$410,172
5R01HL068652-04	Samson, Willis K.	Orexinergic Pathways In Central Autonomic Control	St. Louis University	\$412,468
5K23HL072126-02	Schneider, Hartmut	Physiologic Phenotypes For Obstructive Sleep Apnea	Johns Hopkins	\$154,142
5R44HL068352-03	Schoess, Jeffrey N	Self-Dispensing Respiratory Effort Band	Korosensor.Com, Inc.	\$285,902
5K24HL067948-04	Schwab, Richard J	Pathogenesis And Genetics Of Obstructive Sleep Apnea	University of Pennsylvania	\$139,466
2R01HL050381-11A2	Schwartz, Alan R	Mechanisms Of Sleep Apnea In Severe Obesity	Johns Hopkins	\$401,442
5R01HL071506-04	Schwartz, Alan R	Cardiovascular Stress Of Sleep Apnea And Heart Failure	Johns Hopkins	\$350,380
5R44HL067733-04	Seifert, Gregory J	Sleep Diagnostic Device With Wireless Internet Interface	Advanced Medical Electronics Corp	\$375,627
5U01HL053934-12	Shahar, Eyal	Sleep Heart Health Study (SHHS)	University of Minnesota	\$110,450
5K24HL076446-02	Shea, Steven A	Chronobiology Of Cardiovascular And Pulmonary Disease	Brigham and Women's Hospital	\$122,888
5R01HL076409-02	Shea, Steven A	Circadian And Behavioral Factors Of Cardiovascular Risk	Brigham and Women's Hospital	\$503,109
5R01HL079533-02	Shearer, William	Sleep Studies In HIV+ Older Children/Adolescents	Baylor	\$465,212
5P50HL060296-08	Siegel, Jerome M	CNS Interactions With Hypoxia In OSA	UCLA	\$1,530,283

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5R01HL050531-10	Smith, Curtis A	Central And Peripheral Mechanisms Of Sleep Apnea	University of Wisconsin	\$291,000
5R01HL037379-18	Smith, Philip L li	Obesity And Neural Control In Sleep-Disordered Breathing	Johns Hopkins	\$493,404
5R01HL079554-02	Smith, Philip L li	Effects Of HIV & HAART On Sleep & Daytime Function	Johns Hopkins	\$595,908
5R01HL065176-06	Somers, Virend K	Cardiovascular Disease Mechanisms In Sleep Apnea	Mayo Clinic	\$368,750
5R01HL075025-03	Spiegel, Karine	Predictors Of Adverse Metabolic Effects Of Sleep Loss	Free University of Brussels	\$297,000
5R01HL070841-03	Stefanick, Marcia L	Outcomes Of Sleep Disorders In Older Men-Palo Alto	Stanford	\$91,624
5R01HL071194-04	Stone, Katie L	Outcomes Of Sleep Disorders In Older Men	California Pacific Medical Ctr	\$424,565
2T32HL007913-06A1	Strohl, Kingman P	Sleep Medicine Neurobiology And Epidemiology	Case Western Reserve University	\$235,075
5K23HL004457-04	Thomas, Robert J	Working Memory In Obstructive Sleep Apnea-An FMRI Study	Beth Israel Deaconess Medical Ctr	\$151,716
1R21HL079248-01	Thomas, Robert J	ECG-Derived Estimators Of Sleep Physiology	Beth Israel Deaconess Medical Ctr	\$166,005
1R01HL079294-01A1	Tryba, Andrew	Background Sodium Currents In Respiratory Pacemakers	Medical College of Wisconsin	\$307,529
5T32HL007909-08	Turek, Fred W	Training Grant In Sleep Research	Northwestern	\$277,123
5R01HL072694-04	Van Cauter, Eve	Extended Work Schedule And Health: Role Of Sleep Loss	University of Chicago	\$381,250
5R01HL070154-04	Van Dongen, Hans P	Individual Differences In Response To Sleep Deprivation	Washington State University	\$90,206
7R01HL070154-05	Van Dongen, Hans P	Individual Differences In Response To Sleep Deprivation	Washington State University	\$336,818
1R01HL080492-01	Veasey, Sigrid C	Sleep Apnea: Upper Airway Nerve Injury	University of Pennsylvania	\$373,810
2R01HL064415-05A1	Vgontzas, Alexandros N	The Role Of Cytokines In Sleepiness And Sleep Apnea	Pennsylvania State University Hershey Med Ct	\$256,375
1R01HL082637-01	Volpp, Kevin G	Impact Of Resident Work Hour Rules On Errors And Quality	University of Pennsylvania	\$533,361
5R01HL070784-04	Waters, Karen A	The Metabolic Syndrome In Pediatric Obstructive Apnea	University of Louisville	\$147,000
5K23HL068849-03	Weaver, Edward M	Nasal Obstruction And Sleep Apnea Treatment Outcomes	University of Washington	\$153,060
5R01HL076101-03	Weaver, Terri E	Impact Of CPAP On Functional Outcomes In Milder OSA	University of Pennsylvania	\$608,093
5R01HL075184-03	Weiss, J Woodrow	Cartoid Mediators Of Sympathoexcitation In Sleep Apnea	Beth Israel Deaconess Medical Ctr	\$382,500
5P50HL060292-08	White, David P.	Harvard Center On Sleep Neurobiology And Sleep Apnea (S*)	Brigham and Women's Hospital	\$2,232,457
5R01HL062252-07	Young, Terry B	Epidemiology Of Sleep-Disordered Breathing In Adults	University of Wisconsin	\$993,352
5R01HL071560-03	Youngstedt, Shawn D	Preventing Risks Of Long Sleep	University of South Carolina	\$206,407
5R01HL069988-03	Zee, Phyllis C	Circadian Rhythms And Sleep In Familial DSPS And ASPS	Northwestern	\$371,250
			Total Extramural	\$49,777,636
			OPEC	\$276,000
			RMS	\$504,000
			NHLBI TOTAL	\$50,557,636

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

NATIONAL INSTITUTE ON AGING

Grant No	PI	Title	Institution	Funding
5R01 AG008415	Ancoli-Israel, Sonia	Cognitive Benefits Of Treating Sleep Apnea In Dementia	University Of California San Diego	\$295,934
5R01 AG018760	Behan, Mary	Age,Gender, Serotonin And Respiratory Control	University Of Wisconsin Madison	\$246,986
5R01AG020269	Bliwise, Donald	Biomarkers Of Aging In The Bay Area Sleep Cohort	Emory University	\$320,471
2R01AG012112	Campbell, Scott	Homeostatic Factors In Age-Related Sleep Disturbance	Weill Medical College Of Cornell Univ	\$253,551
5R01AG021020	Cheng, Zixi	Aging, Episodic Hypoxia, And Vagal Cardiac Projections.	University Of Central Florida	\$356,475
2R01AG019186	Cole, Philip	Serotonin N-Acetyltransferase Regulation & Inhibition	Johns Hopkins University	\$200,029
5R01AG024506	Drummond, Sean	Sleep Deprivation And Brain Function In Older Adults	Veterans Medical Research Fdn/San Diego	\$256,973
2R01AG006072	Duffy, Jeanne	Disrupted Sleep In The Elderly: Circadian Etiology	Brigham And Women's Hospital	\$231,830
5R01AG013418	Duncan, Marilyn	Neural Mechanisms Resetting The Aged Circadian Pacemaker	University Of Kentucky	\$279,870
5P01AG021190	Earley, Christopher	Restless Legs Syndrome- The Iron-Dopamine Connection	Johns Hopkins University	\$1,942,610
1K23AG025963	Endeshaw, Yohannes	Nocturnal Polyuria And Sleep-Disordered Breathing	Emory University	\$127,111
2R01AG015866	Ferman, Tanis	Neuropsychology Of Dementia With Lewy Bodies	Mayo Clinic Coll Of Med, Jacksonville	\$199,233
5P01AG014359	Gambetti, Pierluigi	Pathogenetic Mechanisms Of Prion Diseases	Case Western Reserve University	\$200,032
5R01AG019361	Gold, Ellen	Sleep During The Peri-Menopause In A Multi-Ethnic Cohort	University Of California Davis	\$51,828
5R01AG019362	Hall, Martica	Sleep During The Perimenopause In A Multi-Ethnic Cohort	University Of Pittsburgh At Pittsburgh	\$189,539
5R01AG020654	Harper, David	Sleep, Circadian Rhythms And Dementing Illnesses	Mc Lean Hospital (Belmont, Ma)	\$341,408
1R43AG026841	Harris, Catherine	Translating Dementia Care Research: Sleep Disorder	Lightbridge Healthcare Research, Inc.	\$137,200
5K01AG022782	Hsueh, Wen-Chi	Diurnal Preference In Amish Families	University Of California San Francisco	\$148,470
1R01AG026364	Irwin, Michael	Aging: Cytokine Mechanisms And Treatment Of Insomnia	University Of California Los Angeles	\$438,786
5R01AG020584	Kilduff, Thomas	Sleep, Aging, And The Hypocretin/Orexin System	SRI International	\$481,306
5R01AG019363	Kravitz, Howard	Sleep During The Perimenopause In A Multi-Ethnic Cohort	Rush University Medical Center	\$130,500
5R01AG020912	Lee, Cheng	Genetic Defects Of The Mammalian Circadian Clock And Pre	University Of Texas Hlth Sci Ctr Houston	\$333,521
1R03AG026331	Lee, Hochang	Restless Legs Risk In The Biracial East Baltimore Cohort	Johns Hopkins University	\$69,293
5R01AG021826	Lewy, Alfred	Melatonin Entrainment Of Elderly Blind Free-Runners	Oregon Health & Science University	\$302,878
5K23AG024837	Malhotra, Atul	Aging Influence On The Development Of Sleep Apnea	Brigham And Women's Hospital	\$132,952
1R21AG024459	Mccrae, Christina	Sleep/Cognitive Performance/Older Adults/Insomnia	University Of Florida	\$169,967
5R01AG013396	Monk, Timothy	Phase Shift Tolerance In Older People	University Of Pittsburgh	\$278,070
5P01AG020677	Monk, Timothy	Aging Well, Sleeping Efficiently: Intervention Studies	University Of Pittsburgh	\$1,794,030
1R43AG025598	Mulchahey, James	Safety And Pharmacokinetics Of PD6735 In The Elderly	P2D, Inc	\$324,340
2R56AG015370	Murphy, Patricia	Melatonin For Age-Related Sleep Disturbance In Women	Weill Medical College Of Cornell Univ	\$136,708
5R21AG025353	Naidoo, Nirinjini	Age And Sleep Effects On ER Protein Function	University Of Pennsylvania	\$190,200
5P01AG017628	Pack, Allan	The Mechanisms Of Alterations In Sleep With Age	University Of Pennsylvania	\$907,024
1R21AG025553	Punjabi, Naresh	Effects Of Aging On Sleep Architecture	Johns Hopkins University	\$207,878
5R01AG023977	Sanders, Mark	OSA And Metabolic Syndrome: Role Of Oxidative Stress	University Of Pittsburgh	\$371,250

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5R01AG022005	Sastry, Narayan	Socioeconomic And Ethnic Disparities In Adult Health	Rand Corporation	\$46,073
5R01AG021134	Sheikh, Javid	Light Treatment For Sleep/Wake Disturbances AD	Stanford University	\$318,500
5R01AG019360	Sowers, Maryfran	Sleep During The Perimenopause In A Multi-Ethnic Cohort	University Of Michigan	\$136,614
5P01AG018784	Spiegel, David	Stress, The HPA And Health In Aging	Stanford University	\$24,974
5P01AG018784	Spiegel, David	Stress, The HPA And Health In Aging	Stanford University	\$271,671
3P01AG018784	Spiegel, David	Stress, The HPA And Health In Aging	Stanford University	\$8,387
5R01AG022070	Tsang, Teresa	Diastolic Dysfunction & Atrial Fibrillation In Elderly	Mayo Clinic Coll Of Medicine	\$69,691
3R01AG019914	Urbanski, Henryk	Effect Of Aging And Caloric Restriction On Circadian Ph*	Oregon Health & Science University	\$52,470
5P01AG011412	Van Cauter, Eve	Alterations Of Circadian Timing In Sleep And Aging	University Of Chicago	\$1,984,372
3P01AG011412	Van Cauter, Eve	Alterations Of Circadian Timing In Sleep And Aging	University Of Chicago	\$82,350
4R37AG002224	Wise, Phyllis	Neuroendocrine And Neurochemical Function During Aging	University Of California Davis	\$310,575
3R37AG002224	Wise, Phyllis	Neuroendocrine And Neurochemical Function During Aging	University Of California Davis	\$67,568
3R37AG002224	Wise, Phyllis	Neuroendocrine And Neurochemical Function During Aging	University Of California Davis	\$10,000
5R03AG024621	Wright, Kenneth	Aging, Hypnotics, Sleep Inertia And The Risk Of Falling	University Of Colorado	\$57,989
5R01AG014124	Young, Terry	Menopause And Midlife Aging Effects On Sleep Disorders	University Of Wisconsin Madison	\$381,069
5R01AG017636	Zhdanova, Irina	Melatonin And Aging In Non-Human Primates	Boston University	\$461,804
NIA TOTAL				\$16,332,359

NATIONAL INSTITUTE ON ALCOHOL ABUSE AND ALCOHOLISM

Grant No	PI	Title	Institution	Funding
5R01AA9568	Anton, Raymond F	Gabapentin as an Adjunct to Naltrexone for Alcoholism	Medical University of South Carolina	\$31,343
1R21AA14408	Arnedt, J Todd	CBT for Insomnia in Patients with Alcohol Dependence	Brown University	\$144,426
2K24AA0304	Brower, Kirk	Medication Effects on Sleep in Alcoholics	University of Michigan	\$164,986
5R01AA13252	Carskadon, Mary	Alcohol, Sleep, and Circadian Rhythms in Young Humans	Emma Pendleton Bradley Hospital	\$835,177
5R01AA14211	Colrain, Ian	Alcoholism: Sleep and the Brain	SRI International	\$484,442
5R01AA12504	Dahl, Ronald E	Sleep/Arousal in Adolescence: Pathways to Alcohol Abuse	University of Pittsburgh	\$0
5R01AA13242	Earnest, David	Development, Alcohol, and Circadian Clock Function	Texas A & M University Health Sci Ctr	\$216,000
5R01AA06059	Ehlers, Cindy L	EEG, ERP, and Sleep Measures of Alcohol's Effects	Scripps Research Institute	\$0
5R01AA13243	Friedmann, Peter	Trazadone for Sleep Disturbance -Early Alcohol Recovery	Rhode Island Hospital	\$0
5R21AA13246	Godwin, Dwayne	Cellular Mechanisms of Ethanol's Influence on Sleep	Wake Forest University	\$144,000
5R01AA12087	Howland, Jonathan	Hangover, Congeners, Sleep, and Occupational Performance	Boston University	\$0
5R01AA13239	Irwin, Michael	Alcoholism: Sleep and Cytokines in African Americans	University of California-Los Angeles	\$381,250
5R01AA13253	Roehrs, Timothy A	Insomnia as a Path to Alcohol Abuse	Case Western Reserve-Henry Ford Hosp.	\$321,750

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
1R21AA13893	Rosenwasser, Alan	Chronobiology of Alcohol: Animal Models	University of Maine Orono	\$134,182
5R01AA13248	Simasko, Steven M	Mechanisms of Alcohol Effects on Sleep	Washington State University	\$293,600
			NIAAA TOTAL	\$3,151,156

NATIONAL INSTITUTE OF ARTHRITIS & MUSCULOSKELETAL & SKIN DISEASES

Grant No	PI	Title	Institution	Funding
5-R01-AR-35582-21	Cauley Jane A.	Study Of Osteoporotic Fractures	University Of Pittsburgh At Pittsburgh	\$26,659
1-R01-AR-52368-01-A1	Edinger Jack D	Behavioral Insomnia Therapy With Fibromyalgia	Duke University	\$331,973
5-R01-AR-35583-21	Hillier Teresa A	Study Of Osteoporotic Fractures	Kaiser Foundation Research Institute	\$42,114
5-R01-AR-35584-21	Hochberg Marc C.	Study Of Osteoporotic Fractures	University Of Maryland Balt Prof School	\$0
5-R01-AR-49840-03	Nicassio Perry M	Behavioral Treatments For Rheumatoid Arthritis	University Of California Los Angeles	\$36,308
			NIAMS TOTAL	\$437,053

NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT

Grant No	PI	Title	Institution	Funding
R01HD042569-04	Ackerman,Michael J	Cardiac Channel Mutations In SIDS	Mayo Clinic Coll Of Medicine, Rochester	\$395,050
R01HD046855-02	Als,Heidelise	Preterm Fetal Growth Restriction And Developmental Care	Children's Hospital Boston	\$478,654
R43HD051243-01	Alsten,Christopher R	Evaluation Of A Prototype Sleep Enhancement Program For Prenatal Women	Inner Health, Inc.	\$100,000
R01HD042707-03	Bartlett,Donald	The Upper Airway And The Sudden Infant Death Syndrome	Dartmouth College	\$355,500
R01NR008381-04	Carskadon,Mary A	Phase Preference, Sleepiness, And Adolescent Development	Emma Pendleton Bradley Hospital	\$100,000
U10HD029067-11	Corwin,Michael J	Event Recordings Of High Risk Infants On Apnea Monitors	Boston University Medical Campus	\$542,263
P01HD036379-08	Darnall,Robert A	Animal Physiology Core	Children's Hospital Boston	\$233,064
P01HD036379-08	Darnall,Robert A	Sleep, Thermoregulation And Cardiorespiratory Stability	Children's Hospital Boston	\$180,857
R01HD045653-02	Darnall,Robert A	Spontaneous Arousals In "Chime" Infants At Risk For SIDS	Dartmouth College	\$405,306
P01HD036379-08	Dymecki,Susan M	Genetic Modeling Of Medullary Serotonergic Development	Children's Hospital Boston	\$238,657
U01HD045935-03	Elliott,Amy J	Northern Plains Prenatal And Infant Health Consortium	University Of South Dakota	\$380,105
R01HD032774-09S1	Fifer,William P.	Perinatal Assessment Of At Risk Populations	New York State Psychiatric Institute	\$43,609
R44HD040786-02	Gevins,Alan S	Children's Neurophysiological Cognitive Assessment Test	Sam Technology, Inc.	\$349,827
R01HD022695-16	Harper,Ronald M	Physiological Development In SIDS	University Of California Los Angeles	\$310,545
P01HD036379-08	Kinney,Hannah C	The Medullary Serotonergic System In SIDS Brainstems	Children's Hospital Boston	\$275,947

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
R37HD020991-19	Kinney,Hannah C	Brainstem Maturation In The Sudden Infant Death Syndrome	Children's Hospital Boston	\$387,334
U01HD045991-03	Kinney,Hannah C	Developmental Biology And Pathology Center	Children's Hospital Boston	\$438,966
K02HD045459-02	Klerman,Elizabeth B	Impact Of Sleep Disruption On Menstrual Cycle Dynamics	Brigham And Women's Hospital	\$108,540
R01HD036520-09	Krueger,James M	Mechanisms Of Sleep Responses To Viral Infections	Washington State University	\$326,250
R01HD042639-02	Lasky,Robert E	Effects Of Noise On Newborns < 1000g Birthweight	University Of Texas Hlth Sci Ctr Houston	\$267,300
K24HD001476-05	Legro,Richard S.	Insulin Resistance In Pcos--Sequelae And Treatment	Pennsylvania State Univ Hershey Med Ctr	\$135,027
R01HD042125-04	Lewy,Alfred J	Melatonin Studies Of Totally Blind Children	Oregon Health & Science University	\$338,901
Z01HD009998-04	Mc Grath,John	Back To Sleep Campaign	NICHD	\$725,024
P01HD036379-08	Nattie,Eugene E	The Medullary Serotonergic System & Respiratory Control	Children's Hospital Boston	\$268,489
N01HD053412-000	Neel,Lisa C	SIDS Training & Outreach For American Indians & Alaskans	Native American Management Services	\$282,735
P01HD036379-08	Niblock,Mary M	Anatomy Core	Children's Hospital Boston	\$234,928
K23HD041465-04	Pien,Grace W	Longitudinal Study--Sleep-Disordered Breathing/Pregnancy	University Of Pennsylvania	\$130,194
P01HD036379-08	Richerson,George B	Cellular Mechanisms Of Medullary Serotonergic Neurons	Children's Hospital Boston	\$218,148
F31HD051035-01	Schwichtenberg,Amy J	The Development Of Sleeping Patterns In Preterm Infants	University Of Wisconsin Madison	\$30,960
P01HD036379-08	St John,Walter M	Control Of Ventilatory Activity In Eupnea And Gasping	Children's Hospital Boston	\$214,419
R01HD010993-29	Thach,Bradley T	Control Of Breathing In Recovery From Apnea	Washington University	\$344,250
R01HD047928-01A1	Wolfson,Amy R	Young Adolescent Sleep-Smart Pacesetter Program	College Of The Holy Cross	\$317,214
			NICHD TOTAL	\$9,158,063

NATIONAL CENTER FOR COMPLEMENTARY AND ALTERNATIVE MEDICINE

Grant No	PI	Title	Institution	Funding
1R21AT3881-A2	Bell, Iris	Polysomnography In Homeopathic Remedy Effects	University Of Arizona	\$107,825
1R21AT29101	Carmody, ames	Mindfulness-Based Stress Reduction For Hot Flashes	Univ Of Massachusetts Med Sch Worcester	\$19,890
1R21AT25711	Duffy, Jeanne	Effect Of Vitamin B12 On The Human Circadian Pacemaker	Brigham And Women's Hospital	\$189,000
5R01AT15213	Gooneratne, Nalaka	Melatonin Randomized Trial In Insomnia In The Elderly	University Of Pennsylvania	\$455,615
5R01AT24902	Khalsa, Sat Bir	Neuroendocrine Mechanisms In Yoga Treatment Of Insomnia	Brigham And Women's Hospital	\$171,270
5R21AT21082	Landis, Carol	Valerian For Sleep Disturbance In Healthy Older Adults	University Of Washington	\$189,500
1R21AT25311-A1	Mustian, Karen	Polarity Therapy For Cancer-Related Fatigue	University Of Rochester	\$18,750
5R21AT22092	Nakamura, Yoshio	Utah Center For Exploring Mind-Body Interactions (Ucemb*)	University Of Utah	\$0
5F31AT24232	Overk, Cassia	Potential Sedative Mechanism For Humulus Lupulus L.	University Of Illinois At Chicago	\$29,859
1R21AT27131	Scheer, Frank	Melatonin Supplementation In Hypertensive Patients	Brigham And Women's Hospital	\$78,750
1F31AT15641-A1	Taibi, Diana	Effect Of Valerian Root On Sleep In Rheumatoid Arthritis	University Of Virginia Charlottesville	\$26,986
			NCCAM TOTAL	\$1,287,446

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

NATIONAL INSTITUTE ON DRUG ABUSE

Grant No	PI	Title	Institution	Funding
1R43DA019357-01A1	Berka, Chris	Neurocognitive Profile Of Nicotine Use & Withdrawal	Advanced Brain Monitoring Inc	\$11,433
5R01DA019356-02	Bertram, Richard	CrCNS:Comput./Exp.Study:Hypothal.-Pituitary Interaction	Florida State University	\$33,904
5R01DA015648-04	Boger, Dale	Inhibitors Of Fatty Acid Amide Hydrolase (Faah)	Scripps Research Institute	\$57,875
5R21DA017969-02	Burstein, Sumner	Endocannabinoid Analogs As Anti-Inflammatory Agents	University Of Massachusetts	\$30,375
5P01DA017259-02	Cravatt, Benjamin	Faah: Structure, Function, And In Vivo Inhibition	Scripps Research Institute	\$240,628
2R01DA009133-09	De Wit, Harriet	Drug Abuse And Impulsivity: Human Laboratory Models	University Of Chicago	\$34,313
5R01DA016542-03	Dorsey, Cynthia	Neurochemical Substrates Of Sleep Homeostasis	Mclean Hospital	\$315,888
5R01DA003889-22	Griffiths, Roland	Experimental Analysis Of Novel Drugs Of Abuse	Johns Hopkins University	\$46,018
5R01DA003476-20	Hart, Carl	Drug Effects On Behavior: Workplace Implications	Res Fdn For Mental Hygiene Inc	\$244,761
5R01DA016541-04	Irwin, Michael	Cocaine Dependence: EEG Sleep And Cytokines	UCLA	\$381,250
1R01DA017692-01A2	Kosobud, Ann	Role Of Circadian Entrainment In Drug Intake And Abuse	Indiana University	\$270,040
5R01DA014931-03	Kuhn, Cynthia	Ghb Tolerance And Dependence	Duke University	\$26,950
9R44DA020470-02	Lane, Benjamin	Quick Placement EEG Electrode And Installation Tool	Key Technologies Inc	\$37,111
5R01DA013574-03	Lichstein, Kenneth	Treating Addiction To Sleep Medication	University Of Alabama	\$148,862
5R01DA003994-19	Lukas, Scott	Polydrug Abuse-Imaging And Behavior	Mclean Hospital	\$67,969
5R01DA019238-02	Lukas, Scott	Cannabis Dependence: Imaging And Medication Development	Mclean Hospital	\$18,743
5R01DA016368-03	Malcolm, Robert	CBT And Modafinil For Cocaine Addiction	Medical Univ Of South Carolina	\$42,498
1K01DA019541-01	Mclung, Colleen	The Role Of Circadian Genes In Drug Addiction	University Of Texas Southwestern	\$141,449
1F31DA019425-01	Mckinney, Michele	Biochemical Investigations Of Fatty Acid Amide Hydrolase	Scripps Research Institute	\$5,881
5R03DA017275-02	Penetar, David	Bupropion Effects On Marijuana Withdrawal Symptoms	Mclean Hospital	\$8,050
5R01DA005938-12	Ricaurte, George	Mdma Neurotoxicity In Humans: Occurence & Consequences	Johns Hopkins University	\$40,574
5R01DA017355-02	Roehrs, Timothy	Abuse Liability Associated With Chronic Hypnotic Use	Henry Ford Hospital	\$36,309
1R01DA020479-01	Stein, Michael	Insomnia And Drug Relapse Risk	Rhode Island Hospital	\$161,573
5R01DA016427-02	Swan, Gary	The Impact Of Smoking Cessation On Sleep	SRI International	\$469,239
9R44DA020431-02A2	Tucker, Don	Dense Array EEG For Neonatal Sleep Monitoring	Electrical Geodesics Inc	\$300,020
5R01DA015418-03	Zhdanova, Irina	Cocaine-Induced Behaviors In Larval Zebrafish	Boston University	\$24,225
			NIDA TOTAL	\$3,195,935

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

NATIONAL INSTITUTE OF MENTAL HEALTH

Grant No	PI	Title	Institution	Funding
5R01MH058789-07	Albers, Elliot H	Photic Entrainment Of Circadian Behaviors	Georgia State University	\$254,625
5R01MH062641-05	Albers, Elliot H	Neurobiology Of Social Behavior	Georgia State University	\$250,250
5R21MH071414-02	Alexander, Gerianne M	Biosocial Activation Of Sex-Linked Cognitive Behavior	Texas A&M University System	\$172,781
5T32MH019132-15	Alexopoulos, George S	Research Training In Geriatric Mood Disorders	Weill Medical College Of Cornell Univ	\$204,928
5R01MH067870-03	Allada, Ravi	Function Of Casein Kinase 2 In The Circadian Clock	Northwestern University	\$338,365
5R01MH070922-02	Allen, Charles	Calcium Signaling In Suprachiasmatic Nucleus Neurons	Oregon Health & Science University	\$271,800
5R01MH068232-02	Anders, Thomas F.	Sleep Disorders In Children With Autism	University Of California Davis	\$415,000
5R01MH061515-05	Armitage, Roseanne	Sex Differences In Sleep Regulation In Depression	University Of Michigan At Ann Arbor	\$443,457
5F31MH073302-02	Aton, Sara J	Roles Of Gaba And Vip In The Suprachiasmatic Nucleus	Washington University	\$28,111
5R37MH045361-18	Baghdoyan, Helen A	Cholinergic Mechanisms Of REM Sleep Generation	University Of Michigan At Ann Arbor	\$333,686
1R01MH067157-01A2	Beltz, Barbara S	Environmental Regulation Of Neurogenesis	Wellesley College	\$277,554
3R01MH071874-02S1	Benca, Ruth M	An Animal Model Of Mania	University Of Wisconsin Madison	\$37,284
5R01MH071874-02	Benca, Ruth M	An Animal Model Of Mania	University Of Wisconsin Madison	\$432,143
1F31MH075708-01	Berger, Miles	Role Of 5-Ht1a-Ar Overexpression In Affective Disorders	University Of California San Francisco	\$30,061
1R01MH070019-01A2	Bittman, Eric L	Suprachiasmatic Control Of Peripheral Circadian Rhythms	University Of Massachusetts Amherst	\$297,381
2R01MH050701-10A1	Blumberg, Mark S	Behavioral State Development In Infants	University Of Iowa	\$265,500
5K02MH066424-04	Blumberg, Mark S	Homeostasis And Behavioral State Organization In Infants	University Of Iowa	\$114,222
2R01MH053032-11A1	Brenowitz, Eliot A	Comparative Studies Of Vocal Control	University Of Washington	\$297,861
5K02MH066939-03	Brenowitz, Eliot A	Plasticity Of Vocal Control	University Of Washington	\$117,904
5F31MH067318-04	Broome, Bede M	Characteristics Of Sleep	California Institute Of Technology	\$36,152
5R01MH067094-03	Brown, Ronald Lane	Generation Of Retinal Signals For Circadian Entrainment	Oregon Health & Science University	\$302,399
5R01MH064867-08	Bucan, Maja	Genetics Of Rest:Activity Behavior In The Mouse	University Of Pennsylvania	\$361,998
5F31MH073374-02	Butcher, Gregory Q	Erk/Mapk Signaling And Circadian Clock Entrainment	Ohio State University	\$31,902
5R01MH024652-30	Buysse, Daniel J	Psychobiology And Treatment Response In Primary Insomnia	University Of Pittsburgh At Pittsburgh	\$593,047
5R01MH069743-03	Cahill, Gregory M.	Genetic Analysis Of Zebrafish Circadian Rhythmicity	University Of Houston	\$317,419
5F32MH071106-02	Cano, Georgina	Neural Circuitry In Stress-Induced Insomnia	Beth Israel Deaconess Medical Center	\$23,275
5R25MH058879-08	Carskadon, Mary A	Sleep And Chronobiology Summer Research Apprenticeship	Emma Pendleton Bradley Hospital	\$78,731
5R21MH067600-03	Carter, Patricia A	Development Of Caregiver Sleep Intervention	University Of Texas Austin	\$181,977
5R01MH043362-16	Chase, Michael H	Brainstem Regulation Of Active Sleep And Wakefulness	Websciences International	\$405,000
5R01MH069372-02	Chase, Michael H	CNS Sites Mediating Cognition And Mood: Impact Of Apnea	Websciences International	\$382,500
5R01MH044234-16	Church, Russell M.	Temporal Discrimination Learning	Brown University	\$266,722
5K08MH001642-05	Clark, Camellia P	Sleep Deprivation, EEG, & Functional MRI In Depression	University Of California San Diego	\$167,724
5R01MH045130-15	Czeisler, Charles A	Treatment Of Circadian Sleep Disorders With Bright Light	Brigham And Women's Hospital	\$753,017
5K02MH001362-10	Dahl, Ronald E.	Sleep/Arousal & Affect Regulation: Puberty Development	University Of Pittsburgh At Pittsburgh	\$117,225

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5R24MH067346-04	Dahl, Ronald E.	Affect Regulation And Adolescent Brain Maturation	University Of Pittsburgh At Pittsburgh	\$371,250
5R01MH059839-07	Datta, Subimal	Cellular And Neurochemical Mechanisms Of REM Sleep	Boston University Medical Campus	\$282,625
5R01MH068796-02	Davis, Frederick C.	SCN Output Signals	Northeastern University	\$283,140
5R01MH058543-08	De Lecea, Luis	Neuropeptide Cortistatin And Sleep	Scripps Research Institute	\$370,400
5K23MH068372-02	Drake, Christopher L	Predisposition Model Of Insomnia	Henry Ford Health System	\$134,219
5R01MH042922-14	Dubocovich, Margarita L	Modulatory Role Of Melatonin On CNS Function	Northwestern University	\$287,276
5R01MH063466-04	Dubocovich, Margarita L	Melatonin Receptors As Therapeutic Targets In Primates	Northwestern University	\$299,909
5R01MH044651-16	Dunlap, Jay C	Identification And Analysis Of Clock Controlled Genes	Dartmouth College	\$698,017
5R01MH067057-03	Edinger, Jack D	Classifying Psychiatric, Medical, And Primary Insomnias	Duke University	\$478,147
1Z01MH002386-19	Eiden, Lee E	Chemical Coding Of Neurotransmission	IRP	\$2,414,877
1K02MH073090-01	Epperson, Cynthia N	Neuroactive Steroids, Gaba & Glutamate In Pmdd	Yale University	\$117,552
5K02MH001435-07	Erskine, Mary S	Neural Changes Induced By Mating In The Female	Boston University Charles River Campus	\$120,431
1R01MH067105-01A2	Fee, Michale S	Neural Basis Of Sequence Generation In The Songbird	Massachusetts Institute Of Technology	\$343,409
5R01MH062521-04	Feinberg, Irwin	Longitudinal Measurements Of Sleep EEG In Adolescence	University Of California Davis	\$492,430
5R01MH069854-02	Feng, Pingfu	Wake/Sleep Development And Depressive Substrates	Case Western Reserve University	\$161,250
5T32MH017168-22	Fluharty, Steven J	Training Program In Behavioral/Cognitive Neuroscience	University Of Pennsylvania	\$217,668
5R01MH062003-05	Foa, Edna B	Relationship Between Bio. And Psych. Correlates Of PTSD	University Of Pennsylvania	\$315,272
5R01MH067568-05	Frank, Marcos G	Sleep And Neural Plasticity In Developing Neocortex	University Of Pennsylvania	\$277,375
5R01MH063089-04	Freedman, Robert R	Sleep Disturbance In Menopause	Wayne State University	\$329,860
5T32MH019927-12	Fritz, Gregory K.	Research Training In Child Mental Health	Rhode Island Hospital (Providence, Ri)	\$286,329
5R01MH059740-06	Gould, Elizabeth	Hormones, Experience And Hippocampal Neurogenesis	Princeton University	\$342,295
5R01MH061461-05	Green, Carla B.	In Vivo Studies Of Vertebrate Circadian Clock Genes	University Of Virginia Charlottesville	\$271,450
5R01MH067777-02	Greene, Robert W	The Role Of Adenosine In Wake/Sleep Transition	University Of Texas Sw Med Ctr/Dallas	\$303,750
1R43MH075109-01	Harrell, David Brent	Novel Method To Study Sleep In Autistic Disorders	Pro-Tech Services, Inc.	\$99,999
5R01MH067752-02	Heller, H Craig	Non-Circadian Role For Clock Genes In Sleep Homeostasis	Stanford University	\$401,846
3R01MH063104-06S1	Herzog, Erik	Cellular Basis Of Circadian Rhythms In Mammals	Washington University	\$4,965
5R01MH063104-06	Herzog, Erik	Cellular Basis Of Circadian Rhythms In Mammals	Washington University	\$306,756
5T32MH018264-22	Hofer, Myron A	Research Training - Psychobiological Sciences	Columbia University Health Sciences	\$281,390
5R01MH057832-08	Hooper, Scott L	Phase Maintenance: Neuron Properties To Muscle Response	Ohio University Athens	\$201,783
5K23MH066978-03	Joffe, Hadine	Physiology Of Estrogen's Mood Effect In Menopausal Women	Massachusetts General Hospital	\$177,245
5R01MH043836-17	Johnson, Carl H	Molecular/Genetic Analysis Of Biological Clocks In Cells	Vanderbilt University	\$264,250
5R01MH060119-06	Jones, Barbara E	Role Of Basal Forebrain Neurons In Sleep-Wake States	Mc Gill University	\$121,500
5R01MH051573-12	Kay, Steve A	Cell Biology Of Circadian Signaling Mechanisms	Scripps Research Institute	\$469,250
5K02MH001180-11	Keshavan, Matcheri S.	Brain Maturation And Vulnerability To Schizophrenia	Wayne State University	\$117,223
5R01MH061755-07	Kilduff, Thomas S	Neurobiological Studies Of A Novel Hypothalamic Peptide	SRI International	\$452,647
1K01MH070456-01A1	Kilman, Valerie L	Induction Of The Molecular Circadian Clock	Northwestern University	\$144,252

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5R01MH062525-07	Kocsis, Bernat	Cooperation Among Subcortical Networks Underlying Memory	Beth Israel Deaconess Medical Center	\$255,000
5R01MH068545-02	Kripke, Daniel F	Light Stimulation Of Luteinizing Hormone	University Of California San Diego	\$1
5P30MH030915-28	Kupfer, David J	Mhirc For The Study Of Mood And Anxiety Disorders	University Of Pittsburgh At Pittsburgh	\$2,498,882
1K01MH074643-01	Lebourgeois, Monique K	Sleep-Wake Regulation And Emotion In Early Childhood	Brown University	\$137,606
5R01MH074358-02	Lee, Kathryn A	Biomarkers Of Insomnia And Fatigue In HIV/Aids	University Of California San Francisco	\$528,573
5R03MH069518-02	Lee, Theresa M	Stress And Circadian Rhythms	University Of Michigan At Ann Arbor	\$70,307
5K01MH001958-05	Lewin, Daniel	Psychological Sequelae Of Disturbed Sleep In Pediatrics	Children's Research Institute	\$115,317
5R01MH056874-08	Lewy, Alfred J	Melatonin For Circadian Sleep Disorders In The Blind	Oregon Health & Science University	\$302,000
5T32MH019929-12	Lisman, John E	Neuroscience: From Channels To Behavior	Brandeis University	\$219,279
5F31MH071093-02	Luo, Alice H	The SCN And Circadian Activity In The Vta	University Of Pennsylvania	\$41,109
5R21MH066131-02	Manber, Rachel	Antidepressant & CBT For Insomnia To Depression Outcome	Stanford University	\$180,000
1F31MH074291-01A1	Mander, Bryce A.	The Neural Response To Sleep Loss In The Elderly	Northwestern University	\$32,080
1Z01MH002820-03	Manji, Husseini K	Antiglucocorticoid Therapy In Bipolar Depression With Mifepristone (Ru486)	IRP	\$466,876
1Z01MH002853-01	Manji, Husseini K	A Pharmacologic Strategy To Bring About Rapid (Next Day) Antidepressants Effects	IRP	\$434,678
2R01MH046742-16	Marder, Eve E	Intrinsic Plasticity In Oscillatory Neural Networks	Brandeis University	\$343,584
5R01MH068028-04	Margoliash, Daniel	Temporal Patterns In Sleep Mechanisms Of Learning	University Of Chicago	\$255,671
5R01MH057434-06	Marks, Gerald A	Brainstem Mechanisms Of REM Sleep	University Of Texas Sw Med Ctr/Dallas	\$283,500
5R37MH039683-22	Mc Carley, Robert W.	Synaptic Basis Of Sleep Cycle Control	Harvard University (Medical School)	\$469,349
5R01MH062522-05	Mc Carley, Robert W.	Orexin And The Control Of Sleep And Wakefulness	Harvard University (Medical School)	\$224,114
1R34MH070821-01A2	Mccall, William V.	Hypnotics And The Treatment Of Psychiatric Disorders	Wake Forest University Health Sciences	\$190,593
1R01MH072736-01A1	Mccurry, Susan M	Behavioral Treatment Of Nocturnal Disturbances In Ad	University Of Washington	\$391,073
5R01MH063341-06	Mcmahon, Douglas G	Molecular Physiology Of Circadian Pacemaking	Vanderbilt University	\$294,786
1R01MH070415-01A1	Mcnamara, Patrick J	Phylogeny Of Sleep	Boston University Medical Campus	\$296,919
5R37MH046823-15	Mcnaughton, Bruce L	Hebb Marr Networks The Hippocampus And Spatial Memory	University Of Arizona	\$340,875
2K24MH001917-07A2	Mellman, Thomas A.	Psychobiology Of Sleep Disturbance With PTSD	Howard University	\$141,449
5R01MH054006-09	Mellman, Thomas A.	REM Sleep & Memory Processing During Development Of PTSD	Howard University	\$282,299
5R01MH056647-09	Menaker, Michael	Circadian Oscillators In Cultured Mammalian Tissue	University Of Virginia Charlottesville	\$259,000
5R01MH073435-02	Mignot, Emmanuel J	Role Of Hypocretin In Metabolic Effects Of Sleep Loss	Stanford University	\$343,104
5R03MH071350-02	Mileykovskiy, Boris Y	Identification Of Hypocretin (Orexin) Cells In Vivo	University Of California Los Angeles	\$63,000
5R01MH060413-05	Morin, Charles M	Behavioral And Pharmacological Treatment For Insomnia	Laval University	\$225,000
5R01MH064471-04	Morin, Lawrence P	Intrinsic Anatomy Of The Circadian Rhythm System	State University New York Stony Brook	\$112,875
1Z01MH002825-03	Morozov, Alexei Y	Role Of Rhythmic Oscillations In Neuronal Plasticity	IRP	\$64,397
1R01MH072897-01A1	Morrison, Adrian R	Amygdalar Modulation Of Fear-Conditioned Changes In REM Sleep	University Of Pennsylvania	\$314,000
1R43MH071141-01A1	Mulchahey, James Jeffrey	Melatonin Analog For Jet Lag	P2d, Inc.	\$353,001
5R01MH057535-15	Nelson, Randy J	Environment, Behavior, And Reproduction	Ohio State University	\$331,875
5R01MH066144-03	Nelson, Randy J	Photoperiod, Melatonin, And Sickness Behaviors	Ohio State University	\$290,327

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5P50MH066172-04	Nestler, Eric J	Neural Substrates /Appetitive Behavior /Mood /Motivation	University Of Texas Sw Med Ctr/Dallas	\$1,930,527
1R01MH073978-01	Neylan, Thomas C	Neuroendocrine Regulation Of Sleep In PTSD	Northern California Institute Res & Educ	\$510,476
2R01MH061566-05A1	Nofzinger, Eric A.	Sleep Neuroscience In Depression	University Of Pittsburgh At Pittsburgh	\$436,456
5K24MH066227-04	Nofzinger, Eric A.	Sleep Imaging Studies In Depression	University Of Pittsburgh At Pittsburgh	\$104,500
5R01MH062335-04	Obrietan, Karl H	Mapk Signaling And Circadian Timing	Ohio State University	\$258,125
5F32MH067390-02	O'bryant, Erin L	Neuropeptide-Steroid Interactions In Amphibian Brain	University Of Texas Austin	\$48,296
1R01MH070886-01A1	O'hara, Ruth M	MCI, APOE And Sleep Apnea: Effects On Cognition	Stanford University	\$262,004
5R01MH064843-05	Opp, Mark R	Cytokine Neurotransmitter Interactions And Sleep	University Of Michigan At Ann Arbor	\$252,590
5R01MH069836-02	Page, Terry L.	Circadian Rhythms In Olfaction And Sensory Reception	Vanderbilt University	\$169,875
5R01MH066197-04	Park, Jae H	Transcriptional Regulation Of Pdf In Drosophila	University Of Tennessee Knoxville	\$181,250
5R01MH063462-04	Parry, Barbara L	Probing Premenstrual Dysphoric Disorder With Light	University Of California San Diego	\$388,548
1R01MH070788-01A2	Parry, Barbara L	Biological Rhythms In Postpartum Depression	University Of California San Diego	\$365,065
5F31MH070151-03	Partch, Carrie L	Analysis Of Cryptochrome Photoreception.	University Of North Carolina Chapel Hill	\$18,875
5R21MH067184-02	Perlis, Michael L	Is Insomnia A Modifiable Risk Factor For Mdd?	University Of Rochester	\$141,750
5R01MH062296-05	Pickard, Gary E	Retinal Neurons Afferent To The Circadian System	Colorado State University-Fort Collins	\$290,000
1R01MH076280-01	Poe, Gina R	CrCNS - Neuromodulation Of Hippocampal Synaptic Plasticity In Waking & REM Sleep	University Of Michigan At Ann Arbor	\$207,915
5K08MH002012-05	Poland, Russell	Sleep Deprivation And 5-Ht Autoregulatory Processes	University Of California Los Angeles	\$1
3R01MH061285-04S1	Pollak, Seth D	Emotion Processing - Neuroendocrine Supplement	University Of Wisconsin Madison	\$98,213
5R01MH061285-05	Pollak, Seth D	Emotion Processing:Risk For Psychopathology In Children	University Of Wisconsin Madison	\$398,912
5K23MH065434-04	Press, Daniel Z.	Imaging Procedural+Working Memory In Parkinson's Disease	Beth Israel Deaconess Medical Center	\$133,920
5R01MH056895-08	Price, Jeffrey L	Novel Circadian Mutant Of Drosophila	University Of Missouri Kansas City	\$259,947
1F31MH073375-01A1	Pyter, Leah M	Seasonal Plasticity Of Brain And Behavior	Ohio State University	\$33,432
5R01MH068391-02	Rao, Uma	Treatment Prediction In Adolescent And Adult Depression	University Of Texas Sw Med Ctr/Dallas	\$351,000
5R01MH062490-05	Rea, Michael A.	Neurochemical Regulation Of Circadian Timing	University Of Houston	\$242,516
1R01MH071313-01A1	Reinscheid, Rainer K	Physiological Functions Of Neuropeptide S	University Of California Irvine	\$285,517
5T32MH016804-25	Reynolds, Charles F	Clinical Research Training In Psychiatry	University Of Pittsburgh At Pittsburgh	\$223,224
5R01MH063968-05	Richardson, Gary S	Autonomic Dysregulation In Primary Insomnia	Henry Ford Health System	\$321,750
5R01MH068596-03	Rich-Edwards, Janet W	Predictors Of Antenatal And Postpartum Depression	Harvard Pilgrim Health Care, Inc.	\$309,651
5R34MH070805-02	Ritterband, Lee M	Internet Insomnia Intervention: Development/Feasibility	University Of Virginia Charlottesville	\$205,706
5R01MH065606-04	Roberts, Robert E.	Epidemiology Of Disturbed Sleep Among Adolescents	University Of Texas Hlth Sci Ctr Houston	\$582,865
1Z01MH002765-09	Rubinow, David	Reproductive Endocrine Related Mood Disorders--Differential Sensitivity	IRP	\$563,471
5P01MH041712-19	Ryan, Neal D.	Neurobehavioral Changes In Pediatric Affective Disorder	University Of Pittsburgh At Pittsburgh	\$1,494,999
5K23MH001828-04	Salomon, Ronald M	Dynamic Measures Of Neurochemistry In Mood Disorders	Vanderbilt University	\$170,304
2R01MH061716-05A1	Sanford, Larry D	Phenotypical Expression Of Anxiety And Sleep	Eastern Virginia Medical School	\$259,768
5R01MH064827-05	Sanford, Larry D	Limbic Modulation Of Arousal And Alerting	Eastern Virginia Medical School	\$236,075
5R03MH069952-02	Savitz, Adam J.	Treatment Of Sleep Apnea In Patients With Schizophrenia	Weill Medical College Of Cornell Univ	\$71,500

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5R01MH062589-05	Scammell, Thomas Emery	Circadian And Aminergic Regulation Of Orexin Neurons	Beth Israel Deaconess Medical Center	\$294,601
5F31MH070087-02	Schwartz, Michael D	Neural Substrates Of Diurnality	Michigan State University	\$34,654
5T32MH020002-07	Sejnowski, Terrence J	Training Grant In Cognitive Neuroscience	University Of California San Diego	\$323,504
5R01MH064724-03	Sheikh, Javaid I	Sleep In PTSD/Panic: A Multimodal Naturalistic Study	Stanford University	\$243,750
5R01MH055772-08	Shiromani, Priyattam J	Hypothalamic Regulation Of Sleep	Harvard University (Medical School)	\$198,750
5R01MH053433-10	Smale, Laura	The Psychobiology Of Rhythms In Diurnal Mammals	Michigan State University	\$279,324
5R01MH066960-03	Smith, Gerald T	Mechanisms Of Variation In High Frequency Motor Rhythms	Indiana University Bloomington	\$222,689
1F31MH072059-01A2	Spitler, Kevin M	Neural Mechanisms For Emotion In The Amygdala	University Of Arizona	\$33,664
5R01MH048832-11	Stickgold, Robert A	State Dependent Aspects Of Cognition	Beth Israel Deaconess Medical Center	\$382,500
5R01MH065292-03	Stickgold, Robert A	Experimental Manipulation Of Sleep Mentation And Memory	Beth Israel Deaconess Medical Center	\$382,500
5R21MH067754-02	Stickgold, Robert A	fMRI Visualization Of The Human Brain During Sleep Onset	Beth Israel Deaconess Medical Center	\$170,000
5R01MH063323-04	Szymusiak, Ronald	Median Preoptic Nucleus And The Control Of Sleep	Sepulveda Research Corporation	\$147,625
5R01MH067122-03	Taghert, Paul H	Mechanisms Of Circadian Clock Output	Washington University	\$333,915
5U01MH061915-05	Takahashi, Joseph S	Mouse Mutagenesis: Phenotype-Driven Neuroscience Screens	Northwestern University	\$3,411,665
1P50MH074924-01	Takahashi, Joseph S	Chemical And Genetic Manipulation Of Circadian Systems	Northwestern University	\$2,237,333
1R43MH075461-01	Thacher, Scott M	Small Molecule Ligand Discovery For Sleep Cycle Disorders	Orphagen Pharmaceuticals	\$233,571
5R01MH071912-02	Tsuang, Ming T.	Translational Studies Of Cycling In Bipolar Disorder	University Of California San Diego	\$408,897
5T32MH018399-20	Turner, Eric E.	Fellowship In Biological Psychiatry And Neuroscience	University Of California San Diego	\$376,462
5R21MH065062-05	Vazquez, Delia M	Depression Risk, Infant-Mother Attachment And Cortisol	University Of Michigan At Ann Arbor	\$460,057
5R01MH064797-03	Vicini, Stefano	Cerebellar Inhibitory Synapses In Gabar Subunits Ko Mice	Georgetown University	\$310,400
5R03MH069935-02	Walker, Matthew Paul	The Neural Correlates Of Sleep-Dependent Motor Learning	Beth Israel Deaconess Medical Center	\$85,000
1U01MH075378-01	Weed, Michael R	Oral Self-Dosing/Behavioral Assessment	Johns Hopkins University	\$801,080
5K08MH067657-03	Welsh, David K	Circadian Clock Cells: Autonomy, Coupling, And Subtypes	University Of California San Diego	\$163,104
1Z01MH002800-03	White, Benjamin H	Identifying Neural Substrates Of Behavior In Drosophila Melanogaster	IRP	\$1,423,168
1R03MH070656-01A1	Wilkniess, Sandra M	Cognitive Treatments Of Hallucinations In Schizophrenia	University Of Illinois At Chicago	\$77,500
5R01MH061976-04	Wilson, Matthew Alden	Hippocampal Prefrontal Cortical Interactions In Memory	Massachusetts Institute Of Technology	\$248,250
5R01MH062119-05	Wohlgemuth, William K	Combined Behavioral/Pharmacological Therapy For Insomnia	Duke University	\$242,135
5R01MH064104-05	Yehuda, Rachel	Relationship Between Bio And Psych Correlates Of PTSD	Mount Sinai School Of Medicine Of NYU	\$163,500
5R01MH065528-03	Zhdanova, Irina V.	Melatonin, Behavior And Neuronal Activity	Boston University Medical Campus	\$269,172
5R01MH067753-02	Zhou, Qun-Yong	Prokineticin 2 And Suprachiasmatic Circadian Output	University Of California Irvine	\$367,987
2R01MH061171-38	Zucker, Irving	Photoperiod, Behavior And Brain Function	University Of California Berkeley	\$338,363
NIMH TOTAL				\$58,470,680

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE

Grant No	PI	Title	Institution	Funding
5F30NS047802-02	Abbott, Sabra M.	Cholinergic Regulation Of Sleep And Circadian Rhythms	University Of Illinois Urbana-Champaign	\$74,753
5R01NS050939-06	Alam, Md N.	Regulation Of Hypothalamic Sleep-Wake Neuronal System	Sepulveda Research Corporation	\$240,685
1R01NS052903-01A1	Allada, Ravi	Function Of Ion Channel Narrow Abdomen In Daily Rhythms	Northwestern University	\$343,406
5R01NS036607-06	Allen, Charles M.	Cellular Electrophysiology Of The Suprachiasmatic Nuclei	Oregon Health & Science University	\$314,269
5T32NS044851-04	Block, Gene D.	Temporal Biology Training Program	University Of Virginia Charlottesville	\$165,662
5R01NS023426-17	Chase, Michael H.	Neurotransmitter Control Of Sleep And Wakefulness	Websciences International	\$337,500
1R01NS048995-01A1	Chen, Jiang-Fan	A1/A2a Receptors And Caffeine Psychostimulation	Boston University Medical Campus	\$181,046
1F32NS049862-01A1	Chiu, Joanna C.	Role Of Per Phosphorylation In Circadian Biology	Rutgers The St Univ Of Nj New Brunswick	\$43,976
1F31NS053253-01	Christian, Catherine A.	Central Synaptic Mechanisms Regulating Ovulation	University Of Virginia Charlottesville	\$13,477
5R01NS043169-03	Colwell, Chris S.	Neuropeptides And The Mammalian Circadian System	University Of California Los Angeles	\$360,013
2R01NS040982-05	Czeisler, Charles A.	Photic And Nonphotic Input To The Human Circadian System	Brigham And Women's Hospital	\$291,375
5R37NS021229-20	Dani, John	Cholinergic Influences Neuronal Circuit Excitability	Baylor College Of Medicine	\$75,250
2R01NS034004-11	Datta, Subimal	Mechanisms Underlying The Cognitive Function Of Sleep	Boston University Medical Campus	\$373,469
5Z01NS002979-07	David, Goldstein	Clinical Neurocardiology: Catecholamine Systems In Stress And Disease	Ninds Intramural Research Program	\$699,281
5R01NS047014-03	Ding, Jian M.	Dysregulation Of Circadian Rhythm By HIV Protein Tat	East Carolina University	\$236,906
5R01NS042857-03	Earley, Christopher J.	Dopamine And Iron In Restless Legs Syndrome	Johns Hopkins University	\$532,180
2R01NS042088-05	Ederly, Isaac	Seasonal Adaptation Of A Circadian Clock	Rutgers The St Univ Of Nj New Brunswick	\$340,448
5R01NS034958-10	Ederly, Isaac	Clock Mechanism Underlying Drosophila Rhythmic Behavior	Rutgers The St Univ Of Nj New Brunswick	\$350,294
5R01NS050589-02	Eskin, Arnold	Circadian Modulation Of Long-Term Memory Formation	University Of Houston	\$309,066
3T32NS007222-23S1	Feldman, Eva L.	Training In Clinical And Basic Neuroscience	University Of Michigan At Ann Arbor	\$5,126
5T32NS007222-24	Feldman, Eva L.	Training In Clinical And Basic Neuroscience	University Of Michigan At Ann Arbor	\$26,482
5R01NS012636-30	Fidone, Salvatore J.	O2-Chemosensing By Reactive Oxygen Species/Nadph Oxidase	University Of Utah	\$155,574
5P01NS015655-25	Frey, Kirk A.	Pet Study Of Biochemistry And Metabolism Of The CNS	University Of Michigan At Ann Arbor	\$706,843
3R01NS020246-19S1	Garcia-Rill, Edgar E.	Central Modulation Of Rhythms	University Of Arkansas Med Scis Ltl Rock	\$13,632
5R01NS020246-20	Garcia-Rill, Edgar E.	Central Modulation Of Rhythms	University Of Arkansas Med Scis Ltl Rock	\$291,032
1R13NS052032-01	Gillette, Martha U.	2005 Chronobiology Gordon Research Conference	Gordon Research Conferences	\$2,997
2R44NS041118-04	Giuffrida, Joseph P.	Neonatal Intensive Care Unit Telemetry System	Cleveland Medical Devices, Inc.	\$142,163
3R01NS045791-02S1	Greco, Mary A.	Vacht Expression Across Sleep-Wakefulness	SRI International	\$45,500
5R01NS045791-03	Greco, Mary A.	Vacht Expression Across Sleep-Wakefulness	SRI International	\$384,352
5T32NS007473-07	Greenberg, Michael E.	Developmental Neurology	Children's Hospital Boston	\$20,012
9R01NS051280-05A1	Hardin, Paul E.	Circadian Regulatory Circuits In Drosophila	University Of Houston	\$309,066
1F30NS053163-01	Heister, David S.	Development Of REM Sleep	University Of Arkansas Med Scis Ltl Rock	\$37,321
5R01NS045248-03	Hochman, Shawn	Dopaminergic Control Of Spinal Cord And Restless Legs	Emory University	\$289,318
5R01NS046750-02	Holmes, Todd C.	Electrical Signaling In A Circadian Pacemaker Circuit	New York University	\$246,734

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5R01NS045817-03	Jackson, Rob Rob.	Role Of Andante/Ckiib In The Drosophila Circadian Clock	Tufts University Boston	\$301,150
5K01NS047422-02	Johnson, Sheree M.	Co2/H+ Modulation Of Rhythmogenic Inspiratory Neurons	Howard University	\$135,956
2R01NS025378-19A1	Krueger, James M.	Interleukin-1: A Promoter Of Slow Wave Sleep	Washington State University	\$339,475
5R01NS027250-18	Krueger, James M.	Sleep Regulation-The Involvement Of Ghrh	Washington State University	\$344,375
5R01NS042566-03	Lai, Yuan-Yang Y.	Ventral Mesopontine Junction And Motor Activity	University Of California Los Angeles	\$209,475
5R01NS027881-11	Leonard, Christopher S.	Synaptic Modulation Of Mesopontine Cholinergic Neurons	New York Medical College	\$297,350
2R01NS017910-24A1	Levitan, Irwin B.	Regulation Of Ion Channels In Nerve Cells	University Of Pennsylvania	\$116,063
5R01NS046062-04	Lindsey, Bruce G.	Computational Studies Of The Respiratory Brainstem	University Of South Florida	\$327,452
7R01NS045829-03	Liu, Rugao	Ros In Intermittent Hypoxia-Mediated Neuronal Cell Death	University Of North Dakota	\$298,929
5R01NS042859-03	Louis, Elan D.	Pathogenesis Of Essential Tremor: Cerebellar Metabolism	Columbia University Health Sciences	\$231,099
1R01NS051609-01	Lu, Jun	Mechanism Of Dopaminergic Arousal	Beth Israel Deaconess Medical Center	\$393,125
5R01NS045859-02	Mack, Serdia O.	Hypothalamic Control Of Energy Expenditure And Breathing	Howard University	\$232,580
3U54NS034194-12S	Macleish, Peter R.	Developmental Neuroscience Research Core-Supplement	Morehouse School Of Medicine	\$60,719
5U54NS034194-12	Macleish, Peter R.	Developmental Neuroscience Research Program	Morehouse School Of Medicine	\$375,000
5T32NS007292-20	Marder, Eve E.	Neurobiology: Genes, Channels, And Behavior	Brandeis University	\$94,616
5Z01NS002667-21	Mark, Hallett	Physiological Analysis Of Involuntary Movements	Ninds Intramural Research Program	\$55,593
5R37NS033797-12	Mignot, Emmanuel J.	Molecular Genetics Of Human Narcolepsy	Stanford University	\$527,907
5F31NS047799-02	Miller, Brooke H.	Reproductive Defects In The Clock Mutant Mouse	Northwestern University	\$27,984
5R01NS022168-20	Morin, Lawrence P.	Brain, Behavior And Biological Rhythms	State University New York Stony Brook	\$313,228
5R01NS043239-03	Nakajima, Yasuko	Neuropharmacology Of Arousal And Sleep Disorders	University Of Illinois At Chicago	\$333,172
5R01NS044199-02	Ohayon, Maurice M.	Spectrum Of Narcolepsy In The Proband Families	Stanford University	\$300,625
2R01NS035615-08A1	Pickard, Gary E.	5ht Presynaptic Inhibition Of Retinal Input To The SCN	Colorado State University-Fort Collins	\$331,243
5F32NS049789-02	Pigeon, Wilfred R.	Treatment Of Insomnia Secondary To Chronic Pain	University Of Rochester	\$49,928
9R01NS052112-05	Provencio, Ignacio	Photic Regulation Of Circadian Rhythms	University Of Virginia Charlottesville	\$286,755
5K08NS048914-02	Raizen, David M.	Studies Of Behavioral Quiescence In C. Elegans	University Of Pennsylvania	\$175,176
1F30NS048770-01A1	Reeves, Stephen R.	Postnatal Intermittent Hypoxia And Respiration: Potenti*	University Of Louisville	\$25,665
5R01NS047141-02	Reppert, Steven M.	Circadian Clock: Transcriptional Control	Univ Of Massachusetts Med Sch Worcester	\$367,688
5R01NS043374-04	Rye, David B.	Circuitry Of Midbrain Dopamine In Sleep & Wake	Emory University	\$252,700
5R01NS046605-02	Schwartz, William J.	Neurobiology Of Circadian Dysrhythmias	Univ Of Massachusetts Med Sch Worcester	\$294,150
1R01NS048471-01A1	Sehgal, Amita	Cycling Of Circadian Rhythm Proteins	University Of Pennsylvania	\$310,398
1F32NS053222-01	Shafer, Ori T.	Analysis Of Peptide Circuitry Drosophila	Washington University	\$48,296
3R01NS031720-09S2	Shaffery, James P.	Brain Maturation: Function For Rapid Eye-Movement Sleep	University Of Mississippi Medical Center	\$56,536
1R01NS051305-01A1	Shaw, Paul J.	Functional Analysis Of Sleep Homeostasis In Drosophila	Washington University	\$329,104
5R01NS030140-13	Shiromani, Priyattam J.	Brain Mechanisms In Sleep And Narcolepsy	Harvard University (Medical School)	\$275,738
5R01NS042947-03	Siegel, Jerome M.	Sleep In Cetaceans	University Of California Los Angeles	\$265,480
5R37NS014610-26	Siegel, Jerome M.	Immunological Factors In Narcolepsy	University Of California Los Angeles	\$321,216

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5R01NS037919-08	Silver, Rae	Physiological Dissection Of The SCN	Barnard College	\$325,964
2R44NS045417-02	Smith, Jack R.	Pediatric Polysomnography	Neurotronics, Inc.	\$374,958
5R44NS044626-03	Smith, Jack R.	Time Domain Description Of Polysomnography Data	Neurotronics, Inc.	\$375,000
5K23NS047168-02	Smith, Michael T.	Sleep Disturbance And Pain Sensitivity In Chronic Pain	Johns Hopkins University	\$154,221
5R21NS051771-02	Smith, Michael T.	Sleep Deprivation And Pain Modulation	Johns Hopkins University	\$189,047
1F31NS053388-01	Song, Sunbin S.	Time Of Day & Aging In Implicit/Explicit Learning	Georgetown University	\$13,861
5R01NS037056-08	Storm, Daniel R.	Calcium And Camp Regulation Of The Circadian Clock	University Of Washington	\$320,157
5F32NS045512-03	Tapper, Andrew R.	Design And Analysis Of Adnflc Mutant Nachr Knock-In Mice	California Institute Of Technology	\$49,928
5R01NS043459-03	Tosini, Gianluca	Photic And Circadian Regulation Of Retinal Melatonin.	Morehouse School Of Medicine	\$284,000
2R01NS040220-06	Toth, Linda A.	Sleep And Fatigue During Renal Disease In Mice	Southern Illinois University Sch Of Med	\$330,688
5R01NS041454-04	Van Den Pol, Anthony N.	Hypocretin Neurons	Yale University	\$279,585
1R21NS051458-01	Weaver, David R.	Genetic Analysis Of Circadian Oscillator Hierarchy	Univ Of Massachusetts Med Sch Worcester	\$187,313
5R01NS043491-04	Weitz, Charles J.	Secreted SCN Factors And Circadian Locomotor Activity	Harvard University (Medical School)	\$517,246
2R44NS039716-04	Wilder, Steve E.	Improved EEG Patient Interface	Biomec, Inc.	\$193,864
1R01NS051278-01A2	Yamazaki, Shin	Effect Of Temperature On Mammalian Circadian System	Vanderbilt University	\$327,758
1R43NS048676-01A1	Zhu, Yun-Fei	Brain-Penetrating H-3 Receptor Agonists For Insomnia	Neurocrine Biosciences, Inc.	\$136,412
			NINDS TOTAL	\$20,725,156

NATIONAL INSTITUTE OF NURSING RESEARCH

Grant No	PI	Title	Institution	Funding
1R01NR008570-01A2	Barroso, Julie	Fatigue In HIV-Positive People	Duke University	\$660,695
1R01NR008937-01A1	Barsevick, Andrea	Management Of Cancer-Related Fatigue And Sleep Quality	Fox Chase Cancer Center	\$580,742
2P20NR007798-04	Berger, Ann	Fatigue & Breast Cancer-A Behavioral Sleep Intervention	University Of Nebraska	\$312,375
2T32HL007953-06	Brandon, Debra	Preterm Infants: Light Effects On Health And Development	Duke University	\$354,200
5F31NR008979-02	CaRLSon, Barbara	Respiratory Periodicity And Cognitive Decline In Elders	University Of North Carolina	\$332,544
5F31NR009315-02	Carskadon, Mary	Phase Preference, Sleepiness, And Adolescent Development	Emma Pendleton Bradley Hospital	\$250,000
5R01NR004142-08	Coleman, Elizabeth	Exercise To Relieve Cancer-Related Insomnia And Fatigue	University Of Arkansas	\$225,092
5R01NR004281-10	Davis, Jean	Exercise & Sleep: A Clinical Trial In Menopausal Women	Wayne State	\$295,124
5R01NR004340-06	Dinges, David	Neurobehavioral Effects Of Partial Sleep Deprivation	University Of Pennsylvania	\$634,542
5R01NR004573-06	Gedaly-Duff, Vivian	Chemotherapy, Pain, Sleep, Fatigue In Children & Parents	Oregon Health & Science University	\$370,347
5R01NR005345-05	Gross, Cynthia	Impact Of Mind-Body Interventions Post Organ Transplant	University Of Minnesota	\$441,711
5R01NR007762-04	Heaton, Karen	Performance Actigraphy And Sleep In Long-Haul Truckers	University Of Kentucky	\$29,545
5R01NR007771-04	Heitkemper, Margaret	Nursing Management Of lbs: Improving Outcomes	University Of Washington	\$621,633
5R01NR008022-03	Kieckhefer, Gail	Sleep And Nocturnal Asthma In Youth	University Of Washington	\$309,137

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5R01NR008024-03	Landis, Carol	Sleep In Children With Juvenile Rheumatoid Arthritis	University Of Washington	\$348,111
5R01NR008032-04	Lee, Kathryn	Sleep Disruption In New Parents: An Intervention Trial	University Of California San Francisco	\$384,746
5R01NR008044-03	Lee, Kathryn	Nursing Research Training In Symptom Management	University Of California San Francisco	\$393,858
5R01NR008136-03	Metzger, Bonnie	Neuroscience/Neurobehavior Nursing Research Training	University Of Michigan	\$259,130
5R01NR008238-03	Pack, Allan	Training In Sleep And Sleep Disorders	University Of Pennsylvania	\$127,846
5R01NR008381-04	Parker, Kathy	Symptoms, Symptom Interactions, And Health Outcomes	Emory University	\$75,625
5R01NR008585-03	Parker, Kathy	The Effects Of Hemodialysis On The Sleep/Wake Cycle	Emory University	\$466,692
5R01NR008681-02	Perlis, Michael	CBT For Secondary Insomnia In Chronic Pain Patients	University Of Rochester	\$194,664
5R03NR009038-02	Redeker, Nancy	Sleep And Functional Performance In Heart Failure	Univ Of Med/Dent Of Nj-School Of Nursing	\$423,472
5R21NR009080-02	Richards, Kathy	Effect Of Activities And Exercise On Sleep In Dementia	University Of Arkansas	\$445,173
5T32NR007074-14	Sawyer, Amy	Obstructive Sleep Apnea: African American Perceptions	University Of Pennsylvania	\$39,636
5T32NR007088-10	Thomas, Karen	Testing Measures Of Maternal And Infant Circadian Rhythm	University Of Washington	\$75,800
			NINR TOTAL	\$8,652,440

NATIONAL CENTER FOR RESEARCH RESOURCES

Grant No	PI	Title	Institution	Funding
2M01RR002635-21	Aeschbach, Daniel	A New Method To Treat Sleep Disorder	Brigham And Women's Hospital	\$12,057
2M01RR002635-21	Aeschbach, Daniel	Effect On Sleep Depth On Brain Functioning During Wakefulness	Brigham And Women's Hospital	\$71,896
5M01RR002719-20	Allen, Richard	Hypocretin, Histamine And The Restless Legs Syndrome	Johns Hopkins University	\$143,718
5M01RR000055-44	Alverdy, John	Gastric Bypass Effects On Sleep & Glucose Reg	University Of Chicago	\$29,059
5M01RR008084-12	Amin, Raouf	Mechanisms Mediating Cardiovascular Disease	Children's Hospital Med Ctr (Cincinnati)	\$225,909
5M01RR008084-12	Amin, Raouf	Vascular Function In Children With OSA	Children's Hospital Med Ctr (Cincinnati)	\$6,455
3M01RR000827-30S2	Ancoli-Israel, Sonia	Cognitive Benefits Of Treating Sleep Apnea In Dementia	University Of California San Diego	\$124,549
2M01RR000073-42A1	Atanasov, Strahil	Excessive Daytime Sleepiness In Brain Injured Adults	University Of Texas Medical Br Galveston	\$2,279
5M01RR000080-43	Auckley, Dennis	Polaris (Ex) Positive Airway Pressure Therapeutic Device: Polysomnographic Eval	Case Western Reserve University	\$31,749
3M01RR000827-30S2	Ayalon, Liat	Neuropsychological Deficits And Localized Cerebral Activation In Sleep Apnea	University Of California San Diego	\$61,053
5M01RR000096-44	Ayappa, Indu	Automated Analysis Of Sleep Disordered Breathing	New York University School Of Medicine	\$1,504
5M01RR000030-44	Barroso, Julie	Fatigue In Hiv-Positive People	Duke University	\$3,507
3M01RR000125-41S1	Bazzy-Asaad, Alia	Respiratory Disorders Of Sleep In Children	Yale University	\$164,520
5M01RR008084-12	Beebe, Dean	Obstructive Sleep Apnea Among Obese Teens And Preteens	Children's Hospital Med Ctr (Cincinnati)	\$65,007
5M01RR008084-12	Beebe, Dean	Sleep And Neurobehavioral Features: Comparison Group Study	Children's Hospital Med Ctr (Cincinnati)	\$22,130
5M01RR000051-44	Bender, Bruce	Sleep Loss In Patients With Atopic Dermatitis	University Of Colorado Denver/Hsc Aurora	\$11,724
5M01RR000048-44	Benloucif, Susan	A Pilot Study On The Phase Shifting Response To 2-Hour Light Exposure	Northwestern University	\$84,728

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5M01RR000048-44	Benloucif, Susan	Responsiveness Of The Aging Circadian Clock To Light	Northwestern University	\$145,511
5M01RR000048-44	Benloucif, Susan	Supplement To Responsiveness Of The Aging Circadian Clock To Light	Northwestern University	\$70,453
2M01RR010732-11	Bixler, Edward O	Sleep Disordered Breathing In Children	Pennsylvania State Univ Hershey Med Ctr	\$65,266
2M01RR000400-37	Bloomfield, John	Comparing The Effects Of Alcohol And Sleep Deprivation On Driving Performance	University Of Minnesota Twin Cities	\$10,124
5M01RR002719-20	Bolla, Karen I	Sleep Disturbance In Marijuana Withdrawal	Johns Hopkins University	\$151,702
5M01RR000847-32	Bourguignon, Cheryl M	Effects Of Valerian On Sleep Disturbances In Persons With Arthritis	University Of Virginia Charlottesville	\$7,090
5M01RR000042-45	Brower, Kirk J	Gabapentin Treatment Of Alcohol And Sleep Problems	University Of Michigan At Ann Arbor	\$4,118
5M01RR000042-45	Brown, Devin L	Continuous Positive Airway Pressure For Stroke And Obstructive Sleep Apnea	University Of Michigan At Ann Arbor	\$3,088
5M01RR000240-41	Brown, Lawrence	Single Dose Pharmacokinetic And Pharmacodynamic Evaluation	Children's Hospital Of Philadelphia	\$1,290
2M01RR002635-21	Buxton, Orfeu	Sleep Restriction, Impaired Glucose Metabolism, And Performance	Brigham And Women's Hospital	\$1,340
5M01RR000056-44	Buysse, Daniel J	Psychobiology And Treatment Response In Primary Insomnia	University Of Pittsburgh At Pittsburgh	\$105,259
5M01RR000056-44	Buysse, Daniel J	Brief Behavioral Treatment On Insomnia In Primary Care	University Of Pittsburgh At Pittsburgh	\$25,649
2M01RR000585-34	Caples, Sean M	Obstructive Sleep Apnea And Venous Thromboembolic Disease	Mayo Clinic Coll Of Medicine, Rochester	\$12,321
2M01RR000585-34	Caples, Sean M	Sleep Physiology In Electrical Cardioversion Of Atrial Fibrillation	Mayo Clinic Coll Of Medicine, Rochester	\$2,132
5M01RR000069-43	Cavanaugh, Keith	Eval Of Sleep Efficiency In Young Cf Pts During Hospitalization: A Pilot Study	University Of Colorado Denver/Hsc Aurora	\$9,690
5M01RR000042-45	Chervin, Ronald D	Identification Of Sleep Disordered Breathing In Children	University Of Michigan At Ann Arbor	\$5,146
5M01RR000044-44	Ciafaloni, Emma	Causes Of Excessive Sleepiness In Myotonic Dystrophy	University Of Rochester	\$12,189
3M01RR000827-30S2	Clark, Camellia P	Sleep Deprivation, EEG And FMRI In Depression	University Of California San Diego	\$56,780
2M01RR002635-21	Cohen, Richard J	Effects Of Disruptive Sleep On Hormonal And Renal Responses To Posture	Brigham And Women's Hospital	\$179,514
5M01RR014288-07	Cole, Catherine	Pilot Study: Sleep Fragmentation Method & Attention	University Of Arkansas Med Scis Ltl Rock	\$3,706
2M01RR010732-11	Craig, Timothy	Role Of Montelukast On Perennial Allergic Rhinitis & Associated Sleep Disturbanc	Pennsylvania State Univ Hershey Med Ctr	\$11,557
5M01RR000042-45	Crofford, Leslie J	Evaluation Of Sleep Dysfunction In Fibromyalgia	University Of Michigan At Ann Arbor	\$19,557
5M01RR000096-44	Cronstein, Bruce N	Testing For Single Nucleotide Polymorphisms Associated With Fibromyalgia	New York University School Of Medicine	\$1,909
2M01RR002635-21	Czeisler, Charles	Homeostatic Sleep Regulation In Older People	Brigham And Women's Hospital	\$45,102
2M01RR002635-21	Czeisler, Charles	Hypoglycemic Counterregulation In Narcolepsy	Brigham And Women's Hospital	\$723
2M01RR002635-21	Czeisler, Charles	Circadian Entrainment, Sleep-Wake Regulation And Neurobehavioral Performance	Brigham And Women's Hospital	\$216,579
2M01RR002635-21	Czeisler, Charles	After Effects Of Entrainment On Human Circadian Period	Brigham And Women's Hospital	\$446
2M01RR002635-21	Czeisler, Charles	Effects Of Extended Work Hours On Interns	Brigham And Women's Hospital	\$241,585
2M01RR002635-21	Czeisler, Charles	Circadian Adaptation To Night Work In Older People	Brigham And Women's Hospital	\$11,611
2M01RR002635-21	Czeisler, Charles	Circadian Adaptation To Night Work In Young People	Brigham And Women's Hospital	\$345,632
5M01RR000056-44	Dave, Nilesh	Effect Positive Pressure Therapy Gene/Protein Express Vascular	University Of Pittsburgh At Pittsburgh	\$3,664
5M01RR000065-43	Dewit, Marjolein	PK/Pd In Patients Randomized To Once Daily Awakening And Sedated Algorithm	Virginia Commonwealth University	\$29,337
3M01RR000827-30S2	Dimsdale, Joel E	Sleep Apnea And Hypertension: Role Of The Sympathetic Nervous System	University Of California San Diego	\$26,252
3M01RR000827-30S2	Dimsdale, Joel E	Effects Of Opioid Medications On Sleep And Fatigue	University Of California San Diego	\$176,444
5M01RR000040-45	Dinges, David F	Neurobehavioral Effects Of Partial Sleep Deprivation	University Of Pennsylvania	\$1,363
5M01RR000040-45	Dinges, David F	Homeostatic & Circadian Regulation Of Wakefulness During Sleep	University Of Pennsylvania	\$341

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5M01RR000040-45	Dinges, David F	Cumulative Partial Sleep Deprivation During Space Flight	University Of Pennsylvania	\$341
5M01RR000040-45	Dinges, David F	Maintaining Neurobehavioral Performance Capacity During Susops	University Of Pennsylvania	\$1,023
5M01RR000040-45	Dinges, David F	Countermeasures To Neurobehavioral Deficits From Sleep Loss	University Of Pennsylvania	\$466,306
5M01RR000040-45	Dinges, David F	Neurobehavioral Effects Of Partial Sleep Deprivation	University Of Pennsylvania	\$136,006
5M01RR000040-45	Dinges, David F	Countermeasures To Neurobehavioral Deficits From Sleep Lossrecovery Sleep	University Of Pennsylvania	\$171,115
2M01RR003186-20	Dopp, John M	Effect Of Obstructive Sleep Apnea On Humoral And Cell-Mediated Vaccine Response	University Of Wisconsin Madison	\$749
3M01RR000827-30S2	Drummond, Sean Pa	Influence Of Task Difficulty On Cerebral Response Following Sleep Deprivation	University Of California San Diego	\$17,094
3M01RR000827-30S2	Drummond, Sean Pa	Sleep And Medicinal Cannabis In Hiv Patients	University Of California San Diego	\$61,012
3M01RR000827-30S2	Drummond, Sean Pa	Cognitive Performance Following Total Sleep Deprivation	University Of California San Diego	\$64,716
3M01RR000827-30S2	Drummond, Sean Pa	Effects Of Total Sleep Deprivation And Recovery Sleep On Brain Function	University Of California San Diego	\$186,823
3M01RR000827-30S2	Drummond, Sean Pa	Neural Basis Of Sleep-Dependent Learning And Deterioration	University Of California San Diego	\$6,105
2M01RR002635-21	Duffy, Jeanne	Circadian Sleep-Wake Regulation In Older People	Brigham And Women's Hospital	\$170,583
5M01RR002719-20	Earley, Christopher J	Dopaminergic Function In Restless Legs Syndrome	Johns Hopkins University	\$29,541
5M01RR002719-20	Earley, Christopher J	Determining The Genetics Of The Restless Legs Syndrome	Johns Hopkins University	\$21,558
5M01RR002719-20	Earley, Christopher J	Iv Iron Metabolism In RLS	Johns Hopkins University	\$139,725
5M01RR002719-20	Earley, Christopher J	Sleep Restriction In Controls	Johns Hopkins University	\$4,791
5M01RR000055-44	Ehrmann, David	Sleep Apnea And Polycystic Ovary Syndrome	University Of Chicago	\$554,362
5P41RR003655-20	Elston, Robert C	A Genome Scan Of Obstructive Sleep Apnea	Case Western Reserve University	\$8,889
5K23RR017636-03	Emens, Jonathan S	Genetics Of Morning/Evening Types In The Blind/Sighted: Sleep	Oregon Health & Science University	\$129,805
2M01RR000039-45	Endeshaw, Yohannes	Sleep Disordered Breathing And Nocturnal Polyuria In Elderly Populations	Emory University	\$22,892
2M01RR000039-45	Endeshaw, Yohannes	Sleep Disordered Breathing And Nocturnal Polyuria	Emory University	\$3,158
5M01RR018390-03	Erzurum, Serpil	Nitric Oxide And Oxygen Delivery	Cleveland Clinic Lerner Col/Med-Cwru	\$27,494
5M01RR014288-07	Fann, Alice V	Auditory Evoked Potential Study In Patients With Chronic Low Back Pain	University Of Arkansas Med Scis Ltl Rock	\$6,796
2M01RR000645-34	Fifer, William	Perinatal Assessment Of At-Risk Populations	Columbia University Health Sciences	\$22,257
2P51RR000169-44	Fuller, Charles A	Primate Circadian Rhythms In The Martian Environment	University Of California Davis	\$55,451
2M01RR000585-34	Gami, Apoor S	Prospective Autonomic And Sleep Tests After Myocardial Infarction (Past-Mi)	Mayo Clinic Coll Of Medicine, Rochester	\$9,477
2M01RR000585-34	Gami, Apoor S	Atrial Fibrillation Ablation And Sleep Physiology	Mayo Clinic Coll Of Medicine, Rochester	\$2,843
5M01RR000040-45	Gehman, Phillip R	Stress Reactivity In Insomnia	University Of Pennsylvania	\$341
5M01RR000056-44	Germain, Anne	Sleep-Related Pathways Mediating Post-Traumatic Stress Disorder	University Of Pittsburgh At Pittsburgh	\$4,997
5M01RR000042-45	Gilman, Sid	Neurochemical Basis Of Sleep Disorders In Neurodegenerative Diseases	University Of Michigan At Ann Arbor	\$33,966
5M01RR000042-45	Glass, Jennifer M	Effect Of Exercise & Sleep Deprivation On The Development Of Cmi Symptoms	University Of Michigan At Ann Arbor	\$11,837
5M01RR000188-41	Glaze, Daniel	Pharmacodynamic Evaluation Of Three Different Zolpidem Doses In Children	Baylor College Of Medicine	\$18,097
5M01RR000040-45	Goldberg, Lee R	Autoset Cs Vs Oxygen For The Treatment Of Cheyne-Stokes Respiration	University Of Pennsylvania	\$15,339
5M01RR000040-45	Gooneratne, Nalaka S	Role Of Melatonin In Secondary Insomnia In The Elderly	University Of Pennsylvania	\$682
5M01RR000040-45	Gooneratne, Nalaka S	Melatonin Randomized Trial For Insomnia In The Elderly	University Of Pennsylvania	\$33,064
5M01RR000533-37	Gottlieb, Daniel J	Prevalence And Treatment Of Obstructive Sleep Apnea In Congestive Heart Failure	Boston University Medical Campus	\$1,473

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5M01RR000040-45	Gurubhagavatula, Indira	Study Of Effects Of CPAP On Hypertension	University Of Pennsylvania	\$21,475
2M01RR000052-44	Halbower, Ann	Respiratory And Arousal Patters In Normal Childhood Sleep	Johns Hopkins University	\$1,744
2M01RR000052-44	Halbower, Ann	Metabolic Syndrome And Inflammation In Childhood Sleep Apnea	Johns Hopkins University	\$22,430
2M01RR000052-44	Halbower, Ann	Cerebral Impact Of Childhood Sleep Apnea	Johns Hopkins University	\$499
2M01RR000052-44	Halbower, Ann	Cerebral Impact Of Childhood Sleep Apnea	Johns Hopkins University	\$2,243
5M01RR000056-44	Hall, Martica	Sleep During The Perimenopause In A Multi-Ethnic Cohort	University Of Pittsburgh At Pittsburgh	\$23,317
5M01RR000056-44	Hall, Martica	Reducing Stress & Sleep Disturbances In Caregivers Of Alzheimer's Disease	University Of Pittsburgh At Pittsburgh	\$17,655
5M01RR000633-33	Hardin, Dana S	Establishing The Precursors Of The Metabolic Syndrome In Children	University Of Texas Sw Med Ctr/Dallas	\$7,432
2M01RR000052-44	Harris, James C	Correlation Of Regional Cerebral Blood Flow With REM Sleep Eye Movement	Johns Hopkins University	\$1,246
3P41RR006009-15S1	Harris, Kenneth D	Computational Analysis Of Neuronal Cell Assemblies	Mellon Pitts Corporation (Mpc Corp)	\$1,028
5M01RR000096-44	Hilz, Max	Cardiac And Respiratory Autonomic Control During Sleep In Familial Dysautonomia	New York University School Of Medicine	\$33,231
2M01RR000052-44	Hong, Charles	Functional MRI Assessment Of The Eye-Movement-Control Circuit During REM Sleep A	Johns Hopkins University	\$1,495
5M01RR000533-37	Howland, Jonathan	Hangover, Congeners, Sleep, And Occupational Performance	Boston University Medical Campus	\$200,371
5M01RR000051-44	Hoyt, Brian	Nocturnal Hypoxemia And Executive Function In OSA	University Of Colorado Denver/Hsc Aurora	\$858
5M01RR000046-45	Huang, Xuemei	Functional MRI Studies Of REM Sleep Disorder	University Of North Carolina Chapel Hill	\$629
5M01RR000847-32	Huerta, Milagros G	Evaluation Of SDB As An Independent Risk Factor For Ir In Children	University Of Virginia Charlottesville	\$16,544
5M01RR000064-41	Hunt, Steven	Mortality And Morbidity Related To Gastric Bypass Surgery	University Of Utah	\$387,600
5M01RR000865-32	Irwin, Michael	Alcoholism: Sleep And Cytokines	University Of California Los Angeles	\$34,649
5M01RR000865-32	Irwin, Michael	Cancer-Related Symptoms And Immune Activation In Breast Cancer Survivors	University Of California Los Angeles	\$10,683
5M01RR000865-32	Irwin, Michael	Cocaine Dependence: Sleep And Cytokines	University Of California Los Angeles	\$66,987
5M01RR000865-32	Irwin, Michael	Effects Of A Tumor Necrosis Factor Receptor Antagonist (Tnf-Ra) On Sleep And	University Of California Los Angeles	\$53,417
5P41RR003655-20	Iyengar, Sudha K	Mapping Genes For Fibromyalgia Syndrome	Case Western Reserve University	\$4,440
2M01RR000334-39	Johnson, Kyle	Melatonin Levels In Sleep-Disordered Smith-Magenis Syndrome: A Pilot Study	Oregon Health & Science University	\$32,334
5P51RR000167-45	Kalin, Ned H	Primate Sleep And The Amygdala	University Of Wisconsin Madison	\$34,795
5M01RR0008084-12	Kalra, Maninder	Pharyngeal Collapsibility In Obese Children With OSA	Children's Hospital Med Ctr (Cincinnati)	\$14,754
5M01RR000240-41	Kaplan, Paige	Recombinant Human N-Acetylgalactosamine-4-Sulfatase (Rhasb) In Mps Vi	Children's Hospital Of Philadelphia	\$1,290
5M01RR002172-23	Katz, Eliot	Sleep-Disordered Breathing In Children With Marfans Syndrome	Children's Hospital Boston	\$2,179
5M01RR002172-23	Katz, Eliot	Influence Of Negative Airway Pressure On Upper Airway Motor Control	Children's Hospital Boston	\$25,420
3M01RR000125-41S1	Katz, Stuart	Sleep Loss Effect On Vasodilation In Medical Residents	Yale University	\$2,646
2M01RR000334-39	Keepers, George	Melatonin Rhythms In Adhd	Oregon Health & Science University	\$14,924
1K23RR021973-01	Kelly, Andrea	Pediatric Obstructive Sleep Apnea And Metabolic Syndrome	Children's Hospital Of Philadelphia	\$133,272
5M01RR000240-41	Kelly, Andrea	Obstructive Sleep Apnea And The Metabolic Syndrome In Children	Children's Hospital Of Philadelphia	\$56,249
3M01RR000827-30S2	Kelsoe, John R	Role Of Dopamine Metabolism In Antidepressant Effect Of Sleep Deprivation	University Of California San Diego	\$15,874
5M01RR000056-44	Keshavan, Matcheri	Effect Of Quetiapine On Delta Sleep Deficits In Schizophrenia	University Of Pittsburgh At Pittsburgh	\$9,993
2M01RR001032-30A1	Khalsa, Sat Bir S	Nonpharmacological Treatment Of Sleep Disorders	Beth Israel Deaconess Medical Center	\$17,748
2M01RR014467-05	Kinasevitz, Gary	Effect Of One Week CPAP Trt In Obstructive Sleep Apnea In Pts With Gerd	University Of Oklahoma Hlth Sciences Ctr	\$1,718

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
2M01RR002635-21	Klerman, Elizabeth	Impact Of Sleep Disruption On Menstrual Cycle Dynamics	Brigham And Women's Hospital	\$111,192
5G12RR017581-04	Koban, Michael	Act 3: Sleep Deprivation Stress & Energy Metabolism	Morgan State University	\$95,936
2M01RR000585-34	Kotagal, Suresh	Vagus Nerve Stimulation On Sleep Architecture Of Patients	Mayo Clinic Coll Of Medicine, Rochester	\$711
5M01RR000037-45	Landis, Carol	Sleep In Children With Juvenile Rheumatoid Arthritis	University Of Washington	\$14,976
5P41RR003655-20	Larkin, Emma	Linkage Of Serum Leptin Levels In Families With Sleep Apnea	Case Western Reserve University	\$4,440
5K23RR020049-02	Leblanc, Erin S	The Role Of Estradiol In The Menopause	Oregon Health & Science University	\$130,924
2M01RR010732-11	Leuenberger, Urs	Alteration Of Sympathetic Act & BP By CPAP In Sleep Apnea Patients	Pennsylvania State Univ Hershey Med Ctr	\$1,700
2M01RR010732-11	Leuenberger, Urs	Effects Of Posture On Maximal Peripheral Vasodilator Capacity	Pennsylvania State Univ Hershey Med Ctr	\$1,700
2M01RR010732-11	Leuenberger, Urs	Effect Of Symp Neural Blockade On Reactive Hyperemia & Responses In OSA	Pennsylvania State Univ Hershey Med Ctr	\$5,099
2M01RR010732-11	Leuenberger, Urs	Effects Of Repetitive Hypoxic Apnea On BP & Sympathetic Reflex Function	Pennsylvania State Univ Hershey Med Ctr	\$14,277
2M01RR000334-39	Lewy, Alfred J	Melatonin For Circadian Sleep Disorders In The Blind	Oregon Health & Science University	\$542,222
2M01RR000334-39	Lewy, Alfred J	Melatonin Studies Of Totally Blind Children	Oregon Health & Science University	\$85,189
2M01RR000334-39	Lewy, Alfred J	Melatonin Entrainment Of Elderly Blind Free-Runners	Oregon Health & Science University	\$324,587
5M01RR000059-44	Lichter, J Lance	The Effects Of Bright Light And Caffeine On Alterness After Sedation	University Of Iowa	\$36,907
2M01RR000052-44	Lin, Sandra	Mandibular Distraction Osteogenesis	Johns Hopkins University	\$1,246
2P41RR013622-06A1	Lo, Chung-Chuan	Dynamics Of Sleep Wake Transitions During Sleep	Beth Israel Deaconess Medical Center	\$8,630
3M01RR000827-30S2	Loredo, Jose S	Role Of Chemoreceptors In Hypertension And Sleep Apnea	University Of California San Diego	\$1,832
5M01RR000080-43	Ludington, Susan M	Preterm Skin Contact Effects Of Electrophysiologic Sleep	Case Western Reserve University	\$3,175
5M01RR000188-41	Lupski, James	Clinical Correlations Of Contiguous Gene Syndromes	Baylor College Of Medicine	\$14,404
2M01RR000645-34	Macchi, Mariana Mila	Pinealectomy Or Pin-X	Columbia University Health Sciences	\$10,323
2M01RR000645-34	Macchi, Mariana Mila	Jet Lag Experiment 2	Columbia University Health Sciences	\$84,191
5P51RR000168-44	Madras, Bertha K	Molecular Targets Of The Anti-Narcoleptic Drug Modafinil	Harvard University (Medical School)	\$120,481
2M01RR001032-30A1	Malhotra, Atul	The Mechanisms Underlying The Cardiovascular Complications Of Sleep Apnea	Beth Israel Deaconess Medical Center	\$5,461
3M01RR000125-41S1	Malison, Robert T	Effects Of Cocaine Self-Administration And Abstinence On Sleep And Cognition	Yale University	\$288,021
5M01RR000095-45	Malow, Beth	Effects Of Obstructive Sleep Apnea On Epilepsy	Vanderbilt University	\$41,448
5M01RR000095-45	Malow, Beth	Sleep In Children With Autism	Vanderbilt University	\$33,159
5M01RR006192-12	Mansoor, George	Circadian Blood Pressure Profile	University Of Connecticut Sch Of Med/Dnt	\$53,920
5M01RR000240-41	Marcus, Carole	Pathophysiology Of Childhood Obstructive Sleep Apnea Syndrome	Children's Hospital Of Philadelphia	\$81,084
2M01RR000052-44	Marcus, Carole L	Respiratory-Related Evoked Potentials In Children With OSAS	Johns Hopkins University	\$4,735
5M01RR000240-41	Mason, Thornton B	Periodic Limb Movements In Williams Syndrome	Children's Hospital Of Philadelphia	\$35,156
5K23RR016566-04	Mason, Thornton B li	Periodic Limb Movements In Williams Syndrome	Children's Hospital Of Philadelphia	\$131,652
5M01RR000056-44	Matthews, Karen	Stress, Sleep And Emerging CVD Risk Factors (Sleepscore)	University Of Pittsburgh At Pittsburgh	\$23,317
5M01RR0002719-20	Mccann, Una D	Sleep And Nocturnal Endocrine Function In Mdma Users	Johns Hopkins University	\$21,558
5M01RR010284-10	Mellman, Thomas A	REM-PTSD	Howard University	\$371
5M01RR000997-30	Mitchell, Ron	Prevalence Of Sleep Disturbance In Children	University Of New Mexico Albuquerque	\$2,226
5M01RR000056-44	Monk, Timothy	Performance & Sleep Consequences Of Repeated Phase Shifts Within Appendix K	University Of Pittsburgh At Pittsburgh	\$48,966

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5M01RR000056-44	Monk, Timothy	Phase Shift Tolerance In Older People Iii (Modafinil)	University Of Pittsburgh At Pittsburgh	\$25,982
5M01RR000056-44	Monk, Timothy	Circadian Interventions For The Recently Bereaved Elderly	University Of Pittsburgh At Pittsburgh	\$20,985
5M01RR000056-44	Monk, Timothy	Performance And Sleep Consequences Of Slam Shifts In Schedule	University Of Pittsburgh At Pittsburgh	\$42,970
5M01RR000865-32	Motivala, Sarosh	Sleep And Cytokines In Rheumatoid Arthritis: An Examination Of The Effects Of	University Of California Los Angeles	\$11,261
2M01RR001032-30A1	Mullington, Janet M	The Effects Of Cumulative Sleep Deficit In Human Host Response	Beth Israel Deaconess Medical Center	\$455
2M01RR001032-30A1	Mullington, Janet M	Adiposity, BP, And The Inflammatory Response To Sleep Loss	Beth Israel Deaconess Medical Center	\$156,090
2M01RR000052-44	Naidu, Sakkubai	Pathogenesis Of Rett Syndrome	Johns Hopkins University	\$13,956
2M01RR000334-39	Nelson, David V	Effectiveness Of EEG Biofeedback In The Treatment Of Fibromyalgia	Oregon Health & Science University	\$126,229
5M01RR008084-12	Nelson, Erik B	Phenomenology Of Major Depression	Children's Hospital Med Ctr (Cincinnati)	\$17,981
2M01RR003186-20	Nieto, F Javier	Sleep Disordered Breathing, Metabolic Syndrome, And Vascular Function	University Of Wisconsin Madison	\$7,491
5M01RR000056-44	Niggemyer, Keith	Relationship Between Profiles Of Sah, COPD And Both Disorders	University Of Pittsburgh At Pittsburgh	\$16,988
5M01RR000056-44	Nofzinger, Eric	Sleep Guided Pet Studies In Depression	University Of Pittsburgh At Pittsburgh	\$3,997
5M01RR000056-44	Nofzinger, Eric	Effects Of Obstructive Sleep Apnea Treatment On Brain Function	University Of Pittsburgh At Pittsburgh	\$5,996
5M01RR000056-44	Nofzinger, Eric	Neurobiology Of Sleep And Sleep Interventions In The Elderly	University Of Pittsburgh At Pittsburgh	\$33,976
5M01RR000056-44	Nofzinger, Eric	Sleep, Regional Cerebral Metabolism And Serotonin In Depression	University Of Pittsburgh At Pittsburgh	\$7,994
5M01RR000056-44	Nofzinger, Eric	The Localization Of Sleep Homeostasis	University Of Pittsburgh At Pittsburgh	\$22,984
2M01RR000585-34	Olson, Lyle J	Central Sleep Apnea Exacerbates Neurohumoral Activation In Chf	Mayo Clinic Coll Of Medicine, Rochester	\$19,903
2M01RR000334-39	Orwoll, Eric S	Mros Sleep Study	Oregon Health & Science University	\$276,085
5M01RR000040-45	Pack, Allan I	Treatment For Sleep Apnea In The Elderly	University Of Pennsylvania	\$19,429
5M01RR000040-45	Pack, Allan I	Sleep Homeostasis (Drive For Sleep) In Twins	University Of Pennsylvania	\$17,044
3M01RR000827-30S2	Parry, Barbara L	Chronobiology Of Postpartum Depression	University Of California San Diego	\$58,001
3M01RR000827-30S2	Parry, Barbara L	Estradiol And Progesterone Circadian Rhythms In Postmenopause	University Of California San Diego	\$18,926
5M01RR002719-20	Patil, Susheel P	The Effect Of Oral Sedation On Neuromechanical Properties Of The Upper Airway	Johns Hopkins University	\$16,767
5M01RR000042-45	Peltier, Amanda C	Obstructive Sleep Apnea And Impaired Glucose Regulation	University Of Michigan At Ann Arbor	\$41,686
5M01RR000055-44	Penev, Plamen	Role Of Sleep Duration In Metabolic Aging	University Of Chicago	\$126,669
9L30RR022874-03	Perlis, Michael L	Each Of The Projects Undertaken In 2003-2004 And Planned	University Of Rochester	\$15,474
2M01RR003186-20	Pridham, Karen F	Patterns Of Energy Expenditure In Premature Infants	University Of Wisconsin Madison	\$38,202
5M01RR000079-42	Prusiner, Stanley	Development Of Assay For Creutzfeldt-Jakob Disease	University Of California San Francisco	\$23,850
5M01RR002719-20	Punjabi, Naresh M	Early Identification Of Sleep Apnea (Eisa)	Johns Hopkins University	\$4,791
5M01RR002719-20	Punjabi, Naresh M	Altered Metabolism In Sleep Apnea (Amsa)	Johns Hopkins University	\$35,132
5M01RR000040-45	Rader, Daniel	Effects Of Rosiglitazone On Hdl In Non-Diabetic Patients With Metabolic Syndrome	University Of Pennsylvania	\$77,718
5P20RR016467-05	Rand, John	Using EEG Complexity And High Performance Computing To Profile Sleep	University Of Hawaii At Manoa	\$48,548
5M01RR000096-44	Rapoport, David	Skin Temperature Changes To Detect Sleep Onset In Unmonitored Sleep Studies	New York University School Of Medicine	\$10,528
5M01RR000080-43	Redline, Susan S	Familial Aggregation Of Obstructive Sleep Apnea	Case Western Reserve University	\$244,993
5M01RR000080-43	Redline, Susan S	Outcomes Of Sleep Disordered Breathing In Adolescents	Case Western Reserve University	\$154,378
5M01RR000080-43	Redline, Susan S	CPAP Therapy For Sleep And Its Relationship To Metabolic Syndrome	Case Western Reserve University	\$167,739

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Grant No	PI	Title	Institution	Funding
5M01RR000425-36	Rehan, Virender	Effect Of Supine And Prone Positions On Diaphragm Function In Premature Infan	Harbor-Ucla Research & Educ Inst	\$1,570
5M01RR000847-32	Rembold, Christopher M	High-Frequency Sounds When Inspiratory Effort Is High In Obstructive SDB	University Of Virginia Charlottesville	\$2,363
5M01RR000096-44	Ren, Christine	The Impact Of Weight Loss After Bariatric Surgery On Sleep & Esophageal Function	New York University School Of Medicine	\$56,889
5M01RR000055-44	Reutrakul, Sirimon	Disorders Of Tsh Secretion	University Of Chicago	\$1,491
5M01RR000056-44	Reynolds, Charles	Protecting Health In Later Life	University Of Pittsburgh At Pittsburgh	\$53,296
5M01RR002719-20	Ricaurte, George A	Mdma Neurotoxicity In Humans: Occurrence And Consequences	Johns Hopkins University	\$195,617
5M01RR014288-07	Richards, Kathleen C	Effect Of Activities And Exercise On Sleep In Dementia	University Of Arkansas Med Scis Ltl Rock	\$137,752
5M01RR000059-44	Rizzo, Matthew	Driver Impairment Awareness And Crash Risk In Sleep Apnea	University Of Iowa	\$971
2M01RR000073-42A1	Rose, Mary	Long Term Sleep Disturbance In Pediatric Burn Survivors	University Of Texas Medical Br Galveston	\$3,799
5P51RR000166-44	Sackett, Gene P	Sleep And Abnormal Behavior	University Of Washington	\$90,512
2M01RR000052-44	Sakkubai, Naidu	Pathogenesis Of Rett Syndrome	Johns Hopkins University	\$3,489
5M01RR000095-45	Salomon, Ronald	A Study To Evaluate Cerebrospinal Fluid And Plasma Biomarkers Of Alzheimer's	Vanderbilt University	\$34,540
5M01RR000056-44	Sanders, Mark	OSA & The Metabolic Syndrome: Role Of Oxidative Stress	University Of Pittsburgh At Pittsburgh	\$12,324
5M01RR000070-43	Schatzberg, Alan F	Hpa Axis/Sleep/Gcrc	Stanford University	\$10,357
5M01RR000070-43	Schatzberg, Alan F	Hpa Axis/Sleep/Normals	Stanford University	\$11,694
5M01RR000080-43	Scher, Mark S	Sleep And Outcome In High Risk Infants	Case Western Reserve University	\$1,587
5M01RR000040-45	Schwab, Richard	Pathogenesis And Treatment Of Obstructive Sleep Apnea	University Of Pennsylvania	\$1,023
5M01RR002719-20	Schwartz, Alan R	Neural Control Of Upper Airway Collapsibility	Johns Hopkins University	\$22,355
5M01RR002719-20	Schwartz, Alan R	Stress Biomarkers In Sleep Apnea	Johns Hopkins University	\$130,944
5M01RR002719-20	Schwartz, Alan R	Surgical Weight Loss Intervention In Sleep Apnea	Johns Hopkins University	\$81,440
5M01RR000042-45	Selwa, Linda	Sleep Disorders Associated With Epilepsy	University Of Michigan At Ann Arbor	\$42,716
2M01RR002635-21	Shea, Steven	Circadian And Sleep-Wake Aspects Of Epilepsy	Brigham And Women's Hospital	\$28,579
5M01RR000188-41	Shearer, William	Sleep Studies In Hiv Older Children/Adolescents	Baylor College Of Medicine	\$8,271
5M01RR000030-44	Sherwood, Andrew	Biobehavioral Mechanisms Of Blood Pressure Dipping	Duke University	\$96,238
5M01RR005096-16	Simakajornboon, Narong	Association Between Periodic Limb Movement Disorders And Ferritin Level In Child	Tulane University Of Louisiana	\$887
5M01RR002719-20	Smith, Michael T	Effects Of Sleep Continuity Disturbance And Sleep Deprivation On Pain-Mod&	Johns Hopkins University	\$265,081
2P20RR011091-11	Soll, Bruce	Csr, Ccf & Sleep Posture	University Of Hawaii At Manoa	\$18,324
2M01RR000585-34	Somers, Virend	Cardiovascular Disease Mechanisms In Sleep Apnea	Mayo Clinic Coll Of Medicine, Rochester	\$31,277
2M01RR000585-34	Somers, Virend	Genetic Background Of Cardiovascular And Sleep Disorders In Humans	Mayo Clinic Coll Of Medicine, Rochester	\$49,521
5M01RR000533-37	Spiegel, Jeffrey	Sleep Disturbance In Children With Failure To Thrive	Boston University Medical Campus	\$7,735
1S10RR021086-01	Stein, James H	Siemens Acuson Sequoia Ultrasound Machine: Sleep Disorder	University Of Wisconsin Madison	\$63,879
2M01RR000645-34	Stern, Yaakov	Effect Of Sleep Deprivation On FMRI-Measured Cognitive Networks	Columbia University Health Sciences	\$29,999
2M01RR001032-30A1	Stickgold, Robert	State Dependent Aspects Of Cognition	Beth Israel Deaconess Medical Center	\$2,730
2M01RR001032-30A1	Stickgold, Robert	Dreams, Sleep Mentation And Memory	Beth Israel Deaconess Medical Center	\$76,452
5M01RR000847-32	Suratt, Paul M	Evaluation Of Upper Airway Edema With MRI As Contributing Factor For Adult OSA	University Of Virginia Charlottesville	\$2,363
5M01RR000847-32	Suratt, Paul M	Sleep Apnea In Children	University Of Virginia Charlottesville	\$34,664

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

Grant No	PI	Title	Institution	Funding
5M01RR000042-45	Teodorescu, Mihaela	Effects Of Obstructive Sleep Apnea & Treatment On Persistent Asthma	University Of Michigan At Ann Arbor	\$35,510
2P41RR013622-06A1	Thomas, Robert	Cardiopulmonary Coupling In Sleep Disordered Breathing Syndromes	Beth Israel Deaconess Medical Center	\$17,259
2M01RR001032-30A1	Thomas, Robert J	Functional Imaging Of Sleep Fragmentation	Beth Israel Deaconess Medical Center	\$19,113
2M01RR001032-30A1	Thomas, Robert J	Functional Imaging Of Sleep Deprivation	Beth Israel Deaconess Medical Center	\$28,670
5K26RR017543-04	Toth, Linda A	Behavioral And Physiologic Pathobiology Of Mice: Sleep Research	Southern Illinois University Sch Of Med	\$126,533
2P41RR002305-21A1	Van Dongen, Hans	Neurobehavioral Effects Of Partial Sleep Deprivation	University Of Pennsylvania	\$26,325
5M01RR000055-44	Vancauter, Eve	Sleep-Wake Regulation In Gh Deficiency	University Of Chicago	\$5,962
5M01RR000055-44	Vancauter, Eve	Paying The Sleep Debt To Improve Glucose Tolerance	University Of Chicago	\$22,353
5M01RR000055-44	Vancauter, Eve	Sleep Loss And Circadian Disruption	University Of Chicago	\$41,727
5M01RR000055-44	Vancauter, Eve	Impact Of A Sleep Debt In Mid & Older Aged Adults	University Of Chicago	\$4,471
5M01RR000055-44	Vancauter, Eve	Sleep And Circadian Rhythms In Glucose Regulation	University Of Chicago	\$52,157
5M01RR000055-44	Vancauter, Eve	Endocrine, Metabolic, Cognitive Functions In Short & Long Sleepers	University Of Chicago	\$5,962
5M01RR000040-45	Vandongen, Hans	Individual Differences In Response To Sleep Deprivation	University Of Pennsylvania	\$241,674
5M01RR000046-45	Vaughn, Bradley V	Sleep Disorders Associated With Epilepsy	University Of North Carolina Chapel Hill	\$3,770
2M01RR010732-11	Vgontzas, Alexandros N	Effects Of Sleep Depriv & Daytime Napping On Sleep, Sleepiness & Perform & Horm	Pennsylvania State Univ Hershey Med Ctr	\$17,676
2M01RR010732-11	Vgontzas, Alexandros N	Ovine Corticotropin Releasing Hormone (Ocrh) Test In Sleep Disorders	Pennsylvania State Univ Hershey Med Ctr	\$4,079
5M01RR000037-45	Vitiello, Michael	Progesterone And Sleep In Older Women	University Of Washington	\$40,649
5M01RR000046-45	Waag, Barbara	Respiratory Periodicity And Cognitive Decline In Elders	University Of North Carolina Chapel Hill	\$1,256
2G12RR003060-21	Wallman, Joshua	Area Iii: Neurobiology	City College Of New York	\$296,065
5M01RR000044-44	Ward, Denham	Role Of Peripheral Chemoreceptors In The Responses To Hypoglycemia And Hypoxia	University Of Rochester	\$23,849
2M01RR001032-30A1	White, David P	Obesity, Weight Loss And Sleep: Effects On Pharyngeal Anatomy And Function	Beth Israel Deaconess Medical Center	\$455
2M01RR001032-30A1	White, David P	Ventilatory Stability In Normals And Sleep Apneics	Beth Israel Deaconess Medical Center	\$34,131
2M01RR001032-30A1	White, David P	Lung Volumes And Sleep	Beth Israel Deaconess Medical Center	\$38,681
2M01RR001032-30A1	White, David P	Hormonal Regulation Of Ventilatory Control In Ohs	Beth Israel Deaconess Medical Center	\$1,820
2M01RR001032-30A1	White, David P	Tonic Activation Of The Genioglossus	Beth Israel Deaconess Medical Center	\$1,365
2M01RR001032-30A1	White, David P	Hormonal Influence On Ventilatory Control	Beth Israel Deaconess Medical Center	\$121,505
2M01RR001032-30A1	White, David P	Respiratory Control Stability And Upper Airway Anatomy In Sleep Apnea	Beth Israel Deaconess Medical Center	\$27,759
2M01RR001032-30A1	White, David P	Phasic Respiratory Response To Rising Pco2	Beth Israel Deaconess Medical Center	\$47,783
2M01RR001032-30A1	White, David P	Radio Frequency Bion Stimulator System As A Treatment For OSA	Beth Israel Deaconess Medical Center	\$2,730
2M01RR001032-30A1	White, David P	Ability Of Upper Airway Muscles To Compensate For Impaired Upper Airway Anatomy	Beth Israel Deaconess Medical Center	\$42,776
2M01RR001032-30A1	White, David P	Expiratory Positive Airway Pressure And Sleep Apnea	Beth Israel Deaconess Medical Center	\$23,663
5M01RR000059-44	Wilson, Jeffrey S	Noninvasive Positive Pressure Ventilation In Managing COPD	University Of Iowa	\$4,533
5M01RR000048-44	Wolfe, Lisa	Relationship Between Sleep Apnea Severity And Simulated Driving Performance	Northwestern University	\$4,144
5M01RR000058-44	Woodson, B Tucker	MRI Upper Airway Evaluation With Waking Controlled Ventilation	Medical College Of Wisconsin	\$563
2M01RR002635-21	Wright, Kenneth	Circadian Adaptation To Non-24 Hour Sleep-Wake Schedules	Brigham And Women's Hospital	\$468,435
5M01RR000051-44	Wright, Kenneth	Effects Of Chronic Sleep Loss On Daytime Cognitive And Neurobehavioral Function	University Of Colorado Denver/Hsc Aurora	\$21,160

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Grant No	PI	Title	Institution	Funding
5M01RR000051-44	Wright, Kenneth	Aging, Hypnotics, Sleep Inertia And The Risk Of Falling	University Of Colorado Denver/Hsc Aurora	\$286
2R44RR017182-02	Xie, Simon X	High Throughput Screen Of Behavior Using Piezo-Imaging	Afasci, Inc.	\$374,864
5M01RR000070-43	Yesavage, Jerome A	Treatments For Insomnia	Stanford University	\$26,061
2M01RR003186-20	Young, Terry B	Epidemiology Of Sleep-Disordered Breathing	University Of Wisconsin Madison	\$301,872
5M01RR000048-44	Zee, Phyllis	Genetic Components Of Advanced And Delayed Sleep Phase Syndrome	Northwestern University	\$2,763
5M01RR000048-44	Zee, Phyllis	A Countermeasure For Sleep Loss In Older Adults	Northwestern University	\$31,773
5M01RR000048-44	Zee, Phyllis	Characterization Of Circadian Rhythms, Sleep And Sleep-Related Profiles	Northwestern University	\$16,577
NCRR TOTAL				\$15,320,093

NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES

Grant No	PI	Title	Institution	Funding
R21ES012952-02	Yolton, Kimberly	Exploration of ETS Effects on Child Behavior And Sleep	Children's Hospital Med Ctr (Cincinnati)	\$179,740
NIEHS TOTAL				\$179,740

NATIONAL INSTITUTE OF BIOMEDICAL IMAGING AND BIOENGINEERING

Grant No	PI	Title	Institution	Funding
5 R01EB003320-08	Kennedy, Robert T	In Vivo Chemical Monitoring Using Capillary Separations	University Of Michigan At Ann Arbor	\$64,950
NIBIB TOTAL				\$64,950

NATIONAL INSTITUTE OF DENTAL AND CRANIOFACIAL RESEARCH

Grant No	PI	Title	Institution	Funding
1 R43 DE016772-01A1	Berka, Chris	Sleep Apnea Identification & Treatment In Dentistry	Advanced Brain Monitoring, Inc.	\$134,030
5 R44 DE014944-03	Brown, William P	A 3-D Interactive Atlas Of The Maxilla, Mandible & Tmj	Brown And Herbranson Imaging	\$27,798
1 K25 DE016391-01A1	Enciso, Reyes	3d Ct Cephalometrics And Family History In Sleep Apnea	University Of Southern California	\$109,318
1 F32 DE017268-01	Lam, Derek J	Sleep Apnea In Children With Craniofacial Anomalies	University Of Washington	\$55,435
5 R21 DE016317-02	Morris-Wiman, Joyce A	Mast Cell Role In Masseter Muscle Repair	University Of Florida	\$81,875
NIDCR TOTAL				\$408,456

TRANS-NIH SLEEP RESEARCH - FISCAL YEAR 2005

NATIONAL INSTITUTES OF HEALTH - ROADMAP

Grant No	PI	Title	Institution	Funding
1 DP1-OD-000579-01	Tononi, Giulio	NIH Director's Pioneer Award.	University of Wisconsin	\$727,501
			NIH ROADMAP TOTAL	\$727,501
			NIH SLEEP RESEARCH: FISCAL YEAR 2005 TOTAL	\$188,668,664

APPENDIX A –TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

FISCAL YEAR 2005

ACTING CHAIR

Michael J. Twery, Ph.D.

Acting Director

National Center on Sleep Disorders Research
National Heart, Lung, and Blood Institute/NIH
6701 Rockledge Drive, Suite 10116
Bethesda, MD 20892-7952
P: 301-435-0199 F: 301-480-3451
twerym@nhlbi.nih.gov

Deborah Ader, Ph.D.

National Institute of Arthritis and
Musculoskeletal and Skin Diseases
45 Center Drive, Room5AS19H
Bethesda, MD 20892
P: 301-594-5032
aderd@mail.nih.gov

Harold Gordon, Ph.D.

Division of Clinical Neuroscience and
Behavioral Research
National Institute on Drug Abuse/NIH
6001 Executive Boulevard, Room 4233
Bethesda, MD 20892-9551
P: 301-443-4877 F: 301-443-6814
hg23r@nih.gov

Eleanor Z. Hanna, Ph.D.

Associate Director for Special Projects and Centers
Office of Research on Women's Health/NIH
Building 1, Room 201
Bethesda, MD. 20892
P: 301-435-1573 F: 301-402-0005
hanna@od.nih.gov

Kathy Mann Koepke, Ph.D.

Program Director, Division of Extramural Activities
National Institute of Nursing Research
6701 Democracy Blvd, Ste. 710
Bethesda, MD 20892-4870
P: 301-496-9623 F 301-480-8260
koepkeK@mail.nih.gov

Merrill M. Mitler, Ph.D.

Program Director, Systems and Cognitive Neuroscience
National Institute of Neurological Disorders and Stroke
6001 Executive Boulevard, Room 2116
Bethesda, MD 20892-9521
P: 301-496-9964 F: 301-402-2060
mitterm@ninds.nih.gov

Andrew Monjan, Ph.D., M.P.H.

Chief, Neurobiology of Aging Branch
Neuroscience and Neuropsychology of Aging Program
National Institute on Aging
7201 Wisconsin Avenue., Suite 350
Bethesda, MD 20892-9205
P: 301-496-9350 F: 301-496-1494
monjana@nia.nih.gov

Ann O'Mara, Ph.D., R.N.

Program Director: Symptom Management/End of Life
Community Clinical Oncology Program (CCOP)
National Cancer Institute
6130 Executive Blvd., EPN 2010
Bethesda, MD 20892
P: 301-496-8541 F: 301-496-8667
ao45s@nih.gov

Nancy Pearson, Ph.D.

National Center for Complementary & Alternative Medicine/NIH
6707 Democracy Blvd. Room 401
Bethesda, MD 20892
P: 301-594-0519 F: 301-480-3621
pearsonn@mail.nih.gov

William T. Riley, Ph.D.

Behavior Change Program Chief
National Institute of Mental Health
6001 Executive Blvd., Room 6226
Bethesda, MD 20892-9615
P 301-435-0301 F: 301-480-2920
wiriley@mail.nih.gov

Marian Willinger, Ph.D.

Health Scientist Administrator
Pregnancy & Perinatology Branch
National Institute of Child Health and Human Development/NIH
6100 Executive Boulevard, Room 4B03D
Bethesda, MD 20892
P: 301-435-6896 F: 301-496-3790
mw75q@nih.gov

Ellen Witt, Ph.D.

Health Scientist Administrator
National Institute on Alcohol Abuse and Alcoholism/NIH
5635 Fishers Lane Room 2063
Bethesda, MD 20892-9304
P: 301-443-6545
ewitt@mail.nih.gov

APPENDIX B – SLEEP DISORDERS RESEARCH ADVISORY BOARD

FISCAL YEAR 2005

(Terms end June 30 of the Indicated Year)

Chair

Rafael Pelayo, M.D. (2006)
Assistant Professor
Department of Psychiatry and Behavioral Sciences
Stanford University
401 Quarry Road, PBS 3350
Stanford, CA 94305
P: 650-725-5925
pelayo@stanford.edu

Sheila C. Connolly, R.N. 9 Sunbeam Lane Hyannis, MA 02601 P: 508-790-7640 s_connolly@comcast.net	(2007)	Howard P. Roffwarg, M.D. Professor of Psychiatry and Human Behavior Director, Division of Sleep Medicine Co-Director, Animal Sleep Neurophysiology Laboratory The University of Mississippi Medical Center 2500 North State Street Jackson, MS 39216-4505 P: 601-984-6920 F: 601-984-6931 hroffwarg@psychiatry.umsmed.edu	(2009)
Julianne Hill 1340 W. Arthur Ave. Chicago, IL 60626 P: 773-761-4450 (office) julianne_hill@yahoo.com	(2009)	Michael J. Sateia, M.D. Professor of Psychiatry Director, Section of Sleep Medicine Dartmouth Medical School Hanover, NH 03755 P: 603-650-7534 F: 603-650-7820 michael.j.sateia@dartmouth.edu	(2006)
M. Elizabeth Johns Executive Director, Apex, Inc. 216 Harrington Drive Anadarko, OK 73005 P: 405-247-7377 wej@netride.net	(2008)	Michael H. Smolensky, Ph.D. Professor of Environmental Sciences University of Texas-Houston School of Public Health, RAS-W606 1200 Herman Pressler Houston, TX 77030 P: 713-500-9237 F: 713-500-9249 msmolensky@sph.uth.tmc.edu	(2008)
Kathryn A. Lee, R.N., Ph.D., F.A.A.N. Professor, Family Health Care Nursing School of Nursing University of California, San Francisco 2 Koret Way, Box 0606 San Francisco, CA 94143 P: 415-476-4442 F: 415 753-2161 kathryn.lee@nursing.ucsf.edu	(2006)	Lorraine Wearley, Ph.D. Lorraine Wearley Consulting LLC 620 Raymond St. Suite 201 Westfield, NJ 07090 P: 908-803-1793 F: 908-389-1876 lorrainewearley@yahoo.com	(2007)
Gina Poe, Ph.D. Assistant Professor, Department of Anesthesiology University of Michigan Medical Center 7433 Medical Sciences Building 1 1150 West Medical Center Drive Ann Arbor, MI 48109-0615 P: 734-763-2128 F: 734-764-9332 ginapoe@umich.edu	(2007)	Phyllis C. Zee, M.D., Ph.D. Professor of Neurology, Neurobiology and Physiology Director, Sleep Disorders Center Northwestern University Medical School 710. N. Lake Shore Drive, Suite 1126 Chicago, IL 60611 P: 312-908-8549 F: 312-908-5073 p-zee@northwestern.edu	(2009)
Susan Redline, M.D., M.P.H. Chief, Division of Clinical Epidemiology Department of Pediatrics Rainbow Babies and Children's Hospital 11400 Euclid Avenue, RBC 790 Cleveland, OH 44106 P: 216-844-4997 F: 216-844-4998 sxr15@po.cwru.edu	(2006)		

APPENDIX B – SLEEP DISORDERS RESEARCH ADVISORY BOARD

FISCAL YEAR 2005

Ex Officio Members

John Agwunobi, M.D., M.P.H., M.B.A.
Assistant Secretary for Health
U.S. Department of Health and Human Services
200 Independence Avenue, S.W.
Washington, DC 20201

Thomas J. Balkin, Ph.D.
Walter Reed Army Institute of Research
Chief, Department of Behavioral Biology
U.S. Department of Defense
Building 503, Room #2A26
503 Robert Grant Avenue
Silver Spring, MD 20910-7500
P: 301-319-9350 F: 301-319-9979
thomas.balkin@na.amedd.army.mil

Robert W. Greene, M.D., Ph.D.
University of Texas Southwestern Medical Center
U. S. Department of Veterans Affairs
4500 South Lancaster Road
Dallas, TX 75214
P: 214-857-0806 F: 214-857-0917
robertw.greene@utsouthwestern.edu

Merrill M. Mitler, Ph.D.
Program Director, Systems and Cognitive Neuroscience
National Institute of Neurological Disorders and Stroke
6001 Executive Boulevard, Room 2116
Bethesda, MD 20892-9521
(Courier: Rockville, MD 20852)
P: 301-496-9964 F: 301-402-2060
mitterm@ninds.nih.gov

Andrew Monjan, Ph.D., M.P.H.
Chief, Neurobiology of Aging Branch
Neuroscience and Neuropsychology of Aging Program
National Institute on Aging
7201 Wisconsin Avenue., Suite 350
Bethesda, MD 20892-9205
P: 301-496-9350 F: 301-496-1494
monjana@nia.nih.gov

Elizabeth G. Nabel, M.D.
Director
National Heart, Lung, and Blood Institute/NIH
9000 Rockville Pike
Building 31, Room 5A52
Bethesda, MD 20892

William T. Riley, Ph.D.
Behavior Change Program Chief
National Institute of Mental Health
6001 Executive Blvd., Room 6226
Bethesda, MD 20892-9615
P 301-435-0301 F: 301-480-2920
wiriley@mail.nih.gov

Michael J. Twery, Ph.D.
Acting Director
National Center on Sleep Disorders Research
National Heart, Lung, and Blood Institute/NIH
6705 Rockledge Drive, Suite 10116
Bethesda, MD 20892-7952
P: 301-435-0199 F: 301-480-3451
twerym@nhlbi.nih.gov

Marian Willinger, Ph.D.
Health Scientist Administrator
Pregnancy & Perinatology Branch
National Institute of Child Health and Human
Development/NIH
6100 Executive Boulevard, Room 4B03D
Bethesda, MD 20892
P: 301-435-6896 F: 301-496-3790
mw75q@nih.gov

Elias Zerhouni, M.D.
Director, National Institutes of Health
One Center Drive
Building 1, Room 126
Bethesda, MD 20892-0148

APPENDIX B – SLEEP DISORDERS RESEARCH ADVISORY BOARD

FISCAL YEAR 2005

Liaison Members

Deborah Ader, Ph.D.
National Institute of Arthritis and
Musculoskeletal and Skin Diseases
45 Center Drive, Room5AS19H
Bethesda, MD 20892
P: 301-594-5032
aderd@mail.nih.gov

Daniel P. Chapman, Ph.D.
Epidemiologist, National Center for Chronic Disease
Prevention & Health Promotion
Centers for Disease Control and Prevention
4770 Buford Highway, N.E Mailstop K-45
Atlanta, GA 30341
P: 770-488-5464/63 F: 770-488-5964
dpc2@cdc.gov

Harold Gordon, Ph.D.
Division of Clinical Neuroscience and
Behavioral Research
National Institute on Drug Abuse/NIH
6001 Executive Boulevard, Room 4233
Bethesda, MD 20892-9551
P: 301-443-4877 F: 301-443-6814
hg23r@nih.gov

Eleanor Z. Hanna, Ph.D.
Associate Director for Special Projects and Centers
Office of Research on Women's Health/NIH
Building 1, Room 201
Bethesda, MD. 20892
P: 301-435-1573 F: 301-402-0005
hannae@od.nih.gov

Maggie Heisler
Senior Social Science Analyst
Crime Control and Prevention Division
National Institute of Justice
810 Seventh Street, N.W.
Washington, DC 20531
P: 202-616-3452
maggie.heisler@usdoj.gov

Kathy Mann Koepke, Ph.D.
Program Director, Division of Extramural Activities
National Institute of Nursing Research
6701 Democracy Blvd, Ste. 710
Bethesda, MD 20892-4870
P: 301-496-9623 F 301-480-8260
koepkeK@mail.nih.gov

Ann O'Mara, Ph.D., R.N.
Program Director: Symptom Management/End of Life
Community Clinical Oncology Program (CCOP)
National Cancer Institute
6130 Executive Blvd., EPN 2010
Bethesda, MD 20892
P: 301-496-8541 F: 301-496-8667
ao45s@nih.gov

Adrienne Oneto
Chief, Health Surveys Branch
U.S. Department of Commerce Bureau of the Census
Building 3, Room 3442
Washington, DC 20233
P: 301-457-3879 F: 301-457-3155
adrienne.c.oneto@census.gov

Nancy Pearson, Ph.D.
National Center for Complementary & Alternative Medicine/NIH
6707 Democracy Blvd. Room 401
Bethesda, MD 20892
P: 301-594-0519 F: 301-480-3621
pearsonn@mail.nih.gov

Thomas G. Raslear, Ph.D.
Senior Human Factors Program Manager
U.S. Department of Transportation Federal Railroad Admin.
Washington, DC 20590
P: 202-493-6356 F: 202-493-6333
thomas.raslear@fra.dot.gov

Roger R. Rosa, Ph.D.
National Institute for Occupational Safety and Health
Centers for Disease Control and Prevention
200 Independence Avenue, N.W. Room 715 H
Washington, DC 20201
P: 202-401-6997 F: 202-205-2207
rrosa@cdc.gov

Bette Siegel, Ph.D.
Program Manager, Behavioral Health and Performance
National Aeronautics and Space Administration
300 E Street, S.W.
Washington, DC 20546
P: 202-358-2245 F: 202-358-4168
bette.siegel@nasa.gov

Ellen Witt, Ph.D.
Health Scientist Administrator
National Institute on Alcohol Abuse and Alcoholism/NIH
5635 Fishers Lane Room 2063
Bethesda, MD 20892-9304
P: 301-443-6545
ewitt@mail.nih.gov

APPENDIX C – NATIONAL CENTER ON SLEEP DISORDERS RESEARCH

National Center on Sleep Disorders Research (NCSDR)

6701 Rockledge Drive, 10181
Bethesda, MD 20892
Phone: (301) 435-0199 Fax: (301) 480-3451
E-mail: ncsdr@nih.gov

Michael Twery, PhD
Acting Director
twerym@nhlbi.nih.gov

Al Golden, MPH
Public Health Advisor
goldena@nhlbi.nih.gov

Demetrius Valentine
Office Assistant
valentined@nhlbi.nih.gov

WebLinks of Interest

NCSDR Web Site
www.nhlbi.nih.gov/sleep

NHLBI Home Page
www.nhlbi.nih.gov

NIH Home Page
www.nih.gov

NIH Grants and Funding Opportunities
<http://grants1.nih.gov/grants/>

2003 National Sleep Disorders Research Plan
www.nhlbi.nih.gov/health/prof/sleep/res_plan/index.html

Trans-NIH Sleep Research Coordinating Committee Annual Reports
www.nhlbi.nih.gov/about/ncsdr/research/randf.htm

Sleep Disorders Research Advisory Board
www.nhlbi.nih.gov/meetings/sdrab/index.htm

Sleep Workshops and Meeting Summaries
www.nhlbi.nih.gov/resources/docs/index.htm#sleep

Videocast Archive of Past NCSDR Meetings and Events:
<http://videocast.nih.gov/PastEvents.asp?c=26>

Network Sleep Research Activities (SleepRFA-L)
<http://list.nih.gov/archives/sleeprfa-l.html>

Sleep Information for Health Care Professionals
www.nhlbi.nih.gov/about/ncsdr/profedu/profedu-a.htm

Sleep Information for Patients and the General Public
www.nhlbi.nih.gov/about/ncsdr/patpub/patpub-a.htm

This report is available online at
<http://www.nhlbi.nih.gov/about/ncsdr/research/research3.htm>

For printed copies of this report, please contact

National Center on Sleep Disorders Research
6701 Rockledge Drive, Suite 10181
Bethesda, MD 20892
Phone: (301) 435-0199
Fax: (301) 480-3451
E-mail: ncsdr@nih.gov