ANNUAL REPORT

OF THE

TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

FISCAL YEAR 2004

NATIONAL CENTER ON SLEEP DISORDERS RESEARCH (NCSDR)
NATIONAL HEART, LUNG, AND BLOOD INSTITUTE
NATIONAL INSTITUTES OF HEALTH
U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES

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TABLE OF CONTENTS

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 NCSDR, 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 2004 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 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 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 Center on Minority Health and Health Disparities (NCMHD) each has a sleep-related portfolio in Fiscal Year 2004 and this information is included in the Financial Summary and Grant Listings at the end of this Report.

The National Center on Sleep Disorders Research (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 (NSCDR)

CARL E. HUNT, MD, DIRECTOR
AL GOLDEN, MPH, PROGRAM ANALYST

The NCSDR has participated in the planning and conduct of workshops, new initiatives, and public awareness programs during Fiscal Year 2004.

New Initiatives Released in Fiscal Year 2004

RFA-HL-04-010: Inter-Relationships of Sleep, Fatigue, and HIV/AIDS ($2.5 million)

Sponsors: NHLBI; NIMH
Release Date: October, 2003

Objectives: Elucidate the etiology of sleep disturbances and fatigue associated with human immunodeficiency virus (HIV) infection and acquired immunodeficiency disease syndrome (AIDS). An improved understanding of this etiology will help in the development of approaches to improve the sleep and quality of life of HIV-infected patients and improve our fundamental understanding of the relationship between sleep and chronic infections in particular and chronic diseases in general.

Workshops/Conferences Conducted in Fiscal Year 2004

Frontiers of Knowledge in Sleep and Sleep Disorders: Opportunities for Improving Health and Quality Of Life: March 29 - 30, 2004, NIH Campus, Bethesda MD

Sponsors: NHLBI (NCSDR), NIAAA, NIA, NIAMS, NICHD, NIDA, NIMH, NINDS, NINR, NCCAM, Office of Rare Diseases (NIH)

Co-Sponsors: American Academy of Sleep Medicine, American Insomnia Association, American Sleep Apnea Association, Narcolepsy Network, National Sleep Foundation, Restless Legs Syndrome Foundation, Sleep Research Society

Outcome: The conference brought together over 300 health care providers, public health and education experts, policy makers, patient advocacy organizations, sleep medicine specialists, and other stakeholders. The central focus was the question “How can current knowledge about sleep and sleep disorders be translated into cost-effective strategies for (1) improving individual knowledge, attitudes and sleep-related behaviors, (2) improving rates of diagnosis and treatment of sleep disorders, (3) reducing health care costs due to untreated sleep disorders, and (4) improving public health and quality of life?”

Dr. Richard Carmona, the U.S. Surgeon General, provided opening remarks. The full text of his remarks has been published in *J Clinical Sleep Medicine*, January, 2005. They can also be viewed online at http://www.nhlbi.nih.gov/meetings/slp_carmona.pdf. At the close of the conference, recommendations were developed for enhancing public awareness activities to enhance sleep literacy with the potential to positively impact public health.

2003 National Sleep Disorders Research Plan

The National Sleep Disorders Research Plan continues to be a state-of-the-art resource that summarizes the dramatic advances in knowledge since 1996, identifies current gaps in our knowledge base, and provides a broad range of recommendations for future sleep research. These recommendations not only guide prioritization of sleep research within NIH and other Federal and non-Federal entities, but are also helpful in identifying opportunities for new investigators from diverse scientific and clinical disciplines. The recommendations regarding training of sleep research scientists, the education of health care professionals, and community-based public education programs are also intended to help stimulate much needed progress in these areas.

The complete 2003 National Sleep Disorders Research Plan can be accessed online (in html and pdf versions) via http://www.nhlbi.nih.gov/health/prof/sleep/res_plan/index.html. Printed copies of the Plan can be obtained by contacting the NCSDR.

Other Fiscal Year 2004 Activities

National Health and Nutrition Examination Survey (NHANES)
- Large national, population-based sample of subjects 16 years and older
- 2005-2007 Household Questionnaire expanded to include 23 questions related to sleep duration, sleep problems, and sleep disorders.

Institute of Medicine (IOM) Study - Development of Strategies and Recommendations for Enhanced Support of Sleep Medicine and Sleep Research in Academic Health Centers

Sponsors: NCSDR/NHLBI, and the Trans-NIH Sleep Research Coordinating Committee. Funded in part by an Fiscal Year 2004 Evaluation 1% Set-Aside award, Office of Evaluation, Office of Science Education, NIH

Co-Sponsors: American Academy of Sleep Medicine; National Sleep Foundation; Sleep Research Society

The purpose is to develop strategies and recommendations leading to new interdisciplinary programs for the training of future sleep researchers, educators, and sleep medicine clinicians, to address the fragmentation of sleep-related research and clinical care currently present in most academic institutions. This 18-month study began toward the end of Fiscal Year 2004 and the final results will be released in early 2006.

Sleep medicine and sleep research have been growing exponentially during the last 20 years. By 2002, over 2,000 specialized sleep centers existed in the United States. The growth of the field has been fueled by the needs of a large patient population. Although clinical practice related to sleep problems and sleep disorders has been expanding rapidly in the last few years, scientific research is not keeping pace. Insomnia and Restless Legs Syndrome are two examples of very common disorders about which we know very little neurobiologically. Treatments for sleep apnea (e.g., Continuous Positive Airway Pressure) have made a huge difference in the lives of many patients, yet they are still fairly intrusive and not universally accepted by patients.

The field of sleep medicine is multidisciplinary, cutting across multiple Institutes and Centers of the National Institutes of Health (NIH). Sleep research is not limited to very young and old patients--sleep disorders reach across all ages and ethnicities. A pressing need recognized by the 2003

Sleep Disorders Research Plan was training and coordination of sleep medicine and sleep research in existing academic health centers. There are now an estimated 4,500 clinical professionals in the American Academy of Sleep Medicine, yet fewer than 100 basic research faculty members spend the majority of their time in sleep research. To remedy this situation, there is a need to develop new programs for the training of future sleep researchers and sleep medicine clinicians.

The Institute of Medicine (IOM) will convene an ad hoc committee of experts in public health, academic and medical administration, and health sciences research that will:

1. Review and quantify the public health significance of sleep health, sleep loss, and sleep disorders based on current knowledge. This task will include assessments of the contribution of sleep disorders to poor health, reduced quality of life, and early mortality, and the economic consequences of sleep loss and sleep disorders, including lost wages and productivity. Target populations will be segmented as children, adults, and the elderly.

2. Identify gaps in the public health system relating to the understanding, management, and treatment of sleep loss and sleep disorders, and assess the adequacy of the current resources and infrastructures for addressing the gaps. The committee, however, will not be responsible for making any budgetary recommendations.

3. Identify barriers to and opportunities for improving and stimulating multidisciplinary research, education, and training in sleep medicine. Delineate fiscal and academic organizational models that promote and facilitate: sleep research in the basic sciences; cooperative research efforts between basic science disciplines and clinical practice specialties; and multidisciplinary efforts in education and training of practitioners in sleep health, sleep disorders, and sleep research.

4. Develop a comprehensive plan for enhancing sleep medicine and sleep research, as appropriate, for improving the public's health. This will include interdisciplinary initiatives for research, medical education, training, clinical practice, and health policy.

The results of the study will be described in a report that will be made available to the public.

Sleep Apnea and Cardiovascular Disease

- Scientific Statement in preparation, sponsored by the American Heart Association
- Authors: Somers VK, White DP, Abraham WT, Amin R, Costa F, Culebras A, Floras JS, Hunt CE, Pickering TG, Russell R, Woo M, Young T.

Time for Kids (TFK)

NCSDR and the NHLBI Office for Prevention, Education, and Control (OPEC) partnered with Time for Kids (TFK), a Time Inc. subsidiary for educational materials, to produce and distribute materials on sleep to the approximately 30,000 third-grade teachers who subscribe to TFK, and to their 750,000 students.

A 4-page color magazine for students and a 4-page teacher's guide with suggested classroom activities were distributed in March 2004 in association with National Sleep Awareness Week. A follow-up TFK survey indicated that 90 percent of the teachers used these materials in their

classroom. Of these, 90 percent reported their students liked the materials "very much," and 80 percent of students were “very satisfied” with the materials. Another 15 percent of students said they were either “extremely” or “somewhat” satisfied. The materials will be distributed to the same group of teachers and their new 3rd graders in March 2005.

High School Biology Curriculum Supplement

In 2004, the NCSDR and OPEC, in partnership with the NIH Office of Science Education (OSE), completed a high school biology supplemental curriculum, “Sleep, Sleep Disorders, and Biological Rhythms”. The 5-day curriculum, introduced in the 2004/2005 school year, addresses the biology of sleep and its relationship to health, the importance of obtaining adequate sleep, and the dangers of sleep deprivation. Print copies are distributed at no cost through the OSE to high school teachers, and can also be downloaded from the OSE Web site (http://science-education.nih.gov/). To date, the OSE has distributed approximately 12,000 copies of the curriculum, primarily to high school teachers. In addition, more than 2,000 students have accessed the Web site database portion of the curriculum.

Future Conferences

State of the Science Conference: Manifestations and Management of Chronic Insomnia in Adults

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/NHLBI, NCCAM, NIA, NIAAA, NIDA, NINDS, NINR, ORWH
Other Federal Sponsors	VA; FDA; Federal Railroad Administration, DOT; Agency for Healthcare Research and Quality (AHRQ)
Consensus Panel Chair:	Alan I. Leshner, PhD

Objectives: Review the science of insomnia and its treatments in order to respond to the following questions:

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?

Neuroimaging in Sleep Disorders (FY 2006)

Date: March, 2006
Location: NIH

Sponsors NCSDR/NHLBI, NIA, NIAAA, NICHD, NIDA, NINDS, NIDCD

Objectives: Review opportunities for neuroimaging applications in sleep-related research, neuroimaging results in sleep deprivation and sleep disorders, and current state-of-the-art in neuroimaging approaches. Recommendations will be developed regarding potential needs to stimulate new research related to neuroimaging to fill gaps in knowledge.

Publications

Frontiers of Knowledge in Sleep and Sleep Disorders: Opportunities for Improving Health and Quality of Life Conference - Text of Opening Remarks - Dr Richard Carmona, U.S. Surgeon General, *J Clinical Sleep Medicine 2005;*1:83-84.

In preparation: Nature Insight: Nature will publish an *Insight* entitled "Sleep and Sleep Disorders as a supplement to an October, 2005 issue. This supplement is sponsored by NCSDR/NHLBI, NIMH, NINDS, and ORWH.

Communications

Public Contacts

NCSDR receives inquiries from the general public, health care professionals, and from other individuals regarding sleep problems and sleep disorders. In Fiscal Year 2004, 40% of these public inquiries to NCSDR were received and answered by e-mail. Public contacts received and responded to during Fiscal Year 2004 by primary symptom(s) or concerns are summarized as follows:

Primary Sleep Concern	
Snoring/Breathing/Apnea	202
Insomnia	127
Narcolepsy	75
Restless Legs Syndrome	61
Parasomnia (e.g., sleepwalking, sleep paralysis, etc.)	67
General Sleep Problem or General Information	256
Total	***788***

Media Interviews

NCSDR also has significant media contact with newspapers, professional and lay publications, radio, the Internet, and television that are coordinated by the Press Office [NHLBI and Office of the Director (OD)]. A total of 63 media inquiries related to sleep problems and sleep disorders were received that resulted in an NCSDR interview in Fiscal Year 2004. These include the following requests for information and interviews:

Newspaper/Wire Service	16
World Wide Web	3
Magazines	26
Radio	13
TV	2
Other (e.g., Book, Newsletter, etc)	3
Total	***63***

Media Monitoring

1. NHLBI News Release: First National Sleep Conference March 29-30 Explores Sleep's Role in Public Health—Surgeon General, Leading Experts to Discuss Current Evidence, Future Initiatives**,** March 25, 2004

- Wire Coverage

  - Reuters (Maggie Fox) – "American Kids, Parents Lack Sleep, Survey Finds"-March 30, 2004

  - UPI - "Panel: Sleep disorder education needed"- March 29, 2004

  - Health Behavior Service News Service (Aaron Levin) – "Driving is the biggest danger for sleepyheads" – March 29, 2004

- Print Coverage

  - JAMA (Lynne Lamberg)
    - Medical News & Perspectives: Promoting Adequate Sleep Finds a Place on the Public Health Agenda - May 26, 2004 (Vol 291, no. 20).

  - Psychiatric News (Lynne Lamberg)
    - Clinical & Research News: Don't Let Your Patients Lose Sleep Over Insomnia - May 7, 2004 (Volume 39 Number 9). Excerpt: *Participants at an NIH conference translate findings from sleep studies into practical advice to improve public health and quality of life.*

  - US News And World Report, May 17, 2004 (Nell Boyce and Susan Brink)
    - "The Secrets of Sleep (It's a mystery, but it clearly makes us smarter and healthier)" Quotes Drs. Ruth Benca and Virend Somers Excerpt (p. 6 of Web article): *The National Heart, Lung, and Blood Institute last year included sleep apnea as an identifiable cause of high blood pressure, but the medical community has been slow to embrace the idea.*

- o "How to Get a Good Sleep" (Susan Brink) Quotes Drs. Meir Kryger (mentions board member of the National Sleep Foundation") and David Dinges

- o "A Nation's Wake-Up Call" (Lack of sleep becoming a new epidemic?) (Bernadine Healy, M.D.) Excerpt (last paragraph): *What's still wanting, however, is a public-health rally like the ones that brought attention to the ravages of tobacco, the dangers of obesity, and the need for daily exercise. Let's face it: We arise every morning and do our jobs, but for want of sleep, not always as healthily or as safely as we could. It's time for a wake-up call to nudge our sleepy nation.*

- Newsday (Earl Lane, Washington Bureau)
  - o The Nation's Need for ZZZZs -- A culture that sometimes touts sleep loss has a health problem, April 13, 2004

- Miami Herald– (Shari Rudavsky)
  - o "When counting sheep fails", March 30, 2004

- Health Magazine (Jancee Dunn) –(interview for October issue)

- Wire Pickup

  - UPI – "Panel: Sleep disorder education needed"
    - o Washington Times

  - Reuters (Maggie Fox) – "American Kids, Parents Lack Sleep, Survey Finds"
    - o Macon Area Online
    - o Reuters AlertNet, UK
    - o Reuters, United States
    - o Reuters, UK
    - o Yahoo News

- Online Coverage

  - Medscape (Todd Zwillich) – "Physicians May Be Missing Sleep Problems: Poll"
  - WebMD (Todd Zwillich) – "Kids not Getting Enough Sleep"

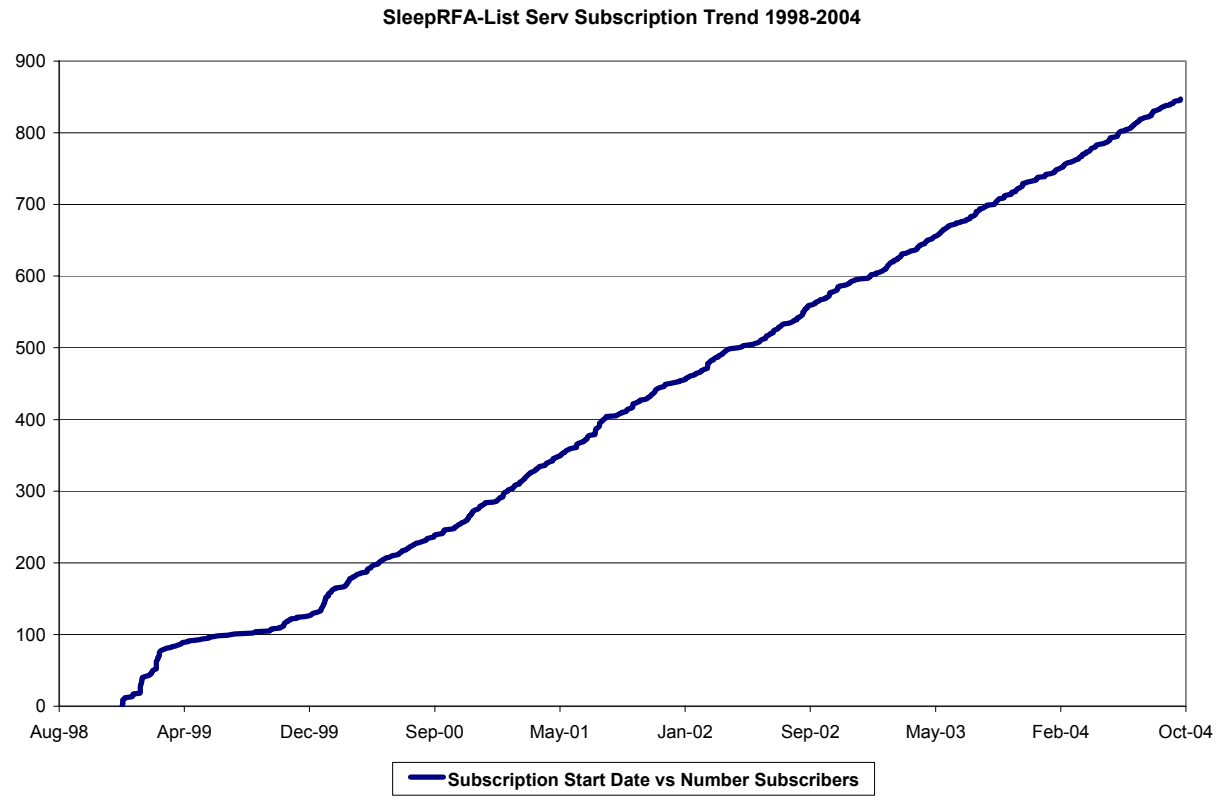
2. NHLBI News Release: NIH Offers New Resources to Better Understand Sleep, June 21, 2004

- Wire Coverage

  - Reuters (Maggie Fox) – "American Kids, Parents Lack Sleep, Survey Finds"-March 30, 2004
  - Sleep-e Times (newsletter) -- Summer 2004

Sleep RFA-L Listserv

The Sleep RFA Listserv, established by NCSDR in 1998, provides information about federal agency initiatives and activities of potential interest to the sleep and circadian research community. As the chart below demonstrates, there has been significant growth in the Sleep RFA Listserv membership since its inception. Listserv archives and additional information about joining the Listserv can be found at: http://list.nih.gov/archives/sleeprfa-l.html



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

Scientific Research and Initiatives

The National Heart, Lung, and Blood Institute (NHLBI) sleep research program covers a wide spectrum ranging from neuroscience, genetics, and circadian rhythm to anatomy, physiology, behavioral science, epidemiology, clinical research, and health education. The program is aimed at understanding the molecular, genetic, and physiological regulation of sleep. A major focus is sleep disordered breathing as a potential risk factor for cardiopulmonary disease, stroke, and weight gain. The NHLBI is a major supporter of investigator-initiated sleep research at NIH. The Institute initiated requests for applications (RFA) on the Role of Sleep and Sleep-Disordered Breathing in Metabolic Syndrome (RFA HL-03-008) and the Inter-relationships of Sleep, Fatigue, and HIV/AIDS (RFA HL-04-010). Sleep research was also solicited in conjunction with the NHLBI initiatives for Overweight and Obesity Control at Worksites (RFA HL-04-006), the Pulmonary Complications of Sickle Cell Disease (RFA-HL-04-015), and the Cultural Competence and Health Disparities Academic Award (RFA-HL-04-012).

Key to many new scientific findings is the Specialized Centers of Research (SCOR) program on the Neurobiology of Sleep and Sleep Apnea (RFA HL-96-014). The objective of this SCOR program is to integrate the molecular, cellular, and genetic approaches to sleep control with clinical investigations on the etiology and pathogenesis of sleep disorders particularly sleep apnea. In addition, the ongoing multi-center Sleep Heart Health Study (SHHS) is employing clinical and epidemiological approaches to examine whether subjects with high blood pressure have sleep apnea, whether sleep apnea is a contributing risk factor for the development of cardiovascular and cerebrovascular disease, and how age, gender, and ethnicity influence the association between apnea, hypertension, and stroke. A prospective longitudinal study launched in 2003 is investigating the significance of sleep disorders as a risk factor for decline in cognition, impaired physical functioning, morbidity, and mortality in men (MrOS). This investigation complements a similar NIH study of women already underway (SOF). Recruitment is also underway for two new blinded sham-controlled multi-center clinical trials to assess continuous positive airway pressure (CPAP) as a treatment for sleep disordered breathing. The "Apnea Positive Pressure Long-term Efficacy Study" (APPLES) will assess the effectiveness of CPAP for the treatment of sleepiness and cognitive deficits associated with moderate to severe obstructive sleep apnea. The "Impact of CPAP On Functional Outcomes In Milder Obstructive Sleep Apnea" (CATNAP) trial is focused on investigating the threshold severity at which therapy should be initiated.

The highlights of new research findings from the NHLBI sleep program include the effects of short sleep duration on cardiovascular disease risk, irregular heart rhythm associated with Sleep Disordered Breathing (SDB), and the effects of SDB on appetite, metabolism, and behavior.

Excessive Sleepiness and Short Sleep Duration in Women

New evidence links both too little and too much sleep to an increased risk of mortality and morbidity. A new prospective four year study of over 3,000 women demonstrates that the risk of death is three times greater among those who sleep more or less than the average of 6-8 hours per night. Daytime sleepiness also appears linked to mortality. The results suggest that each hour of napping is associated with a 6% increased risk of mortality. Women reporting daily naps also walk slower and exhibit weaker hand grip strength. Difficulty sleeping or functioning due to poor sleep (34% of women at baseline) was associated with a two times greater risk of depressive symptoms at follow-up.

Other new findings indicate that sleep duration is associated with an increased risk of coronary events independent of physiological factors such as age, obesity, HDL cholesterol level, and lifestyle factors such as the use of aspirin, post-menopausal hormone therapy, smoking, alcohol consumption, and physical exercise. A study of 71,000 middle age women over ten years found that 70% slept less than eight hours per night. Sleep durations of seven, six, or less than five hours per night were associated with a 9%, 18%, and 45% increased risk of coronary events respectively compared to that of women sleeping eight hours. The study also found that 5% slept nine hours or longer. Intriguingly, increased sleep duration was also associated with a 38% increased risk of coronary events compared to women sleeping eight hours.

Irregular Heart Rhythm Linked With Sleep Disordered Breathing (SDB)

Increasing evidence indicates that SDB including loud snoring and recurring episodes of airway obstruction is a chronic disease associated with increased cardiovascular disease risk. SDB shares many risk factors with irregular heart rhythm (arrhythmia), including male gender, hypertension, congestive heart failure, and coronary artery disease. A study of 460 patients has established that patients with an irregular heart rhythm are more than twice as likely to have SDB compared to other cardiology patients. The association of SDB with irregular heart rhythm was greater than the association of OSA with other previously reported SDB risk factors such as body mass index, neck circumference, diabetes, and hypertension. The study confirms that cardiovascular diseases previously associated with SDB, such as coronary artery disease and congestive heart failure, are accompanied by a high prevalence of SDB. The results suggest that the prevalence of SDB in patients with irregular heart rhythm is substantially greater than the prevalence of SDB in patients with established cardiovascular disease and no diagnosis of irregular heart rhythm.

Irregular heart rhythm is a growing public health concern given that the age-adjusted prevalence of irregular heart rhythm in the United States has tripled from 1960 to 1990. Irregular heart rhythm in patients with congestive heart failure is more common in patients with sleep apnea, and the presence of sleep apnea is predictive of heart rhythm irregularities after coronary bypass surgery. Since treatment of SDB lowers the risk of an irregular heart rhythm, determining the prevalence of SDB in cardiology patients is clinically important.

Sleep and the Regulation of Appetite, Metabolism, and Behavior

Insufficient sleep related to lifestyle, shift work, depression, and untreated sleep disorders influences behaviors contributing to cardiovascular health and stress. New findings from a study of over 1,000 adults demonstrates that a lack of exercise is associated with increased severity of SDB independent of body weight, gender, age, and other factors. The average severity of SDB ranged from 6 events per hour in those reporting no weekly exercise to 2 events

per hour in those reporting more than 7 hours of exercise weekly. The causal mechanism in this relationship is unclear. Sleep disturbance associated with relatively mild SDB can lead to excessive daytime sleepiness and hormonal abnormalities that may disincline persons to be physically active. Sleep-related growth hormone secretion represents 70% of daily hormone production. Decreased energy level and fatigue reported by growth hormone deficient individuals is associated with disturbed sleep and sleep apnea.

SDB is also an independent risk factor for insulin resistance, a condition associated with an increased risk of diabetes. Continuous positive airway pressure (CPAP) treatment of SDB improves insulin sensitivity. Weight gain as a function of appetite regulation may also be influenced by SDB. Recent findings from a study of 130 adults links SDB with abnormalities in leptin, an inflammation producing cytokine that influences appetite. The results suggest that SDB is associated with an exaggerated suppression of leptin during sleep and secretion of leptin during the day independent of age, gender, and ethnicity. This pattern may contribute to the pathogenesis of elevated leptin levels and a state of leptin resistance that is characteristic of human obesity. New findings indicate that overall leptin levels decrease with long-term CPAP therapy independent of body weight changes. While further research is needed to elucidate the mechanisms for these associations, the new findings suggest that treatments to improve sleep quality may enhance healthy behavior by influencing physical activity, appetite, and metabolism.

NATIONAL INSTITUTE ON AGING (NIA)

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

Problems with sleep are common with advancing years and occur in over 50% of adults age 65 and older. It has been estimated that insomnia affects about a third of the older population in this country. This inability to have restful sleep at night results in excessive daytime sleepiness and attention, and memory problems, depressed mood, falls, and lowered quality of life. Other factors associated with aging, such as disease, changes in environment, or concurrent age-related processes also may contribute to problems of sleep. Data indicate that age by itself does not predict incident complaints of insomnia, even in the presence of lowered sleep efficiency and decreased proportion of slow-wave sleep. Rather, the prevalence of insomnia and other sleep disorders is high in the geriatric population due to the associated co-morbidities common in later life. Disturbance in sleep can also lead to adverse changes in functioning of a number of body systems.

The NIA Sleep portfolio totaled almost $16.5 million in Fiscal Year 2004, down from a total of approximately $18.2 million in FY 2003. In addition to the Trans-NIH Sleep Research Coordinating Committee, NIA is also represented on the Sleep Disorders Research Advisory Board. NIA worked with the National Sleep Foundation (NSF) to develop their first Leadership Congress on Sleep, Health and Aging, held March 31-April 1, 2003. The journal *Geriatrics*" included a series of three issues starting in January 2004 with articles on sleep medicine for CME credit, based upon presentations from this meeting. A report of the meeting was published in *JAMA (July 16, 2003 Volume 290 (3) 319-323),* and a report on the final recommendations from this meeting is in preparation. A new section of the NIH SeniorHealth website on sleep and aging is in preparation. In addition, two trans-NIH PAs on sleep are being reissued for FY 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 major conference “Frontiers of Knowledge in Sleep and Sleep Disorders: Opportunities for Improving Health and Quality of Life” that was held at NIH on March 29-30, 2004. NIA is co-sponsoring the State-of-the-Science Conference on Chronic Insomnia being held June 13-15, 2005.

Health Disparities-Related Research

Ethnic differences in post-menopausal women were studied in San Diego in an ancillary study to the Women’s Health Initiative. African-American women and Hispanic women slept less than Caucasian women (5.25 hours, 5.83 hours, and 6.15 hours, respectively), based upon wrist actigraphy. Thus, objective sleep time was significantly related to ethnicity ($p<0.001$) when controlled for covariates of illumination, age, education, and depression score. These objective actigraphy data differ from earlier studies based on self-reported sleep durations indicating that sleep problems tend to be lower amongst African-Americans than Caucasian groups in the North Central Piedmont of North Carolina), a biracial community study in Brooklyn, New York), and the Studies of Women Across the Nation (SWAN). These self-report data suggested that complaints of difficulty sleeping were more frequent among the Caucasian women than in the other groups, and likelihood of psychological distress was significantly higher for Caucasians than for the other racial/ethnic groups. These differences in perception of sleep quality and objective data confirm other studies showing such differences and may result from people under-reporting their wake time after sleep onset, as well as from social factors and expectations.

Basic Research

The use of neuroimaging technologies to study sleep is relatively new. Drummond**,** et al., have reviewed the literature and 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 central nervous system (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. Nofzinger, et al., have recently 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 activity while transitioning to sleep. Furthermore, they found that there was reduced daytime metabolic activity in the prefrontal cortex resulting from the insomnia.

The use of Drosophila in circadian cycle research has been well established. More recently, the rest behavior of fruit flies has been successfully modeled as sleep, opening the Drosophila genome and molecular biology to elucidate sleep mechanisms. Using Drosophila, it has been established that a null mutation (cyc^{01}) in a clock gene, *cycle,* is related to a deficient rest phenotype; rest was specifically and significantly reduced without marked effects on locomotor activity. The animals were not generally hyperactive but rested less while having normal or slightly decreased locomotor activity. After rest deprivation, males exhibited a decrease and females an increase in duration of rebound, with males having a shortened lifespan. *Cycle* is clock-independent (*period* and *timeless* did not change or show rest rebound) while *Clock* mutants have a modest effect similar to *cycle*, possibly implicating that the CLOCK: CYCLE dimer is involved in regulating rest. Modafinil was found to produce a small but significant rebound, and flies given chronic modafinil had shortened lifespan. Microarray studies showed that sleep deprivation increased genes related to metabolism, immune function, and stress (including oxidative stress and endoplasmic reticulum (ER) stress). Relatively few genes were increased during rest rebound, but one important gene that repairs oxidative damages – methionine sulfoxide reductase A (msrA) was increased. A putative serotonin receptor gene (most closely related to mammalian 5HT2B) appears to modulate the effects of light on the circadian rhythm.

Microarray studies in rodents have shown that different functional categories of genes are selectively expressed during wake and sleep states. Wakefulness tends to be associated with genes that code for energy metabolism, stress proteins, synthesis of excitatory neurotransmitters, and neural plasticity and long-term potentiation. Sleep is associated with protein synthesis, membrane trafficking and maintenance, and neural plasticity.

Our current understanding of the regulation of the human sleep-wake cycle indicates that sleep and wake behaviors are generated by a complex interaction of sleep homeostatic and endogenous circadian processes, as well as environmental factors. The sensation of sleepiness, propensity to fall asleep and depth of sleep are hallmarks of the compensatory response to sleep loss. This drive toward sleep and the tendency to sleep longer and more deeply after sleep deprivation is referred to as “sleep homeostatic process”. The sleep homeostatic process regulates the amount of slow wave sleep and depth of sleep. It has been

postulated that the sleep homeostatic process is regulated by sleep factors that increase during wakefulness and decline during sleep.

Recent studies suggest that adenosine may play an important role in this physiological drive toward sleep. With increased wakefulness, brain energy stores decrease and adenosine accumulates, resulting in increased neuronal membrane depolarization and inhibition of neuronal transmission. In support of the hypothesis that sleep is required for the restoration of brain energy metabolism, levels of brain glycogen decreased by about 40% in brains of rats deprived of sleep for 12 or 24 hours while recovery sleep of 15 hours duration after 12 hours sleep deprivation reversed the decreases in glycogen. The glycogen was found to be concentrated in white matter (predominantly localized to glial fibrillary acidic protein (GFAP) positive astrocytes), but also found in gray matter. No changes specifically related to sleep deprivation were found in the activity of any of the major metabolic adenosine enzymes in any brain region, although they were generally higher during periods of activity. In rats, levels of glycogen in brain areas do increase with age, decrease with sleep deprivation, and rebound to higher than normal levels with recovery sleep. All adenosine metabolic enzymes exhibited diurnal variations in activity, but not in all brain regions, while no changes were found specifically related to sleep deprivation. Thus, changes in adenosine with sleep deprivation are not a consequence of alterations in adenosine enzyme activity. While adenosine does increase with prolonged wakefulness in the rat, old rats appear to have a reduction in the sensitivity of the adenosine receptor and do not transduce the adenosine signal to the same degree as in young rats, possibly contributing to the decline in sleep drive common in the elderly. These data suggest that sleep deprivation produces a gradual depletion of brain ATP and higher adenosine levels in some brain regions (striatum and hippocampus) and that different regulatory mechanisms control adenosine levels in these areas compared to the cortex. The effects of sleep deprivation however, are not uniform in all strains of mice, indicating that brain glycogen level per se is dependent upon genetic factors.

Future Directions

Although there is a growing body of research on the aging circadian system, relatively few data exist on the aging sleep homeostatic mechanisms. The brain mechanisms underlying age-dependent changes in the sleep homeostatic mechanisms are beginning to be understood. More consistently applied neuroscience methods (e.g., neurophysiology, neuroanatomy, neuroimaging, and neuropharmacology) in animal and human aging studies are needed to better define the basis of age-related sleep changes. New studies are addressing the genetics of sleep, and the relevance of sleep genetics 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 studies 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 neurons and to 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 50% of our older population.

NATIONAL INSTITUTE ON ALCOHOL ABUSE AND ALCOHOLISM (NIAAA)

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

In Fiscal Year 2004, The National Institute on Alcohol Abuse and Alcoholism (NIAAA) funded regular Research Project Grants, Postdoctoral and Career Development Awards, and Cooperative Agreement components on the topic of alcohol and sleep. The specific areas of sleep-related research supported 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 alcohol exposure on development of circadian clock function and the relationship of prenatal alcohol exposure to the incidence of sudden infant death syndrome (SIDS); 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 2004 from currently funded projects are summarized below:

Sleep Problems in Early Childhood as a Risk Marker for Early Onset of Alcohol Abuse

It is well documented that sleep problems, primarily insomnia, are associated with the onset of alcohol problems among some adults and predict relapse in adult alcoholics in remission. In contrast, there are only a few studies in adolescents that have found a positive correlation between sleep disturbances and the presence of alcohol and other drug problems. Furthermore, because these studies in adolescents were cross-sectional and not prospective, it could not be determined whether sleep problems are the cause or consequence of drinking. However, a recent study has used a longitudinal prospective design to examine the etiological relationship between sleep problems in early childhood and the onset of alcohol and other drug use in early adolescence. In this study, mothers' ratings of their children's sleep problems at ages 3 to 5 years significantly predicted an early onset of any use of alcohol, marijuana, and illicit drugs, as well as an early onset of cigarette use by age 12 to 14. Although sleep problems in early childhood also predicted attention problems and anxiety/depression in later childhood, these disorders did not mediate the relationship between sleep problems and the onset of alcohol and other drug use. This is the first study to demonstrate that early childhood sleep problems may be a robust marker for increased risk of later alcohol and drug use disorders.

Neonatal Alcohol Exposure May Permanently Disrupt Circadian Rhythms

The internal biological clock responsible for the generation of circadian rhythms is located in a region of the brain referred to as the suprachiasmatic nucleus (SCN). In addition to its timekeeping function, the SCN also mediates the entrainment or synchronization of mammalian circadian rhythms to light/dark cycles. Because clinical sleep-wake disturbances have been observed in human infants, children, and adolescents following prenatal alcohol exposure, studies were conducted in rats to determine whether early alcohol exposure produces long-term changes in the circadian time-keeping function of the SCN. Two recent studies found that early postnatal (equivalent to third trimester in humans) ethanol exposure in rats tested as adults produces increased phase-shifting responses to light and alters the circadian rhythm of brain-derived neurotrophic factor, an important rhythmic output from the SCN. These findings, coupled with the changes in circadian period and light/dark entrainment in adult rats prenatally

treated with ethanol, suggest that developmental ethanol exposure may permanently alter the clock mechanism in the SCN and its regulation of circadian behavior.

Effects of Sleep Loss and Ethanol on Performance and Risk-Taking Behavior

Sleepiness and ethanol ingestion alone and in combination have documented detrimental effects on memory, attention, and psychomotor performance. Up to now, however, no studies had compared variable "doses" of sleep loss to multiple doses of ethanol on performance measures. In a recent study, subjects were exposed to 0, 2, 4, and 8 hours of sleep loss or ingested 0, 0.3, 0.6, or 0.9 g/kg ethanol and were then tested on a battery of memory, psychomotor, vigilance and divided attention tasks. At the studied "doses," sleep loss was more potent than ethanol in its sedative effects, but comparable to ethanol in its effects on psychomotor performance. Ethanol produced greater memory impairments than sleep loss, and ethanol-exposed participants were less aware of their overall performance impairment at low and medium doses. This finding is consistent with traffic safety data that show ethanol-related traffic accidents in individuals with relatively low blood alcohol concentration, possibly due to their poor perception of impairment. Another study examined whether sleepiness and ethanol degrade psychomotor speed and risky choice and whether caffeine attenuates these effects. Individuals who were sufficiently well-rested made less risky choices on a laboratory model of risk-taking choice behavior and were more aware of the consequences of their actions than sleep-deprived subjects. Under conditions where risk-taking depends on responding rapidly, alcohol may also influence risky choice and caffeine may attenuate this effect. These studies also have important public health implications, since both impaired performance and risky choice behaviors may contribute to increased risk of automobile crashes.

Mechanisms of Impaired Sleep Loss in African American Alcoholics

Research has demonstrated an inter-relationship between sleep and immune functioning. For example, animal studies provide evidence that sleep is involved with three classes of cellular hormones, referred to as cytokines, which regulate immune system activity: T helper 1 (Th1, e.g., interferon), anti-inflammatory/Th2 (e.g., interleukin 10), and pro-inflammatory (IL-6) cytokines. In humans, it appears that sleep onset, duration, and depth are correlated with levels of the pro-inflammatory cytokine, IL-6. Since previous studies have shown that African American alcoholics show more severe disturbances of sleep and immune function compared to their Euro-American counterparts, a recent study investigated whether elevated circulating levels of proinflammatory IL-6 and tumor necrosis factor alpha (TNF) are associated with disordered sleep in alcohol dependent African American subjects. Compared to controls, abstinent alcohol-dependent subjects had increased nocturnal levels of IL-6 and TNF, which also occurred following sleep deprivation. In addition, experimental sleep deprivation produces abnormal elevations of IL-6 and TNF in African-American alcoholics, and elevated levels of circulating IL-6 prior to sleep onset predicted a delay in the time to fall asleep. Taken together, these findings indicate that circulating levels pro-inflammatory cytokines may have a negative influence on sleep initiation.

Abnormal Melatonin Secretion and Disordered Sleep in Alcoholics

Melatonin is thought to affect sleep by resetting the internal biological clock. In alcoholics, the relationship between melatonin and disordered sleep is unknown. Therefore, a recent study examined the association between decreases and/or delays in melatonin secretion and abnormalities of sleep in abstinent alcoholics. Compared to controls, alcoholics showed abnormal secretion of the circadian-dependent hormones, melatonin and cortisol, and a delay in

the nocturnal rise of melatonin. Coupled with the delay of nocturnal melatonin secretion, alcoholics show a prolonged sleep latency which correlates with later onset of the nocturnal plateau of melatonin. This association between delayed onset of sleep and night-time melatonin secretion supports the notion that abnormally low melatonin levels or a delay in melatonin release during the night might contribute to disordered sleep in alcoholics. This finding has implications for the use of melatonin in the treatment of insomnia in recovering alcoholics.

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

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

The NIAMS funded 5 grants in sleep or sleep-related research in FY 2004, in the areas of fibromyalgia, rheumatoid arthritis, and bone fracture. One study is examining, among other things, sleep and stress as predictors of pain, fatigue, and distressed mood in FM. One study is investigating behavioral treatments for rheumatoid arthritis, with sleep quality as one of the outcome variables. Additional funded research involves investigating the role of impaired sleep as a major cause of fractures, disability and cognitive decline in older women. Finally, a conference on the role of fatigue in rheumatic diseases was held in September (funded with Fiscal Year 2003 dollars).

The NIAMS has no sleep-specific initiatives active in FY 2005.

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 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. It may be the result of treatment for the disease or for one or more symptoms, such as pain. During Fiscal Year 2004, the NCI supported 14 investigator-initiated projects (R03, R21, R01), one clinical trial (U10) and two conferences (R13) in sleep -related research.

Three investigator-initiated projects are exploring the onset, severity, and relationships of sleep and fatigue in patients undergoing chemotherapy and radiotherapy. One study is testing an intervention to ameliorate fatigue and, secondarily, sleep problems. Hot flashes and resultant sleep disturbances are particularly problematic in the breast cancer population and two studies are testing hypnosis and acupuncture to relieve hot flashes and possibly the associated sleep problems. Cancer survivors have reported sleep disturbances, long after their treatments have ended. Three studies are testing interventions to relieve or reduce insomnia in cancer survivors. The remaining five studies are exploring biological mechanisms of insomnia and related sleep disorders in patients undergoing therapy and in cancer survivors. In addition to investigator-initiated projects, the NCI also supports a large clinical trials network for preventing and treating cancer, and for managing associated symptoms. Currently, NCI is supporting a phase III trial to test the efficacy of valerian to improve sleep in patients undergoing adjuvant therapy.

The Institute is also supporting two conference grants. Of increasing importance is the impact of caring for a family member with cancer and one conference was devoted to synthesizing existing knowledge in order to chart future directions for scientists in order to reduce the distress associated with sleep disturbances, particularly insomnia, in adults and children with cancer and their caregivers. The other conference focused on recent developments in cell biology that are important in identifying mechanisms underlying genetic diseases and providing insights into methods for prevention, diagnosis and therapy of human diseases. A basic knowledge of cell biology will be required to understand the defects in cell function that cause human diseases, including many cancers, cardiovascular pathologies, defective immune responses, sleep disorders, hypertension, diabetes, and neurodegenerative disorders.

NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT (NICHD)

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

The National Institute of Child Health and Human Development (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

Sleeping on the stomach increases the risk for SIDS. It has been proposed that stomach sleep position increases the likelihood that the infant will rebreathe expired air, which is low in oxygen (hypoxia). In addition, stomach sleep position increases the likelihood that an infant will have their face and/or head covered and overheat (hyperthermia). In order to understand how these environmental conditions influence autoresuscitation, mice were exposed to either condition or combination of the two and the ability of the animals to autoresuscitate was examined. While neither hyperthermia nor hypoxia alone affected autoresuscitation, there was an increasing frequency of failure to autoresuscitate to the first exposure to hypoxia as the temperature increased. In addition, there was decreased ability to recover from multiple exposures to hypoxia when the temperature was increased. These studies suggest that both hypoxia and hyperthermia in combination may contribute to the increased SIDS risk posed by stomach sleep position and the head covered by bedding (*J Appl Physiol* 2004;97: 669-674).

The Collaborative Home Infant Monitoring Evaluation (CHIME) Study, a multicenter cooperative study of home monitoring of high risk infants has been completed. Almost 1200 infants were enrolled in the following subject groups: healthy term infants, preterm infants <1750 grams, siblings of SIDS and babies experiencing an idiopathic apparent life-threatening event. The objectives of the study were to: determine whether home apnea monitors employing event recordings are effective in identifying episodes that are dangerous to the infant's health; determine the conditions that optimize the use of apnea monitors in high risk infants; correlate physiological markers, health status, and behavior with the propensity for life-threatening events; and provide important information on the maturation of heart and respiratory function in sleeping infants. The NICHD, CHIME investigators, and industry collaborated in the development of a new monitoring technology, which was tested for its potential to detect and record life-threatening cardiorespiratory episodes.

In 2001, a major study from CHIME showed that cardiorespiratory events (apnea and bradycardia) meeting conventional alarm thresholds are quite common, even in healthy term infants. More severe events were common only in preterm infants, and their timing suggests that they are not likely immediate precursors to SIDS. The information from this study was used by the Committee on Fetus and Newborn, American Academy of Pediatrics in the drafting of their policy statement, *Apnea, Sudden Infant Death Syndrome, and Home Monitoring*, which was published in 2003. This policy statement recommended that home cardiorespiratory monitoring should not be prescribed to prevent SIDS and that parents should be advised that these monitors have not been proven to prevent unexpected deaths in infants. Home monitoring may be warranted for a limited time for premature infants at high risk for recurrent cardiorespiratory episodes after discharge from the hospital (*Pediatrics* 2003;111:914-917).

In January 2004, the entire CHIME database, which includes all raw physiological records and study forms became accessible to researchers at the following website: http://dccwww.bumc.bu.edu/ChimeNisp/. In Fiscal Year 2004 the NICHD awarded a grant to use the CHIME database to examine spontaneous arousal from the polysomnograms that were done on the infants enrolled in CHIME. This grant is testing automated analysis to standardize the definitions of arousal and will examine shifts in autonomic activity associated with these arousals using measures of heart rate variability. In addition, An "Atlas of Infant Polysomnography" was published by the CHIME Study and is a valuable resource for researchers and clinicians.

It can be hazardous for an infant to sleep on an adult bed alone or with another person because it has the potential to lead to entrapment, overlay, and suffocation. While bed sharing with other children increases SIDS risk, there is controversy regarding the risk associated with sharing a bed with a parent. The Infant Care Practices Study, which was a longitudinal prospective study of over 15,000 mother-infant dyads enrolled at birth in Massachusetts and Ohio from 1995-1998, obtained information on bed sharing practices in the United States. The proportion of women who reported bed sharing for most of the past night decreased from 22% when the infant was one month of age to 13% and 14% at 3 and 6 months of age respectively. At all ages, breastfeeding was a strong predictor of bed sharing, primarily among white and Asian women. In addition, the probability of bed sharing was high among Black women and their infants independent of breastfeeding (*J Dev Behav Pediatr* 2004;25:141-149). More research is needed to understand the motivation, and potential benefits or hazards.

Sleep-disordered breathing (SDB) affects 1-3 percent of children and can have associated morbidities including inattentive and hyperactive behavior, disruptive behavior disorders, cognitive deficits, and excessive daytime sleepiness. The goal of this project is to study and improve methods for the identification of childhood SDB that carries reversible morbidity. Children scheduled for adenotonsillectomy, hernia repair, and other minimally invasive procedures are enrolled and compared to a group of healthy control children by assessments of behavior, psychiatric status, cognition, and sleepiness. Neuropsychological and psychiatric testing, overnight polysomnography, and daytime Multiple Sleep Latency Tests are performed at baseline and the neuropsychological testing is repeated at 3 and 12 months post surgery. Early results, comparing physical findings with polysomnographic findings, suggest that tonsillar size may be the most reliable predictor of sleep-disordered breathing (SDB) severity. SDB severity, as measured by polysomnography, showed only limited association with behavioral outcomes. Rates of periodic limb movements during sleep also predicted behavioral outcomes. Behavioral morbidity among children scheduled for adenotonsillectomy was notably high and included both disruptive behavior disorders and attention deficit/hyperactivity disorders. Follow-up data after treatment for SDB and in control children will help to demonstrate if SDB causes behavioral problems. This study will also provide valuable sleep and sleep-related data on normal children. The data could enhance bedside and laboratory identification of optimal candidates for adenotonsillectomy, improve clinicians' diagnostic accuracy in cases of SDB, and expand knowledge of how sleep, breathing, and daytime behavior are intimately related in children.

Prenatal Alcohol in SIDS and Stillbirth Network (PASS)

In Fiscal Year 2003, the 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 sudden infant death syndrome (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 will be working with Northern Plains Indian communities and populations in the Western Cape of South Africa. The investigators will work 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. In Fiscal Year 2004, the network has made great strides in developing a study design that will combine prospective and retrospective data collection. It incorporates the use of methodologies in epidemiology, physiology, pathology, and the neurosciences to decipher the complex relationship between alcohol use and abuse during pregnancy and their effect on the developing fetus and infant.

The "Back to Sleep" National Public Health Education Campaign

Based on growing epidemiological evidence that sleeping on the stomach increases the risk for SIDS, the American Academy of Pediatrics (AAP) recommended in spring of 1992 that healthy infants be placed to sleep on their side or back to reduce the risk of SIDS. In spring of 1994, the "Back to Sleep" coalition was formed between the U.S. PHS, the AAP, the Association of SIDS Program Professionals, and the SIDS Alliance, for the planning, development, and implementation of the "Back to Sleep" national public education campaign. In June of 1994, the campaign was launched. In 1996, the AAP revised the sleep position statement to recommend that back sleep position is preferred over side.

While the decline in SIDS rates has occurred in all segments of the population, the African American and American Indian infants are more than twice as likely to die from SIDS as white infants.

Since 1999 the NICHD has been working with affected communities to develop specific campaign initiatives.

African American Outreach Initiative

In January 2004, the NICHD, CJ Foundation for SIDS, and the National Black Reproductive and Child Health Institute sponsored a training event in Jacksonville, Florida. The event was hosted by the Bold City Chapter of The Links, Inc. and provided an opportunity for participants to learn how to use the *Resource Kit for Reducing the Risk of SIDS in African American Communities* and conduct SIDS education in local community settings.

During April 2004, the NICHD again joined forces with The Links, Inc. – the Prince George's County Chapter in Maryland. This local group sponsors an annual Black Family Symposium, which includes educational workshops, health screenings, and healthy activities for children. Several NICHD research staff presented on various topics including SIDS and health issues during infancy.

During October 2004, which is SIDS Awareness Month, the NICHD ran public service announcements on radio stations around the country and displayed ads on buses in the Washington, D.C. area to remind African American parents, grandparents, and caregivers about reducing the risk of SIDS. Also, specific public education activities occurred in the Mississippi Delta region. *Woman to Woman*, a Mississippi state-wide television show, aired PSAs throughout the month and into early November. The Mississippi Head Start Association

partnered with the State Day Care Licensing division and sent SIDS information to 28,000 child care providers across the state. Over 250 pastors in Mississippi, Louisiana, and Arkansas received information about SIDS Sunday, in which they were asked to pick a Sunday in October to talk to their church members about SIDS risk reduction. Mississippi First! Health Partner members conducted a variety of outreach activities. They held SIDS poster contests at the Boys and Girls Club; conducted a SIDS workshop for 1,000 people; provided information to a newborn nursery; gave out SIDS risk reduction materials at a local mall; and worked with the Delta Health Partners in developing a SIDS curriculum.

American Indian/Alaska Native Outreach Initiative

In the summer of 2004, NICHD organized a meeting with several work group members from each region that served as site coordinators along with their discussion group leaders to report the findings from the discussion groups. The findings were constructive to proceed to the next phase in developing adaptable materials and support material for diverse American Indian and Alaska Native communities. The work group and partners will be involved throughout the development of the plan and will continue to provide guidance and feedback at various stages.

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, approximately 1.6 million adults (3.1% of all adults who used CAM in 2002) used CAM specifically for sleep problems. These CAM therapies include dietary supplements such as melatonin and valerian, mind/body approaches such as meditation, and therapies such as acupuncture and yoga that are part of non-western traditional medical systems. 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 summarized below.

Insomnia

Chronic insomnia is a significant health problem for many individuals and is often difficult to treat. Furthermore, conventional therapies can produce unwanted side effects. As a result, many individuals have turned to alternative therapies in search of more effective treatments and fewer side effects. NCCAM is interested in determining whether or not these alternative treatments 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 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 of melatonin for insomnia in the elderly. A significant percentage of elderly individuals with insomnia have low endogenous levels of melatonin, which is a normally occurring neurohormone as well as a popular dietary supplement used for various sleep disorders. This clinical study will investigate whether melatonin will relieve insomnia in these individuals.

Sleep Deprivation Related to Neurodegenerative Diseases

Neurodegenerative diseases such as Parkinson's disease (PD) and Alzheimer's disease (AD) are often accompanied by sleep disturbances due to pain and/or neurological changes related to disease progression. NCCAM supports a clinical study investigating the efficacy and safety of valerian for the treatment of sleep disturbances in PD. 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 advertised as having hypnotic properties effective in treating sleep disorders. However, insufficient scientific data exist to determine its true effectiveness. Some evidence does exist in a mouse model to suggest that it reduces spontaneous locomotor activity, which is a problem in PD, 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 PD patients.

In addition, NCCAM supports a study on the use of high intensity light therapy for AD patients in nursing homes. The long term care of AD 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 and used for various periods of time will contribute to a lessening

of these problems. If results are positive, this could provide a low-risk alternative and relatively inexpensive treatment.

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-02-124), 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 includes interactions between drugs used to treat sleep disorders and dietary supplements such as valerian and melatonin.

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. In 2004, NCCAM co-sponsored a conference on Pineal Cell Biology that brought together experts in the field of circadian biology to summarize new research findings in this area and to consider future directions. The NCCAM also support a study investigating the effect of blue light on sleep-wake regulatory cycle in humans.

Systematic Reviews

Because of the wide use of the dietary supplement, melatonin, for sleep disorders, NCCAM commissioned the Agency for Healthcare Research and Quality (AHRQ) to conduct a systematic review of published research on this subject to determine the strength of scientific evidence supporting the efficacy of melatonin for sleep disorders. . This systematic review published in 2004 found that melatonin appears to be safe, but it may not be effective for treating most primary sleep disorders. However, melatonin may be effective in treating delayed sleep phase syndrome. Finally, the report suggests that the mechanism by which melatonin produces sleepiness in humans is still not well understood. More information is needed about how melatonin is absorbed, distributed, and metabolized in humans. The information from this systematic review should help guide future research.

NATIONAL INSTITUTE ON DRUG ABUSE (NIDA)

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

The National Institute on Drug Abuse (NIDA) has a primary research goal to understand brain systems affected by psychoactive drugs of abuse. Sleep disturbances both during and following withdrawal from use of such drugs among individuals who are addicted strongly support the need for NIDA-supported sleep research. Current studies focus on the neurobiology associated with sleep, sleep and circadian cycles, and sleep architecture. Indeed, sleep disturbances often outlast other withdrawal symptoms and are often a cause for relapse. This suggests that the neural systems involved in the addiction process are many of the same ones also involved in sleep architecture. In addition, it is important to study how sleepiness and, conversely, insomnia 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 biologic functions including sleep. For example, oleamide has been isolated from the cerebral fluid of sleep-deprived cats. A newly funded study will focus on N-arachidonylglycine (NAGly), an endogenous constituent of many tissues, which has a potent inhibitory effect on FAAH. Studies of these mechanisms will provide insight into the cannabinoid system as well as their interactions in the brain. To this end, Boger and colleagues examined several sulfoxide and sulfone inhibitors of FAAH (Du et al., 2005 *Bioorganic & Medicinal Chemistry Letters,* 15, 1003-106.) Also, in the laboratory of Cravatt, characterization of the sleep-wake patterns in FAAH knock-out mice demonstrated increased slow-wave sleep and more intense episodes of slow-wave sleep than control littermates, supporting a role of FAA as possible modulators of sleep (Huitron-Resendiz. *Sleep* 2004;27(5):857-865). Finally, it should be noted that study of these amides and metabolites also determines their role in nociceptive pathways (Cravatt & Lichtman. *J Neurobiol* 2004;61(1):149-160) which are important influences in drug abuse research.

NIDA supports several studies that focus on benzodiazepines and non-benzodiazepine hypnotics, most of which are concerned with mechanisms of action and potential for abuse. For example, one such study on zolpidem demonstrated an improvement in sleep quality and next-day performance but worsened mood compared to placebo (Hart et al. *Exp Clin Psychopharm* 2003;11(4):259-268).

Because of overlap in the neural systems involved in sleep and drug abuse, there is reason to hypothesize that treatments for sleep disorders may prove effective in the treatment of drug abuse as well. For example, Modafinil, a drug approved for the treatment of narcolepsy, is now being investigated as a possible atypical agonist replacement for cocaine. Trials are being conducted to determine if it will reduce the “high” or drug effect of cocaine and if it, together with cognitive behavior therapy, can be an effective treatment. The first steps in these investigations of modafinil are to determine pharmacokinetic properties. For example, one study showed that d-enantiomer was eliminated from human serum quicker than the l-enantiomer (Donovan et al. *Ther Drug Monit* 2003;25(2):197-202). Continued studies will determine the effectiveness of the drug.

Finally, a major thrust of research results just starting to be reported is the effect of drugs of abuse on sleep architecture. How do drugs affect sleep cycles and sleep efficiency? And importantly, are the effects on sleep following drug withdrawal part of the cause of relapse? Studies of sleep quality for marijuana are underway as are studies of magnetic resonance

imaging on brain changes. The most comprehensive study to date characterizes sleep quality in chronic cocaine users (Pace-Schott et al. *Psychopharm* 2005). Volunteer cocaine users resided on an inpatient unit while studied with three days of baseline abstinence, three days of (monitored) binge cocaine use, and 15 days of abstinence. During this period, sleep duration, efficiency, and onset latency worsened while subjective reports remained constant. It is concluded that this dissociation between objective and subjective sleep quality is related to disruption of the sleep homeostat and may be contributory to relapse. Therapeutic intervention might take these data into consideration. Continuing studies in these areas may to lead to better understanding on biological mechanisms underlying drug abuse vulnerability as related to sleep architecture.

NATIONAL INSTITUTE OF MENTAL HEALTH (NIMH)

REGINA DOLAN-SEWELL, PHD - NIMH REPRESENTATIVE TO THE TRANS-NIH SLEEP RESEARCH COORDINATING COMMITTEE

Sleep disorders and sleep disruption associated with mental illness account for significant impairment in many children and adults and present a notable challenge to mental health. NIMH supports a wide variety of sleep-related research including genetics, cellular and molecular mechanisms of circadian systems, nosology and epidemiology of sleep disorders, the relationship of sleep disruption to mental illness, and the development of treatments for sleep disorders. The NIMH sleep portfolio spans the basic and applied neuroscience areas, and includes research program and career development grants.

Freeing Older Adults with Insomnia from Chronic Dependence on Sleep Medications

Older adults suffer disproportionately from chronic insomnia, which is associated with a variety of functional impairments, reduced quality of life, and increased risk for depression. Commonly treated with benzodiazepine (BZD) sleep medications, such individuals frequently exceed the recommended short-term use of these drugs and experience iatrogenic exacerbations of their sleep disturbance, including altered sleep structure, medication tolerance and dependence, withdrawal symptoms, rebound insomnia, and other hypnotic-dependent sleep problems. Once caught in this vicious cycle, patients typically become long-term BZD users and experience great difficulty in discontinuing these medications. Moreover, with prolonged use in older adults, BZD medications tend to lead to or increase the risks of experiencing multiple health-threatening consequences, including impairments in cognitive functioning, falls and fractures, and even mortality. Research is thus needed to identify more effective intervention strategies for helping older adults with chronic insomnia on two interlinked fronts, i.e., how to reduce or discontinue reliance on BZD medications while also alleviating the sleep disturbance that led to hypnotic medication use in the first place.

In a randomized clinical trial, Morin et al. compared the relative effectiveness of a supervised regimen for BZD tapering, cognitive-behavioral therapy (CBT) for insomnia, and the combination of the two. These approaches were tested over a 10-week intervention period in 76 older adult outpatients with chronic insomnia and prolonged BZD use. Follow-up assessments were conducted at 3 and 12 months with respect to changes in levels of BZD use, sleep indices, and symptoms of depression and anxiety. The results showed that all three interventions produced significant reductions in BZD use; patients reduced their overall usage by 90 percent in quantity and 80 percent in frequency, with 63 percent of patients becoming drug-free within an average of 7 weeks. The combined treatment approach was more effective than either component alone in helping patients achieve drug-free status by the end of active treatment, but its degree of superiority fell off considerably at the follow-up points. Meanwhile, CBT, alone or in combination with tapering, was effective in alleviating some aspects of participants' insomnia, though improvements often became obvious only after patients stayed off BZDs for several months. With gradual and structured tapering of the BZDs, however, even the patients assigned to the tapering condition alone experienced few withdrawal symptoms and little rebound insomnia. The study findings document the efficacy of clinical procedures for facilitating BZD discontinuation while also minimizing negative consequences on sleep patterns, and even improving these over time. Future research advances may come from identifying the essential therapeutic components of these or similar procedures.

Morin, C. M., Bastien, C., Guay, B., Radouco-Thomas, M., Leblanc, J., & Vallieres, A. Randomized clinical trial of supervised tapering and cognitive behavior therapy to facilitate benzodiazepine discontinuation in older adults with chronic insomnia. *American Journal of Psychiatry* 2004;161:332-342.

Progress in Understanding the Relationship of Anxiety and Learning to Sleep

Behavioral and physiological studies support the theory that anxiety interferes with rapid eye movement (REM) sleep and that REM sleep is a very favorable state for the consolidation and integration of memories. Investigators have used the open-field test to test the relationships between sleep, anxiety, and learning in rodents. The open-field test is a well-established tool for the assessment of rodent behavior and induces anxiety-like behaviors in rodents (who naturally avoid open spaces). When rodents are placed in this condition the novelty or "threat" of the open space serves as a stressor, and fear-conditioned mice show decreases in REM sleep after exposure to this fearful cue or context. In contrast, some forms of non-fear learning (such as maze exposure/learning) result in increases in REM sleep post- exposure. Despite these robust findings, however, why and how anxiety and learning are related to sleep remains poorly understood.

In order to determine how anxiety and exploration in the open-field could influence sleep, Tang et al recorded sleep after time in the open-field in strains of mice bred for various levels of anxiety behaviors. All strains of mice showed immediate decreases in REM sleep – consistent with the hypothesis that the open-field is stressful. However, the time course and amount of REM decrease, as well as subsequent increases in REM sleep varied among the strains of mice, with the mice bred to be the most anxious having greater decreases in REM sleep and a longer interval before return to baseline levels of REM sleep. Additionally, greater open-field activity (thought to be indicative of exploratory learning) was positively related to REM increases after time in the open field. Mice bred to be less anxious showed the greatest amount of activity and the greatest increases in REM sleep.

The results suggest that anxiety may induce initial REM suppression and exploratory learning may be associated with REM increase. The relative changes in REM sleep (depending on strain of mice) after time in the open field may result from the interaction between emotionality (i.e., anxious behavior) and learning (i.e., exploration) experiences during wakefulness. Future research should help determine if this is true and should further clarify the nature of the relationships among anxiety, learning and sleep.

Tang, X, Xiao J., Liu X & Sanford L.D. Strain differences in the influence of open field exposure on sleep in mice. *Behavioral Brain Research* 2004*;*154:137-147.

Neuropeptide with Arousal-Promoting and Anxiolytic-Like Effects Identified

Sleep and anxiety disorders are significant public health concerns affecting millions of people. Although research has provided clues to the origins of these disorders, the identification of treatment targets continues to pose challenges to investigators. Arousal (i.e., sleep/wake state) regulation involves multiple neurochemical compounds and complex neurocircuitries including neurotransmitters such as noradrenaline, acetycholine, serotonin, glutamate, and GABA and neuropeptides such as hypocretin/orexin and neuropeptide Y. Some of these same circuits and signaling molecules have also been implicated in anxiety disorders, suggesting the existence of some shared brain regulatory components for arousal and anxiety.

While many brain systems regulating arousal and anxiety have been identified, it is likely that additional compounds and systems have yet to be discovered. Novel neurotransmitters or modulators can be found through studies of Orphan G-Protein Coupled Receptors (GPCRs). GPCRs are cloned receptor proteins whose endogenous ligands have not yet been identified. Xu et al describe physiological functions of such a newly de-orphanized GPCR system, neuropeptide S (NPS), and its cognate GPCR. The NPS receptors were localized to several brain regions including a population of neurons that are adjacent to the norepinephrine cells of the locus coeruleus, an area recognized for its role in arousal regulation. Rats injected (icv) with NPS spent more time in wakefulness during the first hour post-NPS injection followed by a rebound in the amount of non-REM sleep in the second hour. In a second study, mice injected icv with NPS displayed increased motor activity (behavioral arousal) independent of novel or stressful conditions. Finally, mice injected with NPS displayed increased exploratory behavior similar to mice injected with known anxiety-reducing compounds. Results revealed that NPS is a novel neuropeptide that potently modulates arousal and possibly sleep-wake behavior. Together, these data show that NPS can promote arousal, might be involved in the induction of wakefulness or suppression of sleep, and may regulate anxiety. Future studies of this neurotransmitter system might further our understanding of sleep disorders and pathological anxiety, facilitate the identification of novel treatment targets, and promote the development of more effective treatments for sleep and anxiety disorders.

Xu Y-L, Reinscheid RK, Huitron-Resendiz S, Clark SD, Wang Z, Lin SH, Brucher, FA, Zeng J, Ly NK, Henriksen SJ, de Lecea L, and Civelli O. Neuropeptide S, a neuropeptide promoting arousal and anxiolytic-like effects. *Neuron* 2004*;*43:487-497.

NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE (NINDS)

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

The NINDS has a long-standing interest in central nervous system homeostatic mechanisms such as sleep and circadian rhythms. The 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, NINDS' financial support of extramural sleep disorders research projects totaled almost $25 million in Fiscal Year 2004. Basic and clinical research projects have yielded important homeostatic mechanisms in the brainstem that further our understanding of sleep, certain sleep disorders, and the relationship between sleep and energy balance. The following are some of the most notable scientific advances made by NINDS-funded investigators in Fiscal Year 2004.

The NINDS portfolio includes a number of studies which focus on the central mechanisms involved in the regulation of sleep and wakefulness. One recent study showed that neurons that synthesize melanin-concentrating hormone may modulate arousal and energy homeostasis. NINDS-funded researchers have developed a viral approach for selective long-term reporter gene expression in such neurons, allowing the study of their cellular physiology in hypothalamic slices and showing that neurons containing melanin-concentrating hormone may integrate information within the arousal system in support of energy conservation. A second study provided evidence to suggest that histaminergic neurons promote wakefulness. Histaminergic neurons are found exclusively in the tuberomammillary nucleus (TMN), and electrolytic lesions of the posterior hypothalamus, where the TMN resides, produce intense hypersomnolence, or excessive sleepiness. It is important to determine the limits of histaminergic involvement in wakefulness. Electrolytic lesion studies have demonstrated that extensive loss of histaminergic neurons in this brain region is not critical for spontaneous periods of wakefulness, even though histamine probably has a role in sustaining wakefulness.

The NINDS also supports research on sleep disruption and its consequences. Animal and human studies of sleep and learning have demonstrated that training on various tasks increases subsequent rapid eye movement (REM) sleep, followed by improvement in performance on the learned task. Experiments have demonstrated that experimental activation of a certain REM sleep mechanism, the P-wave, enhances the physiological process of memory. On the other hand, REM sleep deprivation after training blocks the expected performance improvement. NINDS-funded investigators showed that activation of the P-wave generator in rats through the administration of a drug prevented the memory-impairing effects of REM sleep deprivation on learning and memory.

Detailed understanding of circadian timing mechanisms, the body's "clock" on which the sleep-wake cycle depends, is critical for sleep disorders research. Circadian clocks comprise a cyclic series of dynamic cellular states, characterized by the changing availability of substrates that alter clock time when activated. NINDS-supported investigators are trying to determine the molecular signals which are responsible for circadian timing. One recent study showed that chronic inhibition of protein kinase G type II disrupted electrical activity rhythms and tonically increased Bmal1 mRNA, a key component of circadian control mechanisms. Protein kinase G type II activation may define a critical control point for temporal progression into the daytime domain by acting on the positive arm of the transcriptional/translational feedback loop.

When the body's circadian clock is disrupted, sleep disorders such as insomnia may result. One therapeutic approach to insomnia associated with difficulty sleeping through the night is exposure to bright light. It has been shown in animal studies that exposure to brief pulses of bright light can phase shift the circadian pacemaker and that the resetting action of light is most efficient during the first minutes of light exposure. In humans, multiple consecutive days of exposure to brief bright light pulses have been shown to phase shift the circadian pacemaker. NINDS-supported investigators have recently shown that a single sequence of intermittent bright light pulses can delay the human circadian pacemaker and that intermittent pulses have a greater resetting efficacy on a per minute basis than does continuous exposure.

The NINDS portfolio also includes studies to understand sleep disordered breathing (sleep apnea), which can produce intermittent hypoxia on a nightly basis associated with substantial cortico-hippocampal damage leading to impairments of neurocognitive, respiratory and cardiovascular functions. NINDS-supported investigators have developed a mouse model of sleep apnea to study the molecular causes and consequences of the disorder. New findings indicate that the increased production of reactive oxygen species and oxidative stress propagation contribute, at least partially, to the cortical neuronal cell death and neurocognitive dysfunction associated with intermittent hypoxia.

NATIONAL INSTITUTE OF NURSING RESEARCH (NINR)

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

NINR's sleep research portfolio consists of three general areas: (1) the impact of sleep deprivation across the lifespan in healthy populations; (2) the impact of sleep disturbance in patients with chronic illnesses; and (3) the management of sleep disturbances. The following are examples of the research studies funded by NINR.

Sleep Deprivation in Healthy Populations

Previous study (Dinges R01NR4281; *Sleep* 2003;2:117-126) has suggested that it is not the total amount of lost time from sleep, but rather the total time of wakefulness that results in declining concentration and cognitive performance. These investigators have now demonstrated that both acute total and short-term partial sleep deprivation resulted in elevated high-sensitivity C-Reactive Protein concentrations, a stable marker of inflammation that has been shown to be predictive of cardiovascular morbidity (*JAmCollCardiol* 2004;43:678–83). Sleep loss may be one of the ways that inflammatory processes are activated and contribute to the association of sleep complaints, short sleep duration, and cardiovascular morbidity observed in epidemiologic surveys.

Parents of newborn babies experience more sleep disruption at night during the postpartum period as compared to the last month of pregnancy. Compared to fathers, with their stable 24-hour sleep patterns over time, mothers had less sleep at night and more sleep during the day after the baby was born, but there was no gender difference in ratings of fatigue (Lee R01NR5345; *Biological Research for Nursing* 2004;5:311-318).

Often thought to be the result of lifestyle choices, sleep deprivation appears especially common in adolescence. Wake times imposed by school schedules oppose the maturational tendency toward later bedtimes. A recent study suggests that this shift toward later bedtimes may be in part the result of shifting underlying biology rather than behavioral choices (Carskadon R01NR8381; *Annals New York Academy of Sciences* 2004;1021:276-291).

Sleep Disturbance in the Chronically Ill

Sleep disturbances significantly contribute to the burden of illness in many chronic health conditions. In addition to the effects of pain disturbing sleep, changes in physiologic processes may interfere with normal sleep patterns. For example, Alzheimer's disease, dementia, rheumatoid arthritis, fibromyalgia, AIDS, asthma, and urinary incontinence are all accompanied by sleep disruptions.

In cardiac surgery patients, sleep contributes to both physical functional and emotional well-being following surgery. Almost half of the patients who had cardiac surgery were still reporting sleep disturbances at 8 weeks post surgery, and these sleep disturbances were related to both physical function and emotional well-being (Redeker R01NR8022; *Nursing Research* 2004;53;154-16). Sleep was most disturbed during the first postoperative week and improved at fourth and eighth postoperative week. Preoperative sleep variables predicted the sleep variance postoperatively; i.e., the presence of sleep disturbance preoperatively predicts the longer maintenance of sleep disturbances during the postoperative period (Redeker R01NR8022; *Research in Nursing & Health*, 2004, 27, 217–22).

The symptoms of fibromyalgia, a common rheumatic condition in women between the ages of 40 and 60, include fatigue and non-restorative sleep. Women with fibromyalgia had lower pain thresholds, more psychological distress, higher depression scores, and reduced subjective and objective sleep quality when compared to women without fibromyalgia. However, pain, mood, and sleep symptoms are not associated with changes in the enumeration of peripheral lymphocytes or function (i.e., immune response markers) in fibromyalgia (Landis R01NR8136; *Brain, Behavior, and Immunity* 2004;18:304–313).

Because fatigue and sleep disturbances are common in patients with chronic disorders, it is important to be able to quickly, but accurately measure alertness/fatigue in patients who may be suffering from pain and other discomforts. In a study to assess whether axillary or thoracic skin temperatures could be used to replace the standard rectal temperature measurement of circadian timing, neither axillary and skin temperatures served as an adequate substitute in adult women (Thomas K01NR7649 [last funded in FY03, active in FY04]; *Biological Research for Nursing* 2004;5:187-194). In contrast, a study of narcoleptic and obstructive sleep apnea patients found pupillometric Alertness Level Test (ALT) scores of sleepiness were consistent with EEG records and self-report measures (Merritt R01NR4959 [last funded in FY 2003, active in Fiscal Year 2004]; *International Journal of Psychophysiology* 2004;52: 97–112). The ALT is convenient, easily repeatable and less technically demanding than EEG sleepiness measures.

Fatigue, pain, and sleep disturbance are common problems encountered by patients receiving radiation therapy. Studies are underway to determine the patterns of change in sleep disturbance, fatigue, and pain over the course of radiation therapy, and to examine the relationship between opioid use, pain, and sleep in oncology patients.

Management of Sleep Disturbances

NINR funds a variety of different interventions to improve sleep. Sleep difficulties can affect daytime physical and social functioning, and have been associated with an increased incidence of depression. For example, one intervention in rural older adults with obstructive sleep apnea seeks to increase adherence to CPAP via self-directed, focus counseling provided via an interactive internet connection (Smith R01NR4828). Another study is evaluating whether melatonin and behavioral techniques are an effective intervention for jet lag that has been found to impair judgment and performance (Eastman R01NR7677). In another, a new nurse investigator is using behavioral treatments to improve sleep in community dwelling elders who frequently experience insomnia secondary to chronic pain (Perlis R21NR9080). An individualized behavioral intervention to promote nighttime sleep by maximizing daytime activity in breast cancer patients undergoing chemotherapy is ongoing (Berger R01NR7762). Similarly, menopausal women are prompted to increase their daily exercise in order to improve nighttime sleep (Davis R01NR8024).

Disturbed sleep with nighttime wandering is common in patients with Alzheimer's disease, and has been cited as the most frequent cause for nursing home placement. Both patients with dementia and their caregivers experience significant sleep deprivation. Researchers are testing innovative strategies (e.g., melatonin, light, nighttime alarm systems [Rowe R42NR4952]) to improve nighttime sleep in these individuals. The improved sleep may decrease the agitation commonly found in individuals with Alzheimer's disease. In addition, the improved sleep in patients with Alzheimer's disease may also increase the sleep experienced by caregivers, and subsequently may delay or reduce the need for institutionalization of the demented patient.

Training and Career Development

NINR is committed to the training and career development of new investigators in the area of sleep research. NINR supports pre-doctoral fellowships (9 in Fiscal Year 2004), mentored research scientist development awards, and institutional training grants (3 in Fiscal Year 2004) focusing on sleep research. The research foci of these awards include studying the relationships among sleep, hormonal regulation, immune function, and disease (e.g., in estrogen-related disorders and in respiratory infection); the dysregulation of sleep in disease (e.g., in cancer and cancer therapy; in premature infant chronic lung disease; and in heart disease), and perceptions of sleep hygiene and intervention in adults (e.g., sleep intervention in long-haul truckers and perceptions of CPAP in African Americans).

OFFICE OF RESEARCH ON WOMEN'S HEALTH (ORWH)

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

The Office of Research on Women's Health (ORWH) supported projects within the National Institute of Mental Health and the National Institute of Nursing Research related to sleep disorders in which sleep disruption is a factor, changes in relevant symptoms across the fluctuating hormonal cycle in women, and changes in relevant symptoms or other basic factors across the natural age span in men and women. Since the ORWH has no direct funding authority; the Institutes to which these dollars have been assigned are noted in the summaries that follow, and funding details can be found in the respective ICs' grant listings.

5R01MH059919-05 Menopausal Depressions: Chronobiological Basis
University of California, San Diego, Barbara L Parry (NIMH)

The effects of estradiol and progesterone administration on circadian rhythms in humans will be tested in healthy postmenopausal women. It is hypothesized that estrogen advances the amplitude and synchrony of biological rhythms as measured by melatonin, sleep, and activity and that progesterone antagonizes these effects. This study further extends study of this hypothesis in a controlled design and should yield important information about the possible mechanisms mediating the effects of hormones on mood and behavior

5R01NR004142-07 Nursing Management of IBS: Improving Outcomes
University of Washington. Margaret M. Heitkemper (NINR)

The investigator will further test the effectiveness of comprehensive self-management (CSM) treatment for Irritable Bowel Syndrome (IBS) by comparing 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.

A Complete Listing of Funded Sleep Research For Each Trans-NIH SRCC Institute and Center for Fiscal Year 2004 is Provided in the Following Pages

Sleep Disorders Research
(Dollars in thousands)

	1996	1997	1998	1999	2000	2001	2002	2003	**2004**	*2005 Estimate*
NHLBI	16,450	19,219	22,932	31,845	35,128	37,579	45,155	50,328	**53,085**	*54,147*
NIA	7,800	9,179	11,818	13,296	13,034	14,533	14,600	18,178	**16,492**	*16,937*
NIAAA	551	728	766	736	1,132	1,681	4,342	4,553	**4,857**	*4,955*
NIAMS	--	--	--	--	--	--	300	248	**161**	*165*
NCI	--	--	--	--	--	--	--	--	**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**	*7,700*
NCCAM	--	--	--	--	--	177	900	1,121	**1,062**	*1,110*
NIDA	1,201	1,042	1,586	2,163	2,553	2,517	3,235	2,988	**3,126**	*3,180*
NIMH	27,231	28,601	34,027[§]	39,219	40,667	50,742	56,647	63,222	**59,785**	*61,111*
NINDS	9,453	11,598	13,639	15,231	12,495*	17,603	22,918	24,588	**24,952**	*25,500*
NINR	2,842	3,565	3,394	3,503	4,635	5,375	8,091	11,030	**10,025**	*10,276*
ORWH	--	--	--	--	--	--	--	--	**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**	*15,178*
NHGRI	--	--	--	--	--	599	0	0	**0**	*0*
NIBIB	--	--	--	--	--	--	--	258	**243**	*250*
NIEHS	--	--	--	--	--	--	--	--	**190**	*194*
NIDCR	--	--	--	--	--	--	--	--	**99**	*100*
NCMHD	--	--	--	--	--	--	--	--	**7**	*7*
Total	76,143	84,719	102,835[§]	119,746	123,558	145,083	175,022	197,085[†]	**196,239**	*200,810*

[§] 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.

[†] 159% increase over 1996

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

TRANS-NIH SLEEP RESEARCH – FY 2004

NATIONAL HEART, LUNG, AND BLOOD INSTITUTE

Grant No	PI	Title	Institution	Funding
5R01HL067209-04	Aloia, Mark S	Motivating Adherence To CPAP In Obstructive Sleep Apnea	Brown University	$427,773
1R01HL075366-01A1	Aloia, Mark S	Subcortical Hyperintensities In Sleep Apnea Syndrome	Brown University	$416,554
5R01HL070907-02	Amin, Raouf S	Mechanisms Mediating C/V Disease In Children With Osa	Children's Hospital Med Ctr (Cincinnati)	$372,500
5K25HL004420-04	Ayappa, Indu A	Automated (Ai) Analysis Of Sleep Disordered Breathing	New York University School Of Medicine	$147,690
2K24HL004174-06	Badr, M Safwan	Sleep Apnea: Determinants And Consequences	Wayne State University	$81,623
5R01HL070848-02	Barrett-Connor, Elizabeth L	Outcomes Of Sleep Disorders In Older Men	University Of California San Diego	$650,289
5R01HL075029-02	Bass, Joseph T	Impact Of Sleep On Feeding And The Metabolic Syndrome	Evanston Northwestern Healthcare	$377,960
1K23HL075369-01	Beebe, Dean	Osa In Obese Teens And Preteens: Neurobehavioral Effects	Children's Hospital Med Ctr (Cincinnati)	$113,446
5R01HL067604-05	Benloucif, Susan J	Responsiveness Of The Aging Circadian Clock To Light	Northwestern University	$220,500
1R43HL075947-01A1	Bergmann, Bernard M	Preclinical Studies: Aging, Nrem Sleep And Gh Release	Slowave	$98,322
5R01HL063772-04	Bixler, Edward O.	Prevalence Of Sleep Disordered Breathing In Children	Pennsylvania State Univ Hershey Med Ctr	$269,325
5R01HL071510-03	Block, Gene D	Sleeping Sickness/Cytokine Effects On Biological Clock	University Of Virginia Charlottesville	$210,000
1R43HL075983-01A1	Busch, Frederick	Intelligent Quantitative CPAP For Osa Therapy	Cleveland Medical Devices, Inc.	$156,137
1R01HL075614-01	Calhoun, David A	Etiology Of Sleep Apnea-Related Hyperaldosteronism	University Of Alabama At Birmingham	$288,425
5R01HL070842-02	Cauley, Jane A.	Outcomes Of Sleep Disorders In Older Men - Pittsburgh	University Of Pittsburgh At Pittsburgh	$472,875
1F32HL078360-01	Chang, Anne-Marie	Genetic Analysis Of Extreme Circadian/Sleep Phenotypes	Brigham And Women's Hospital	$48,343
5R01HL068303-03	Chase, Michael H	Web-Based Sleep Research Protocols And Standards	Websciences International	$566,150
9R01HL080941-05A1	Chervin, Ronald D	Identification Of Sleep-Disordered Breathing In Children	University Of Michigan At Ann Arbor	$540,125
1R01HL077453-01	Czeisler, Charles A	Adaptation Of Circadian Responses To Light Treatment	Brigham And Women's Hospital	$315,000
5T32HL007901-07	Czeisler, Charles A	Training In Sleep, Circadian & Respiratory Neurobiology	Brigham And Women's Hospital	$531,016
5R01HL052992-09	Czeisler, Charles A.	Bright Light Treatment Of Shift Rotation Insomnia	Brigham And Women's Hospital	$382,996
1F32HL078164-01	Dave, Nilesh B	Lung Vascular Responses--Intermittent/Sustained Hypoxia	University Of Pittsburgh At Pittsburgh	$54,352
5R01HL072722-03	Decker, Michael J	Episodic Neonatal Hypoxia Impairs Sleep And Cognition	Emory University	$266,000
5U01HL068060-03	Dement, William C	Apples: Apnea Positive Pressure Long-Term Efficacy Study	Stanford University	$3,109,570
2R01HL044915-13A1	Dimsdale, Joel E	Sleep Apnea And Hypertension: Role Of Sns	University Of California San Diego	$604,144
1R01HL079526-01	Dixon, Denise A	Implications Of Sleep & Fatigue In Pediatric HIV	Univ Of Med/Dent Nj Newark	$367,383
5R01HL050775-11	Duckles, Sue P	Vascular Reactivity: Gender And Hormonal Influence	University Of California Irvine	$340,875
3R01HL050775-11S1	Duckles, Sue P	Vascular Reactivity: Gender And Hormonal Influence	University Of California Irvine	$44,500
5R01HL066267-04	Durand, Dominique M	Activation Of Tongue Muscles In Obstructive Sleep Apnea	Case Western Reserve University	$191,250
5R01HL072408-02	Eastman, Charmane I	Effects Of Short And Long Nights On The Circadian Clock	Rush University Medical Center	$361,150
5R01HL073259-02	Edinger, Jack D	Sleep EEG Spectral Measures Of Insomnia	Duke University	$128,000
5R01HL075079-02	Ehrmann, David A	Sleep, Metabolic, And Cardiovascular Dysfunction In Pcos	University Of Chicago	$361,263

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
5R01HL070847-02	Ensrud, Kristine E	Outcomes Of Sleep Disorders In Older Men-Minneapolis	University Of Minnesota Twin Cities	$512,743
5R01HL075080-02	Epstein, Paul N.	Altered Glucose Homeostasis By Sleep Impairment	University Of Louisville	$330,750
5K23HL004400-05	Fogel, Robert B	Androgens & Sleep: Apnea Epidemiology & Pathophysiology	Brigham And Women's Hospital	$133,920
5R01HL025739-22	Forster, Hubert V	Control Of Breathing During Physiologic Conditions	Medical College Of Wisconsin	$179,507
5R01HL070301-04	Foster, Gary D.	Sleep Apnea In Look Ahead Participants	University Of Pennsylvania	$502,725
5R01HL068162-02	Fregosi, Ralph F	Functional MRI Of The Pharyngeal Airway	University Of Arizona	$303,000
2R44HL065265-02A1	Gevins, Alan S	Functional Alertness Monitor For Sleep Disorder Patients	Sam Technology, Inc.	$335,213
1F32HL077066-01	Gottselig, Julie M	Sleep Slow Wave Activity And Waking Function	Brigham And Women's Hospital	$52,279
5R01HL065270-06	Gozal, David A.	Neurocognitive Function In Snoring Children	University Of Louisville	$414,955
5R01HL069932-03	Gozal, David A.	Postnatal Brain Susceptibility To Intermittent Hypoxia	University Of Louisville	$357,500
5R01HL069706-05	Greco, Mary A	Regulation Of Chat Expression During Sleep-Wakefulness	Sri International	$361,344
5R01HL022418-25	Harper, Ronald M	Neural Control Of Cardiorespiratory Function	University Of California Los Angeles	$228,750
1R01HL076518-01	Hayward, Linda F	Supramedullary Control Of Respiration	University Of Florida	$363,438
5R01HL059873-08	Jackson, F Rob	Studies Of A Neural Pacemaker Output Pathway	Tufts University Boston	$356,625
5K23HL073238-02	Katz, Eliot S	Upper Airway Motor Control During Sleep In Children	Children's Hospital (Boston)	$125,684
1R21HL076375-01	Khoo, Michael C	Heart Rate Variability In Sleep-Disordered Breathing	University Of Southern California	$154,800
5R01HL059658-07	Kilduff, Thomas S	Neural Gene Expression In Sleep Deprivation And Recovery	Sri International	$500,827
1R43HL076883-01	Krausman, David T	Ambulatory Assessment Of Leg Movements And Arousals	Individual Monitoring Sys, Inc. (Im Sys)	$157,094
5R44HL065166-03	Krausman, David T	Ambulatory Airflow-Pressure Monitor For Sleep Medicine	Individual Monitoring Sys, Inc. (Im Sys)	$507,085
1R01HL071123-01A2	Kripke, Daniel F	Genetic Variants In Circadian Rhythm Sleep Disorders	University Of California San Diego	$336,623
5R01HL071097-03	Kubin, Leszek K	Hypothalamo-Brainstem Control Of Sleepness And Arousal	University Of Pennsylvania	$396,250
5R01HL074385-02	Kubin, Leszek K	Episodic Hypoxia, Hypothalamus And Insulin Resistance	University Of Pennsylvania	$358,876
5R01HL068699-02	Leuenberger, Urs A	Sympathetic And Vascular Function In Sleep Apnea	Pennsylvania State Univ Hershey Med Ctr	$261,975
5R44HL068463-03	Levendowski, Daniel J	Automated Detection Of Sleep Disordered Breathing	Advanced Brain Monitoring, Inc.	$286,402
5R44HL070484-03	Levendowski, Daniel J	Biobehavioral Measurements Of Alertness In Sleep Apnea	Advanced Brain Monitoring, Inc.	$285,317
1R01HL079555-01	Lewin, Daniel S	Sleep Fatigue & Cognitive Correlates In Pediatric HIV	Children's Research Institute	$436,437
5R01HL070837-02	Lewis, Cora E	Outcomes Of Sleep Disorders In Older Men-Birmingham	University Of Alabama At Birmingham	$524,796
1F32HL074670-01A1	Liu, Audrey H	Effects Of Obesity And Leptin On The Murine Upper Airway	Johns Hopkins University	$50,548
7R01HL075034-03	Liu, Rugao	Ros In Episodic Hypoxia-Induced Cardiovascular Dysfunct*	University Of North Dakota	$367,500
5R01HL040881-16	Lydic, Ralph B	Cholinergic Mechanisms Of Breathing During Sleep	University Of Michigan At Ann Arbor	$293,158
5R01HL057120-09	Lydic, Ralph B	Opioid Induced Rem Sleep Inhibition	University Of Michigan At Ann Arbor	$357,653
5R01HL065272-06	Lydic, Ralph B	Cholinergic Phenotype In Murine Models Of Sleep	University Of Michigan At Ann Arbor	$263,855
5R01HL058585-07	Marcus, Carole L	Pathophysiology Of Childhood Obstructive Sleep Apnea	Children's Hospital Of Philadelphia	$323,185
1R01HL076379-01	Matthews, Karen A	Stress, Sleep And Emerging CVD Risk Factors	University Of Pittsburgh At Pittsburgh	$691,926

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
1R43HL076032-01	Matthews, Robert	Non Contacting Bioelectric Array For Sleep Monitoring	Quantum Applied Science And Research	$99,937
5R01HL071515-03	Mignot, Emmanuel J	Sleep Disordered Breathing, Apoe And Lipid Metabolism	Stanford University	$360,246
1R01HL073921-01A1	Miller, Andrew H	Pathophysiology Of Ifn-Alpha-Induced Sleep Disturbances	Emory University	$229,500
1R43HL078442-01	Modarres-Zadeh, Mohammad N	Novel Real-Time Algorithms:Quantifying Wake-Sleep States	Cleveland Medical Devices, Inc.	$176,785
1R01HL070911-01A2	Molfese, Dennis L	Sleep And Sleep Disorders In Children	University Of Louisville	$367,291
5F32HL074591-02	Montgomery-Downs, Hawley E	Snoring, Early Behavior, And Oxidant Stress	University Of Louisville	$48,928
1R01HL074072-01A1	Morgan, Barbara J	Sleep Disordered Breathing And Vasomotor Regulation	University Of Wisconsin Madison	$352,850
5R01HL075501-02	Mullington, Janet M	Adiposity, Bp & The Inflammatory Response To Sleep Loss	Beth Israel Deaconess Medical Center	$411,419
1U01HL077813-01	Newman, Anne B	The Sleep Heart Health Study	University Of Pittsburgh At Pittsburgh	$90,113
5R01HL075035-02	Nieto, F Javier	SDB, Metabolic Syndrome, And Vascular Function	University Of Wisconsin Madison	$363,750
2U01HL053941-11	O'connor, George T	Sleep Heart Health Study	Boston University Medical Campus	$110,183
1R01HL080972-01	Opp, Mark R	Sleep, Cytokines And Infection	University Of Michigan At Ann Arbor	$363,211
5R01HL070838-02	Orwoll, Eric S.	Outcomes Of Sleep Disorders In Older Men-Portland	Oregon Health & Science University	$628,915
5P50HL060287-07	Pack, Allan I	SCOR In Neurobiology Of Sleep And Sleep Apnea	University Of Pennsylvania	$2,328,073
5T32HL007713-12	Pack, Allan I	Training Program In Sleep And Respiratory Neurobiology	University Of Pennsylvania	$408,448
5T32HL007953-05	Pack, Allan I	Training In Sleep And Sleep Disorders	University Of Pennsylvania	$162,998
5R01HL072067-02	Pack, Allan I.	Family Linkage Study Of Obstructive Sleep Apnea	University Of Pennsylvania	$1,143,464
5R01HL069699-04	Pavlides, Constantine	Gene Regulation And Synaptic Plasticity In Sleep	Rockefeller University	$355,306
5K08HL068715-03	Polotsky, Vsevolod Y	Sleep Disordered Breathing And Glucose Regulation	Johns Hopkins University	$131,490
1R21HL075014-01	Poon, Chi-Sang	Analysis Of Heart Rate Variability In Sleep Apnea	Massachusetts Institute Of Technology	$160,000
5R01HL059596-08	Ptacek, Louis J. Ii	Characterization Of Advanced Sleep Phase Syndrome	University Of California San Francisco	$451,864
5R01HL075078-02	Punjabi, Naresh M	The Effects Of Sleep Apnea On Metabolic Function	Johns Hopkins University	$408,750
2U01HL053937-11	Punjabi, Naresh M	The Sleep Heart Health Study	Johns Hopkins University	$102,559
2U01HL053938-11	Quan, Stuart F.	The Sleep Heart Health Study (SHHS)	University Of Arizona	$91,793
5R01HL072702-03	Quattrochi, James J	Cellular And Molecular Mechanisms Of REM Sleep Control	Massachusetts Mental Health Institute	$200,550
1R01HL070870-01A2	Radulovacki, Miodrag G	Intertrigeminal Region Control Of Apnea	University Of Illinois At Chicago	$376,300
5R01HL046380-14	Redline, Susan S	Familial Aggregation And Natural History Of Sleep Apnea	Case Western Reserve University	$647,348
5R01HL070839-02	Redline, Susan S	Outcomes Of Sleep Disorders In Older Men- Reading Center	Case Western Reserve University	$397,424
5R01HL070916-03	Redline, Susan S	Outcomes Of Sleep Disordered Breathing In Adolescents	Case Western Reserve University	$382,500
5R01HL075077-02	Redline, Susan S	Effects Of Sleep Apnea Treatment On Metabolic Syndrome	Case Western Reserve University	$371,317
2U01HL063463-06	Redline, Susan S	The Sleep Heart Health Study	Case Western Reserve University	$170,549
2U01HL063429-06	Resnick, Helaine E.	Sleep Heart Health Study	Missouri Breaks Research, Inc.	$243,191
5R44HL065893-03	Riley, William T	Computerized Self-Help Treatment For Primary Insomnia	Personal Improvement Computer Systems	$446,195
2U01HL053916-11	Robbins, John A	Sleep Heart Health Study	University Of California Davis	$85,573

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
5K23HL004426-05	Rosen, Carol L	Evaluation Of Diagnostic Tests For Pediatric Sleep Apnea	Case Western Reserve University	$127,035
5R01HL075083-02	Saad, Mohammed F	Sleep-Disordered Breathing & The Metabolic Syndrome	University Of California Los Angeles	$399,306
2U01HL064360-06	Samet, Jonathan M.	Data Coordinating Center For Sleep Heart Health	Johns Hopkins University	$476,156
5R01HL068652-03	Samson, Willis K.	Orexinergic Pathways In Central Autonomic Control	St. Louis University	$400,455
1K23HL072126-01A1	Schneider, Hartmut	Physiologic Phenotypes For Obstructive Sleep Apnea	Johns Hopkins University	$157,809
2R44HL068352-02	Schoess, Jeffrey N	Self-Dispensing Respiratory Effort Band	Korosensor.Com, Inc.	$303,415
5K24HL067948-03	Schwab, Richard J	Pathogenesis And Genetics Of Obstructive Sleep Apnea	University Of Pennsylvania	$139,466
5R01HL071506-03	Schwartz, Alan R	Cardiovascular Stress Of Sleep Apnea And Heart Failure	Johns Hopkins University	$350,380
2U01HL053934-11	Shahar, Eyal	Sleep Heart Health Study (SHHS)	University Of Minnesota Twin Cities	$107,559
1K24HL076446-01	Shea, Steven A	Chronobiology Of Cardiovascular And Pulmonary Disease	Brigham And Women's Hospital	$120,069
1R01HL076409-01	Shea, Steven A	Circadian And Behavioral Factors Of Cardiovascular Risk	Brigham And Women's Hospital	$503,798
1R01HL079533-01	Shearer, William T	Sleep Studies In HIV+ Older Children/Adolescents	Baylor College Of Medicine	$473,956
5P50HL060296-07	Siegel, Jerome M	CNS Interactions With Hypoxia In OSA	University Of California Los Angeles	$1,763,232
2R01HL050531-09A1	Smith, Curtis A	Central And Peripheral Mechanisms Of Sleep Apnea	University Of Wisconsin Madison	$319,792
2R01HL037379-17A2	Smith, Philip L	Obesity And Neural Control In Sleep-Disordered Breathing	Johns Hopkins University	$477,194
1R01HL079554-01	Smith, Philip L	Effects Of HIV & Haart On Sleep & Daytime Function	Johns Hopkins University	$608,053
2R01HL065176-05	Somers, Virend	Cardiovascular Disease Mechanisms In Sleep Apnea	Mayo Clinic Coll Of Medicine, Rochester	$368,750
5R01HL075025-02	Spiegel, Karine	Predictors Of Adverse Metabolic Effects Of Sleep Loss	Free University Of Brussels	$297,000
5R01HL070841-02	Stefanick, Marcia L	Outcomes Of Sleep Disorders In Older Men-Palo Alto	Stanford University	$568,976
5R01HL071194-02	Stone, Katie L	Outcomes Of Sleep Disorders In Older Men	University Of California San Francisco	$505,815
5K23HL004457-03	Thomas, Robert J	Working Memory In Obstructive Sleep Apnea-An Fmri Study	Beth Israel Deaconess Medical Center	$151,716
5R01HL070522-15	Toth, Linda A	Sleep Patterns During Infectious Disease	Southern Illinois University Sch Of Med	$282,000
5T32HL007909-07	Turek, Fred W	Training Grant In Sleep Research	Northwestern University	$277,123
5R01HL072694-03	Van Cauter, Eve	Extended Work Schedule And Health: Role Of Sleep Loss	University Of Chicago	$381,250
5R01HL070154-03	Van Dongen, Hans P	Individual Differences In Response To Sleep Deprivation	University Of Pennsylvania	$457,032
1R43HL075979-01	Vosburgh, Frederick	Device To Cancel Secondhand Snoring & For Sleep Research	Nekton Research, Llc	$98,307
7R01HL070784-03	Waters, Karen A	The Metabolic Syndrome In Pediatric Obstructive Apnea	University Of Louisville	$147,000
5K23HL068849-02	Weaver, Edward M	Nasal Obstruction And Sleep Apnea Treatment Outcomes	University Of Washington	$153,060
5R01HL076101-02	Weaver, Terri E	Impact Of CPAP On Functional Outcomes In Milder OSA	University Of Pennsylvania	$612,378
5R01HL075184-02	Weiss, J Woodrow	Cartoid Mediators Of Sympathoexcitation In Sleep Apnea	Beth Israel Deaconess Medical Center	$382,500
1R13HL078328-01	Weiss, James W	Eigth International Conference On Sleep And Breathing	Beth Israel Deaconess Medical Center	$22,500
5F32HL072560-02	Wellman, David A	Respiratory Control Stability In Obstructive Sleep Apnea	Brigham And Women's Hospital	$58,612
5P50HL060292-07	White, David P	Harvard Center On Sleep Neurobiology And Sleep Apnea	Brigham And Women's Hospital	$1,980,371
5R01HL048531-12	White, David P	Sleep, Airway Patency And The Pharyngeal Musculature	Brigham And Women's Hospital	$423,750

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
5R01HL073196-02	Wright, Kenneth P Jr	Effect Of Sleep Deprivation On Inflammatory Markers	University Of Colorado At Boulder	$146,558
2R01HL062252-06	Young, Terry B.	Epidemiology Of Sleep-Disordered Breathing In Adults	University Of Wisconsin Madison	$964,467
5R01HL071560-02	Youngstedt, Shawn D	Preventing Risks Of Long Sleep	University Of South Carolina At Columbia	$205,243
3R01HL071560-02S1	Youngstedt, Shawn D	Preventing Risks Of Long Sleep	University Of South Carolina At Columbia	$40,740
5R01HL069988-02	Zee, Phyllis C	Circadian Rhythms And Sleep In Familial Dsps And Asps	Northwestern University	$371,250
			Total Extramural	$51,921,169
			OPEC	$365,000
			Research Management and Support (RMS)	$799,000
			NHLBI TOTAL	***$53,085,169***

NATIONAL INSTITUTE ON AGING

Grant No	PI	Title	Institution	Funding
5R01AG008415-14	Ancoli-Israel, Sonia	Cognitive Benefits Of Treating Sleep Apnea In Dementia	University Of California San Diego	$267,213
5R01AG018760-04	Behan, Mary	Age,Gender, Serotonin And Respiratory Control	University Of Wisconsin Madison	$246,986
5R01AG020269-02	Bliwise, Donald	Biomarkers Of Aging In The Bay Area Sleep Cohort	Emory University	$271,699
5K24AG000972-05	Buysse, Daniel	Rational Pharmacotherapy Of Primary Insomnia	University of Pittsburgh at Pittsburgh	$105,516
5R01AG021020-02	Cheng, Zixi	Aging, Episodic Hypoxia, And Vagal Cardiac Projections.	University of Louisville	$356,273
1R03AG02329-701	Cheng, Zixi	Aging, Hypoxia, And Sympathetic Cardiac Projections	University of Louisville	$73,250
5R01AG019186-04	Cole, Philip	Serotonin N Acetyltransferase Mechanism And Inhibition	Johns Hopkins University	$163,500
3P01AG00997510-S1	Czeisler, Charles	Sleep, Aging And Circadian Rhythm Disorders	Brigham And Women's Hospital	$91,476
5F32AG022741-02	Davidson, Alec	Circadian Organization In The Aged Rodent	University of Virginia Charlottesville	$48,928
1R01AG02450-01	Drummond, Sean	Sleep Deprivation And Brain Function In Older Adults	University Of California San Diego	$250,497
5R01AG013418-08	Duncan, Marilyn	Neural Mechanisms Resetting The Aged Circadian Pacemaker	University of Kentucky	$279,870
5R01AG020287-03	Earley, Christopher	Response To Iron Treatment For Restless Leg Syndrome	Johns Hopkins University	$498,047
5R01AG005394-20	Ensrud, Kristine	Study Of Osteoporotic Fractures	University Of Minnesota Twin Cities	$144,336
1Z01AG000666-04	Francomano, Clair A.	Hereditary Disorders Of Connective Tissue--Clinical And Molecular Studies		$263,876
5P01AG014359-08	Gambetti, Pierluigi	Pathogenetic Mechanisms Of Prion Diseases	Case Western Reserve University	$194,887
5R01AG019361-03	Gold, Ellen	Sleep During The Peri-Menopause In A Multi-Ethnic Cohort	University of California Davis	$224,564
5K23AG001021-05	Gooneratne, Nalaka	Role Of Melatonin In Secondary Insomnia In The Elderly	University of Pennsylvania	$131,678
5R01AG019362-03	Hall, Martica	Sleep During The Perimenopause In A Multi-Ethnic Cohort	University of Pittsburgh at Pittsburgh	$515,515
5R01AG020654-02	Harper, David	Sleep, Circadian Rhythms And Dementing Illnesses	McLean Hospital (Belmont MA)	$341,408
5K01AG022782-02	Hsueh, Wen-Chi	Diurnal Preference In Amish Families	University of California San Francisco	$140,343

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
5R01AG020584-02	Kilduff, Thomas	Sleep, Aging, And The Hypocretin/Orexin System	SRI International	$481,355
3R01AG02101001-A1S1	King, Abby	Combining Exercise And Diet In Older Adults	Stanford University	$70,484
5R01AG021010-02	King, Abby	Combining Exercise And Diet In Older Adults	Stanford University	$73,020
5R01AG021010-02	King, Abby	Combining Exercise And Diet In Older Adults	Stanford University	$357,803
5R01AG019363-03	Kravitz, Howard	Sleep During The Perimenopause In A Multi-Ethnic Cohort	Harvard University	$228,375
5R01AG012364-10	Kripke, Daniel	Illumination In Human Aging: Sleep And Mood Effects	University of California San Diego	$328,311
7R01AG020912-02	Lee, Cheng	Genetic Defects Of The Mammalian Circadian Clock And Pre	Baylor College of Medicine	$333,561
5R01AG021826-03	Lewy, Alfred	Melatonin Entrainment Of Elderly Blind Free-Runners	Oregon Health & Science University	$302,878
3R01AG020082-03S1	Moe, Karen	Progesterone And Sleep In Older Women	University of Washington	$63,125
5R01AG013396-08	Monk, Timothy	Phase Shift Tolerance In Older People	University of Pittsburgh at Pittsburgh	$243,311
5P01AG020677-02	Monk, Timothy	Aging Well, Sleeping Efficiently: Intervention Studies	University of Pittsburgh at Pittsburgh	$1,649,021
5P01AG017628-04	Pack, Allan	The Mechanisms Of Alterations In Sleep With Age	University of Pennsylvania	$884,721
5R01AG018299-04	Rudy, Thomas	Chronic Pain In The 65+: Evaluating Functional Impacts	University of Pittsburgh at Pittsburgh	$244,769
5R01AG023977-02	Sanders, Mark	Osa And Metabolic Syndrome: Role Of Oxidative Stress	University of Pittsburgh at Pittsburgh	$371,250
1R01AG022005-01A1	Sastry, Narayan	Socioeconomic And Ethnic Disparities In Adult Health	RAND Corporation	$501,911
1R01AG01933901A2	Schwartz, Robert	Testosterone Supplementation And Exercise In Elderly Men	Baylor College of Medicine	$338,311
3R01AG019339-01A2S1	Schwartz, Robert	Testosterone Supplementation And Exercise In Elderly Men	Baylor College of Medicine	$770
1R01AG021134-01A2	Sheikh, Javaid	Light Treatment For Sleep/Wake Disturbances Ad		$313,700
5R01AG019360-03	Sowers, Maryfran	Sleep During The Perimenopause In A Multi-Ethnic Cohort	University of Michigan	$395,934
5P01AG018784-04	Spiegel, David	Stress, The Hpa And Health In Aging	Stanford University	$363,502
5R01AG022070-02	Tsang, Teresa	Diastolic Dysfunction & Atrial Fibrillation In Elderly	Mayo Clinic Rochester	$349,091
5R01AG019914-04	Urbanski, Henryk	Effect Of Aging And Caloric Restriction On Circadian Ph*	Oregon Health & Science University	$259,289
5P01AG011412-09	Van Cauter, Eve	Alterations Of Circadian Timing In Sleep And Aging	University of Chicago	$2,046,975
5R01AG020082-03	Vitiello, Michael	Progesterone And Sleep In Older Women	University of Washington	$284,069
1R21AG024288-01	Weiner, Debra	Osteopuncture For Oa-Associated Knee Pain & Disability	University of Pittsburgh at Pittsburgh	$222,750
5R37AG002224-24	Wise, Phyllis	Neuroendocrine And Neurochemical Function During Aging	University of California Davis	$297,000
1R03AG024621-01	Wright, Kenneth	Aging, Hpnotics, Sleep Inertia And The Risk Of Falling	University Of Colorado At Boulder	$58,012
5R01AG014124-08	Young, Theresa	Menopause And Midlife Aging Effects On Sleep Disorders	University Of Wisconsin Madison	$369,964
5R01AG017636-03	Zhdanova, Irina	Melatonin And Aging In Non-Human Primates	Boston University	$449,228
			NIA TOTAL	***$16,492,352***

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

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	$118,186
1R21AA14408	Arnedt, J Todd	CBT for Insomnia in Patients with Alcohol Dependence	Brown University	$144,426
5R01AA13252	Carskadon, Mary	Alcohol, Sleep, and Circadian Rhythms in Young Humans	Emma Pendleton Bradley Hospital	$837,157
5R01AA14211	Colrain, Ian	Alcoholism: Sleep and the Brain	SRI International	$470,331
5R01AA12504	Dahl, Ronald E	Sleep/Arousal in Adolescence: Pathways to Alcohol Abuse	University of Pittsburgh	$261,315
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	$370,400
5R01AA13243	Friedmann, Peter	Trazadone for Sleep Disturbance -Early Alcohol Recovery	Rhode Island Hospital	$403,088
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	$410,053
5R01AA13239	Irwin, Michael	Alcoholism: Sleep and Cytokines in African Americans	University of California-Los Angeles	$381,250
5U01AA15035	Jacobson, Sandra W	FAS, SIDS, and Stillbirths in Cape Town South Africa	Wayne State University	$353,299
5R01AA13253	Roehrs, Timothy A	Insomnia as a Path to Alcohol Abuse	Case Western Reserve-Henry Ford Hosp.	$321,750
1R21AA13893	Rosenwasser, Alan	Chronobiology of Alcohol: Animal Models	University of Maine Orono	$132,379
5R01AA13248	Simasko, Steven M	Mechanisms of Alcohol Effects on Sleep	Washington State University	$293,600
			NIAAA TOTAL	***$4,857,234***

NATIONAL INSTITUTE OF ARTHRITIS & MUSCULOSKELETAL & SKIN DISEASES

Grant No	PI	Title	Institution	Funding
5R01AR35582-20	Cauley Jane A.	Study Of Osteoporotic Fractures	University of Pittsburgh	$26,009
5R01AR35583-20	Hillier Teresa A	Study Of Osteoporotic Fractures	Kaiser Foundation Research Institute	$41,055
5R01AR35584-20	Hochberg Marc C.	Study Of Osteoporotic Fractures	University of Maryland	$27,557
5R01AR49840-02	Nicassio Perry M	Behavioral Treatments For Rheumatoid Arthritis	University of California Los Angeles	$36,092
5R01AR46303-06	Okifuji Akiko	Sex Hormones, Stress, And Pain In Fibromyalgia	University of Utah	$30,320
			NIAMS TOTAL	***$161,033***

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

NATIONAL INSTITUTE OF CHILD HEALTH AND HUMAN DEVELOPMENT

Grant No	PI	Title	Institution	Funding
1 R01HD046855-01	Als, Heidelise	Preterm Fetal Growth Restriction And Developmental Care	Children's Hospital (Boston)	$479,176
5 R01HD042707-02	Bartlett,Donald	The Upper Airway And The Sudden Infant Death Syndrome	Dartmouth College	$355,500
1 N01HD000163-000	Brackett,Thomas	Infant Mortality - Back To Sleep	Iq Solutions	$738,436
5 R01NR008381-03	Carskadon,Mary A	Phase Preference, Sleepiness, And Adolescent Development	Emma Pendleton Bradley Hospital	$100,000
5 U10HD029067-10	Corwin,Michael J	Event Recordings Of High Risk Infants On Apnea Monitors	Boston University Medical Campus	$533,354
5 P01HD036379-07	Darnall,Robert A	Animal Physiology Core	Children's Hospital (Boston)	$226,204
5 P01HD036379-07	Darnall,Robert A	Sleep, Thermoregulation And Cardiorespiratory Stability	Children's Hospital (Boston)	$175,534
1 R01HD045653-01	Darnall,Robert A	Spontaneous Arousals In "Chime" Infants At Risk For SIDS	Dartmouth College	$422,009
5 P01HD036379-07	Dymecki,Susan M	Genetic Modeling Of Medullary Serotonergic Development	Children's Hospital (Boston)	$231,633
5 R03HD042042-02	Kennedy,Craig H	Sleep Architecture: Individuals With Mental Retardation	Vanderbilt University	$75,500
5 P01HD036379-07	Kinney,Hannah C	The Medullary Serotonergic System In SIDS Brainstems	Children's Hospital (Boston)	$267,825
5R37HD020991-18	Kinney,Hannah C	Brainstem Maturation In The Sudden Infant Death Syndrome	Children's Hospital (Boston)	$284,400
1K02HD045459-01	Klerman,Elizabeth B	Impact Of Sleep Disruption On Menstrual Cycle Dynamics	Brigham And Women's Hospital	$108,540
5R01HD040291-03	Klerman,Elizabeth B	Impact Of Sleep Disruption On Menstrual Cycle Dynamics	Brigham And Women's Hospital	$216,975
5R01HD036520-08	Krueger,James M	Mechanisms Of Sleep Responses To Viral Infections	Washington State University	$326,250
1R01HD042639-01A2	Lasky,Robert E	Effects Of Noise On Newborns < 1000g Birthweight	University Of Texas Hlth Sci Ctr Houston	$310,118
5K24HD001476-04	Legro,Richard S.	Insulin Resistance In Pcos--Sequelae And Treatment	Pennsylvania State Univ Hershey Med Ctr	$135,027
5R01HD042125-03	Lewy,Alfred J	Melatonin Studies Of Totally Blind Children	Oregon Health & Science University	$338,924
1Z01HD009998-03	Mc Grath,John	Back To Sleep Campaign	Nichd	$720,525
5P01HD036379-07	Nattie,Eugene E	The Medullary Serotonergic System & Respiratory Control	Children's Hospital (Boston)	$260,587
5P01HD036379-07	Niblock,Mary M	Anatomy Core	Children's Hospital (Boston)	$228,013
5K23HD041465-03	Pien,Grace W	Longitudinal Study--Sleep-Disordered Breathing/Pregnancy	University Of Pennsylvania	$130,194
5P01HD036379-07	Richerson,George B	Cellular Mechanisms Of Medullary Serotonergic Neurons	Children's Hospital (Boston)	$211,727
5F32HD042395-03	Row, Barry W	Stress & Memory Following Postnatal Intermittent Hypoxia	University Of Louisville	$47,296
5P01HD013063-25	Sahni,Rakesh	Response To Nutrient And Oxygen Supply	Columbia University Health Sciences	$238,441
2R01HD010993-28	Thach,Bradley T	Control Of Breathing In Recovery From Apnea	Washington University	$344,250
			NICHD TOTAL	***$7,506,348***

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

NATIONAL CENTER FOR COMPLEMENTARY AND ALTERNATIVE MEDICINE

Grant No	PI	Title	Institution	Funding
R01AT000611-05	Bliwise, Donald	Polysomnographic Assessment Of Alternative Treatment	Emory University	$177,591
R01AT001521-02	Gooneratne, Nalaka	Melatonin Randomized Trial In Insomnia In The Elderly	University Of Pennsylvania	$370,061
K01AT000066-05	Khalsa, Sat	Yoga As A Treatment For Insomnia	Brigham And Women's Hospital	$133,920
R01AT002490-01	Khalsa, Sat	Neuroendocrine Mechanisms In Yoga Treatment Of Insomnia	Brigham And Women's Hospital	$165,810
R21AT002108-01	Landis, Carol	Valerian For Sleep Disturbance In Healthy Older Adults	University Of Washington	$189,500
R13MH071229-01	Maywood, Elizabeth	2004 Pineal Cell Biology Gordon Research Conference	Gordon Research Conferences	$2,000
R21AT002209-01	Nakamura, Yoshio	Utah Center For Exploring Mind-Body Interactions (Ucemb*	University Of Utah	$0
F31AT002423-01	Overk, Cassia	Potential Sedative Mechanism For Humulus Lupulus L.	University Of Illinois At Chicago	$23,522
			NCCAM TOTAL	***$1,062,404***

NATIONAL INSTITUTE ON DRUG ABUSE

Grant No	PI	Title	Institution	Funding
5 R21DA17122-02	Bolla, Karen I.	Sleep Disturbance in Marijuana Withdrawal	Johns Hopkins University	$125,000
5 R03DA16289-02	Donny, Eric C	Effects of Chronic Exposure to Smoking Stimuli	Johns Hopkins University	$20,438
5 R01DA16542-02	Dorsey, Cynthia M	Neurochemical Substrates of Sleep Homeostasis	Mc Lean Hospital (Belmont, Ma)	$395,000
5 R01DA08105-11	Foltin, Richard W	Laboratory Analysis of Cocaine Abstinence	Columbia University	$110,068
5 R01DA14725-03	Freudenberg, Nicholas	Impact/HIV Intervention/Adolescent Males Leaving Jail	Hunter College	$150,546
5 R01DA03889-21	Griffiths, Roland R	Experimental Analysis of Novel Drugs of Abuse	Johns Hopkins University	$111,693
2 R01DA03476-19A2	Hart, Carl L	Drug Effects on Behavior: Workplace Implications	New York State Psychiatric Institute	$241,977
5 F31DA15272-03	Herin, David V	Role of 5-HT2A Receptors in MDMA induced Behavior	University Of Texas	$7,073
5 R01DA16541-03	Irwin, Michael R	Cocaine Dependence: EEG Sleep and Cytokines	University Of California San Diego	$381,250
5 R01DA14931-02	Kuhn, Cynthia M.	GHB Tolerance and Dependence	Duke University	$134,750
5 R01DA16368-02	Malcolm, Robert J	CBT and Modafinil for Cocaine Addiction	U.S. PHS Public Advisory Groups	$101,826
5 R01DA16563-02	McCann, Una D	Sleep and Nocturnal Endocrine Function in MDMA User	Johns Hopkins University	$402,672
1 F31DA17406-01	Passetti, Lora L	12-Step Participation After Adolescent Treatment	University Of Illinois Urbana-Champaign	$0
5 R01DA05938-11	Ricaurte, George A.	MDMA Neurotoxicity in Humans: Occurence & Consequences	Johns Hopkins University	$202,913
1 R01DA17355-01A1	Roehrs, Timothy A	Abuse Liability Associated with Chronic Hypnotic Use	Henry Ford Health System	$351,334
5 R01DA14910-04	Singer, Lynn T	Developmental Outcomes of Prenatal Exposure to MDMA ('E*	Case Western Reserve University	$0

Grant No	PI	Title	Institution	Funding
1 R01DA16427-01A1	Swan, Gary E	Impact of Smoking Cessation on Sleep	SRI International	$389,140
			NIDA TOTAL	***$3,125,680***

NATIONAL INSTITUTE OF MENTAL HEALTH

Grant No	PI	Title	Institution	Funding
5R01MH058789-06	Albers, Elliot H	Photic Entrainment Of Circadian Behaviors	Georgia State University	$291,000
5R01MH062641-04	Albers, Elliot H	Neurobiology Of Social Behavior	Georgia State University	$250,250
1R21MH071414-01	Alexander, Gerianne M	Biosocial Activation Of Sex-Linked Cognitive Behavior	Texas A&M University System	$172,781
5T32MH019132-14	Alexopoulos, George S.	Research Training In Geriatric Mood Disorders	Weill Medical College Of Cornell Univ	$227,374
5R01MH067870-02	Allada, Ravi	Function Of Casein Kinase 2 In The Circadian Clock	Northwestern University	$350,460
1R01MH070922-01	Allen, Charles	Calcium Signaling In Suprachiasmatic Nucleus Neurons	Oregon Health & Science University	$271,350
1R01MH068232-01A1	Anders, Thomas F.	Sleep Disorders In Children With Autism	University Of California Davis	$347,479
3R01MH068232-01A1S1	Anders, Thomas F.	Sleep Disorders In Children With Autism	University Of California Davis	$40,591
5K08MH001844-06	Anderson, Matthew P	Ca Channels In Thalamic & Hippocampal Rhythmic Activity	Beth Israel Deaconess Medical Center	$158,288
5R01MH061515-04	Armitage, Roseanna	Sex Differences In Sleep Regulation In Depression	University Of Michigan At Ann Arbor	$430,504
1F31MH073302-01	Aton, Sara J	Roles Of Gaba And Vip In The Suprachiasmatic Nucleus	Washington University	$28,111
2R37MH045361-17	Baghdoyan, Helen A	Cholinergic Mechanisms Of REM Sleep Generation	University Of Michigan At Ann Arbor	$331,778
1Z01MH002767-07	Baler, Ruben David	Circadian System: Temporal And Spatial Gene Expression		$502,616
5R01MH049741-13	Barlow, Robert B	Computational Models Of Retinal And Brain Function	Upstate Medical University	$223,359
1R01MH071874-01	Benca, Ruth M	An Animal Model Of Mania	University Of Wisconsin Madison	$444,262
5R01MH062359-04	Berridge, Craig W	Neurobiology Of Orexin/Hypocretin-Induced Arousal	University Of Wisconsin Madison	$218,250
5R01MH062599-03	Black, John L	Hypocretin System Immune Diathesis In Human Narcolepsy	Mayo Clinic Coll Of Medicine, Rochester	$295,048
5K02MH066424-03	Blumberg, Mark S	Homeostasis And Behavioral State Organization In Infants	University Of Iowa	$110,895
5R01MH053032-10	Brenowitz, Eliot A	Comparative Studies Of Vocal Control	University Of Washington	$294,071
5K02MH066939-02	Brenowitz, Eliot A	Plasticity Of Vocal Control	University Of Washington	$117,904
5F31MH067318-03	Broome, Bede M	Characteristics Of Sleep	California Institute Of Technology	$37,883
5R01MH067094-02	Brown, Ronald Lane	Generation Of Retinal Signals For Circadian Entrainment	Oregon Health & Science University	$293,591
5R01MH064867-07	Bucan, Maja	Genetics Of Rest:Activity Behavior In The Mouse	University Of Pennsylvania	$351,456
5F30MH012351-04	Buchanan, Gordon F	Cholinergic Influence On Circadian Function	University Of Illinois Urbana-Champaign	$37,273
1F31MH073374-01	Butcher, Gregory Q	Erk/Mapk Signaling And Circadian Clock Entrainment	Ohio State University	$31,902
5R01MH024652-29	Buysse, Daniel J	Psychobiology And Treatment Response In Primary Insomnia	University Of Pittsburgh At Pittsburgh	$578,280
5R01MH069743-02	Cahill, Gregory M.	Genetic Analysis Of Zebrafish Circadian Rhythmicity	University Of Houston	$317,419

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
5R03MH067196-02	Caldwell-Andrews, Alison A	Psychosocial Intervention Program For Hysterectomy	Yale University	$81,750
1F32MH071106-01A1	Cano, Georgina	Neural Circuitry In Stress-Induced Insomnia	Beth Israel Deaconess Medical Center	$50,911
5R44MH062852-03	Cantor, Hal C	Real-Time Melatonin Monitor To Diagnose Sleep Disorder	Advanced Sensor Technologies, Inc.	$458,352
5R25MH058879-07	Carskadon, Mary A	Sleep And Chronobiology Summer Research Apprenticeship	Emma Pendleton Bradley Hospital	$78,731
5R21MH067600-02	Carter, Patricia A	Development Of Caregiver Sleep Intervention	University Of Texas Austin	$182,137
5R01MH043362-15	Chase, Michael H	Brainstem Regulation Of Active Sleep And Wakefulness	Websciences International	$405,000
1R01MH069372-01A1	Chase, Michael H	CNS Sites Mediating Cognition And Mood: Impact Of Apnea	Websciences International	$382,500
5R01MH044234-15	Church, Russell M.	Temporal Discrimination Learning	Brown University	$267,063
5K08MH001642-04	Clark, Camellia P	Sleep Deprivation, Eeg, & Functional MRI In Depression	University Of California San Diego	$167,724
5F31MH065793-02	Cohen-Zion, Mairav	Sleep And Circadian Rhythms In Children With ADHD	University Of California San Diego	$16,172
5R01MH064799-03	Crystal, Jonathon D	Mechanisms Of Time Discrimination	University Of Georgia	$176,180
5R01MH045130-14	Czeisler, Charles A	Treatment Of Circadian Sleep Disorders With Bright Light	Brigham And Women's Hospital	$733,089
5K02MH001362-09	Dahl, Ronald E.	Sleep/Arousal & Affect Regulation: Puberty Development	University Of Pittsburgh At Pittsburgh	$117,225
5R24MH067346-03	Dahl, Ronald E.	Affect Regulation And Adolescent Brain Maturation	University Of Pittsburgh At Pittsburgh	$371,250
5R01MH059839-06	Datta, Subimal	Cellular And Neurochemical Mechanisms Of Rem Sleep	Boston University Medical Campus	$323,000
1R01MH068796-01A1	Davis, Frederick C.	SCN Output Signals	Northeastern University	$306,671
5R01MH058543-07	De Lecea, Luis	Neuropeptide Cortistatin And Sleep	Scripps Research Institute	$370,400
5T32MH020051-05	De Vries, Geert J	Training In Neuroendocrinology	University Of Massachusetts Amherst	$147,957
1K23MH068372-01A1	Drake, Christopher L	Predisposition Model Of Insomnia	Henry Ford Health System	$130,310
2R01MH042922-13A1	Dubocovich, Margarita L	Modulatory Role Of Melatonin On CNS Function	Northwestern University	$287,276
5R01MH063466-03	Dubocovich, Margarita L	Melatonin Receptors As Therapeutic Targets In Primates	Northwestern University	$301,480
5R01MH044651-15	Dunlap, Jay C	Identification And Analysis Of Clock Controlled Genes	Dartmouth College	$677,819
5R01MH067057-02	Edinger, Jack D	Classifying Psychiatric, Medical, And Primary Insomnias	Duke University	$467,211
1Z01MH002386-18	Eiden, Lee E	Chemical Coding Of Neurotransmission		$3,388,467
5K23MH001830-05	Epperson, Cynthia N	Neuronal Dysfunction In Premenstrual Dysphoric Disorder	Yale University	$156,400
2K02MH001435-06A1	Erskine, Mary S	Neural Changes Induced By Mating In The Female	Boston University Charles River Campus	$118,371
5R01MH062521-03	Feinberg, Irwin	Longitudinal Measurements Of Sleep Eeg In Adolescence	University Of California Davis	$451,633
1R01MH069854-01	Feng, Pingfu	Wake/Sleep Development And Depressive Substrates	Case Western Reserve University	$161,250
5F31MH070222-02	Fisher, Jill A	Informed Consent In Private Sector Mental Health Research	Rensselaer Polytechnic Institute	$42,115
2T32MH017168-21	Fluharty, Steven J	Training Program In Behavioral/Cognitive Neuroscience	University Of Pennsylvania	$219,154
5R01MH062003-04	Foa, Edna B	Relationship Between Bio. And Psych. Correlates Of PTSD	University Of Pennsylvania	$366,584
5R01MH067568-04	Frank, Marcos G	Sleep And Neural Plasticity In Developing Neocortex	University Of Pennsylvania	$277,375
1R01MH067752-01A2	Franken, Paul	Non-Circadian Role For Clock Genes In Sleep Homeostasis	Stanford University	$409,916
5R01MH063089-03	Freedman, Robert R	Sleep Disturbance In Menopause	Wayne State University	$332,310

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
2T32MH019927-11	Fritz, Gregory K	Research Training In Child Mental Health	Rhode Island Hospital (Providence, Ri)	$201,887
5F31MH067420-02	Gamble, Karen L	Photic And Nonphotic Interactions On Circadian Behavior	Georgia State University	$24,849
5F31MH067413-03	Gooley, Joshua J	Characteristics Of Retinal Cells That Contain Melanopsin	Beth Israel Deaconess Medical Center	$29,746
5R01MH059740-05	Gould, Elizabeth	Hormones, Experience And Hippocampal Neurogenesis	Princeton University	$342,295
2R01MH061461-04A1	Green, Carla B.	In Vivo Studies Of Vertebrate Circadian Clock Genes	University Of Virginia Charlottesville	$270,560
1R01MH067777-01A1	Greene, Robert W	The Role Of Adenosine In Wake/Sleep Transition	University Of Texas Sw Med Ctr/Dallas	$303,750
5F31MH070342-02	Hanlon, Erin C	Minority Predoctoral Fellowship Program	University Of Wisconsin Madison	$29,688
5R01MH060013-05	Hasselmo, Michael E	Neuromodulation And Cortical Memory Function	Boston University Charles River Campus	$254,394
5R01MH061492-05	Hasselmo, Michael E	Cholinergic Regulation Of Entorhinal Network Function	Boston University Charles River Campus	$251,230
2R01MH063104-05	Herzog, Erik	Cellular Basis Of Circadian Rhythms In Mammals	Washington University	$282,612
5T32MH018264-21	Hofer, Myron A	Research Training - Psychobiological Sciences	Columbia University Health Sciences	$264,386
5R01MH057832-07	Hooper, Scott L	Phase Maintenance: Neuron Properties To Muscle Response	Ohio University Athens	$199,859
5F32MH069035-02	Huot, Rebecca L	Maternal Depression, Child Temperament And Cortisol	Emory University	$52,678
5F30MH068087-02	Itri, Jason N	Intercellular Communication In Suprachiasmatic Nucleus	University Of California Los Angeles	$12,788
5K23MH066978-02	Joffe, Hadine	Physiology Of Estrogen's Mood Effect In Menopausal Women	Massachusetts General Hospital	$177,130
5R01MH043836-16	Johnson, Carl H	Molecular/Genetic Analysis Of Biological Clocks In Cells	Vanderbilt University	$264,250
5R44MH062886-03	Johnson, David A	Integrated Low-Cost Eeg/Emg Recording System For Mice	Pinnacle Technology, Inc.	$350,543
5R01MH061385-05	Johnson, Eric O	Epidemiology Of Insomnia & Mental Illness In Adolescence	Henry Ford Health System	$125,461
5R01MH060119-05	Jones, Barbara E	Role Of Basal Forebrain Neurons In Sleep-Wake States	Mc Gill University	$121,500
5R01MH045923-15	Kandel, Eric R	Molecular Biological Approaches: Ltp In The Hippocampus	Columbia University Health Sciences	$298,375
5R01MH051573-11	Kay, Steve A	Cell Biology Of Circadian Signaling Mechanisms	Scripps Research Institute	$469,250
5K02MH001180-09	Keshavan, Matcheri S.	Brain Maturation And Vulnerability To Schizophrenia	University Of Pittsburgh At Pittsburgh	$117,223
2R01MH061755-06	Kilduff, Thomas S	Neurobiological Studies Of A Novel Hypothalamic Peptide	Sri International	$444,232
5R01MH062525-06	Kocsis, Bernat	Cooperation Among Subcortical Networks Underlying Memory	Beth Israel Deaconess Medical Center	$241,605
1R01MH068545-01A1	Kripke, Daniel F	Light Stimulation Of Luteinizing Hormone	University Of California San Diego	$1
5P30MH030915-27	Kupfer, David J	Mhirc For The Study Of Mood And Anxiety Disorders	University Of Pittsburgh At Pittsburgh	$2,429,730
1R01MH074358-01	Lee, Kathryn A	Biomarkers Of Insomnia And Fatigue In HIV/Aids	University Of California San Francisco	$528,731
1R03MH069518-01A1	Lee, Theresa M	Stress And Circadian Rhythms	University Of Michigan At Ann Arbor	$75,804
5K01MH001958-04	Lewin, Daniel S	Psychological Sequelae Of Disturbed Sleep In Pediatrics	Children's Research Institute	$137,794
5R01MH056874-07	Lewy, Alfred J	Melatonin For Circadian Sleep Disorders In The Blind	Oregon Health & Science University	$339,750
2T32MH019929-11	Lisman, John E	Neuroscience: From Channels To Behavior	Brandeis University	$218,760
5K08MH002012-04	Lopez, Faustino	Sleep Deprivation And 5-Ht Autoregulatory Processes	University Of California Los Angeles	$155,883
1F31MH071093-01	Luo, Alice H	The SCN And Circadian Activity In The Vta	University Of Pennsylvania	$41,109
1R21MH066131-01A2	Manber, Rachel	Antidepressant & CBT For Insomnia To Depression Outcome	Stanford University	$180,000

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
1Z01MH002820-02	Manji, Husseini K	Antiglucocorticoid Therapy In Bipolar Depression With Mi		$221,989
5R37MH046742-15	Marder, Eve E	Intrinsic Plasticity In Oscillatory Neural Networks	Brandeis University	$316,345
5R01MH068028-03	Margoliash, Daniel	Temporal Patterns In Sleep Mechanisms Of Learning	University Of Chicago	$255,998
5R01MH057434-05	Marks, Gerald A	Brainstem Mechanisms Of REM Sleep	University Of Texas Sw Med Ctr/Dallas	$283,500
1R13MH071229-01	Maywood, Elizabeth S	2004 Pineal Cell Biology Gordon Research Conference	Gordon Research Conferences	$15,000
5R37MH039683-21	Mc Carley, Robert W.	Synaptic Basis Of Sleep Cycle Control	Harvard University (Medical School)	$455,748
5R01MH062522-04	Mc Carley, Robert W.	Orexin And The Control Of Sleep And Wakefulness	Harvard University (Medical School)	$217,586
5R01MH047480-13	Mcginty, Dennis J	Sleep Control By Thermosensitive Neurons	University Of California Los Angeles	$220,500
1F32MH070156-01A1	Mckenna, James T	Hypoxia-Induced Apoptosis In A Model Of Sleep Apnea	Harvard University (Medical School)	$47,296
5R01MH063341-05	Mcmahon, Douglas G	Molecular Physiology Of Circadian Pacemaking	Vanderbilt University	$294,786
5R37MH046823-14	Mcnaughton, Bruce L	Hebb Marr Networks The Hippocampus And Spatial Memory	University Of Arizona	$340,875
7R01MH054006-08	Mellman, Thomas A.	Rem Sleep & Memory Processing During Development Of PTSD	Howard University	$287,456
5R01MH056647-08	Menaker, Michael	Circadian Oscillators In Cultured Mammalian Tissue	University Of Virginia Charlottesville	$259,000
1R01MH073435-01	Mignot, Emmanuel J	Role Of Hypocretin In Metabolic Effects Of Sleep Loss	Stanford University	$318,078
1R03MH071350-01	Mileykovskiy, Boris Y	Identification Of Hypocretin (Orexin) Cells In Vivo	University Of California Los Angeles	$63,000
5R01MH060413-04	Morin, Charles M	Behavioral And Pharmacological Treatment For Insomnia	Laval University	$225,000
5R01MH064471-03	Morin, Lawrence P	Intrinsic Anatomy Of The Circadian Rhythm System	State University New York Stony Brook	$150,500
1Z01MH002825-02	Morozov, Alexei Y	Role Of Rhythmic Oscillations In Neuronal Plasticity		$460,731
5R01MH060641-05	Mullington, Janet M	Chronic Sleep Restriction & Human Host Response	Beth Israel Deaconess Medical Center	$288,694
3R15MH060122-02S1	Nelson, Dwight E	Photic Sensitivity Of The Circadian Entrainment Pathway	University Of St. Thomas	$16,264
5R01MH057535-14	Nelson, Randy J	Environment, Behavior, And Reproduction In Rodents	Ohio State University	$295,000
5R01MH066144-02	Nelson, Randy J	Photoperiod, Melatonin, And Sickness Behaviors	Ohio State University	$290,752
5P50MH066172-03	Nestler, Eric J	Neural Substrates /Appetitive Behavior /Mood /Motivation	University Of Texas Sw Med Ctr/Dallas	$1,874,755
5R01MH061566-04	Nofzinger, Eric A.	Sleep-Guided Pet Studies In Depression	University Of Pittsburgh At Pittsburgh	$335,250
5K24MH066227-03	Nofzinger, Eric A.	Sleep Imaging Studies In Depression	University Of Pittsburgh At Pittsburgh	$102,243
5R01MH018343-34	Nottebohm, Fernando	The Biology Of Neuronal Replacement	Rockefeller University	$426,181
5R01MH062335-03	Obrietan, Karl H	Mapk Signaling And Circadian Timing	Ohio State University	$258,125
5R01MH064843-04	Opp, Mark R	Cytokine Neurotransmitter Interactions And Sleep	University Of Michigan At Ann Arbor	$290,340
1R01MH069836-01A1	Page, Terry L.	Circadian Rhythms In Olfaction And Sensory Reception	Vanderbilt University	$192,375
5R01MH066197-03	Park, Jae H	Transcriptional Regulation Of Pdf In Drosophila	University Of Tennessee Knoxville	$215,700
5R01MH063462-03	Parry, Barbara L	Probing Premenstrual Dysphoric Disorder With Light	University Of California San Diego	$377,339
5R01MH059919-05	Parry, Barbara L	Menopausal Depression: Chronobiologic Basis	University Of California San Diego	$675,092
1R21MH067184-01A2	Perlis, Michael L	Is Insomnia A Modifiable Risk Factor For MDD?	University Of Rochester	$283,500
5R01MH062296-04	Pickard, Gary E	Retinal Neurons Afferent To The Circadian System	Colorado State University-Fort Collins	$326,250

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
5R01MH060670-05	Poe, Gina R	REM Sleep And Memory	University Of Michigan At Ann Arbor	$209,196
5K23MH065434-03	Press, Daniel Z.	Imaging Procedural+Working Memory In Parkinson's Disease	Beth Israel Deaconess Medical Center	$133,920
2R01MH056895-07A1	Price, Jeffrey L	Novel Circadian Mutant Of Drosophila	University Of Missouri Columbia	$259,947
5R01MH062405-04	Provencio, Ignacio	Photic Regulation Of Circadian Rhythms	Henry M. Jackson Fdn For The Adv Mil/Med	$259,350
1R01MH068391-01A1	Rao, Uma	Treatment Prediction In Adolescent And Adult Depression	University Of Texas Sw Med Ctr/Dallas	$351,000
5R01MH062490-04	Rea, Michael A.	Neurochemical Regulation Of Circadian Timing	University Of Houston	$242,971
5T32MH016804-24	Reynolds, Charles F	Clinical Research Training In Psychiatry	University Of Pittsburgh At Pittsburgh	$254,919
5R01MH063968-04	Richardson, Gary S	Autonomic Dysregulation In Primary Insomnia	Henry Ford Health System	$321,750
5R01MH068596-02	Rich-Edwards, Janet W	Predictors Of Antenatal And Postpartum Depression	Harvard Pilgrim Health Care, Inc.	$306,996
1R34MH070805-01	Ritterband, Lee M	Internet Insomnia Intervention: Development/Feasibility	University Of Virginia Charlottesville	$205,200
5R01MH065606-03	Roberts, Robert E.	Epidemiology Of Disturbed Sleep Among Adolescents	University Of Texas Hlth Sci Ctr Houston	$811,147
1Z01MH002765-08	Rubinow, David	Reproductive Endocrine Related Mood Disorders--Different		$628,270
5R01MH060385-05	Ruby, Norman F	Circadian Rhythm Entrainment	Stanford University	$197,479
5P01MH041712-18	Ryan, Neal D.	Neurobehavioral Changes In Pediatric Affective Disorder	University Of Pittsburgh At Pittsburgh	$1,400,832
5K23MH001828-03	Salomon, Ronald M	Dynamic Measures Of Neurochemistry In Mood Disorders	Vanderbilt University	$170,098
5R01MH064827-04	Sanford, Larry D	Limbic Modulation Of Arousal And Alerting	Eastern Virginia Medical School	$236,075
1R03MH069952-01	Savitz, Adam J.	Treatment Of Sleep Apnea In Patients With Schizophrenia	Weill Medical College Of Cornell Univ	$71,500
5R01MH062589-04	Scammell, Thomas E	Circadian And Aminergic Regulation Of Orexin Neurons	Beth Israel Deaconess Medical Center	$372,865
3R01MH062589-03S1	Scammell, Thomas E	Circadian And Aminergic Regulation Of Orexin Neurons	Beth Israel Deaconess Medical Center	$61,380
1F31MH070087-01A1	Schwartz, Michael D	Neural Substrates Of Diurnality	Michigan State University	$34,654
2T32MH020002-06	Sejnowski, Terrence J	Training Grant In Cognitive Neuroscience	University Of California San Diego	$284,579
5R01MH064724-02	Sheikh, Javaid I	Sleep In PTSD/Panic: A Multimodal Naturalistic Study	Stanford University	$243,750
5R01MH055772-07	Shiromani, Priyattam J	Hypothalamic Regulation Of Sleep	Harvard University (Medical School)	$231,875
5R01MH064109-04	Siegel, Jerome M	Hypocretin Release In Disease States And Behavior	University Of California Los Angeles	$305,000
5R01MH053433-09	Smale, Laura None	The Psychobiology Of Rhythms In Diurnal Mammals	Michigan State University	$279,324
5R01MH066960-02	Smith, Gerald T	Mechanisms Of Variation In High Frequency Motor Rhythms	Indiana University Bloomington	$219,300
5F31MH070151-02	Stentz, Carrie L	Analysis Of Cryptochrome Photoreception.	University Of North Carolina Chapel Hill	$26,937
2R01MH048832-10A1	Stickgold, Robert A	State Dependent Aspects Of Cognition	Beth Israel Deaconess Medical Center	$366,750
5R01MH065292-02	Stickgold, Robert A	Experimental Manipulation Of Sleep Mentation And Memory	Beth Israel Deaconess Medical Center	$382,500
1R21MH067754-01A1	Stickgold, Robert A	Fmri Visualization Of The Human Brain During Sleep Onset	Beth Israel Deaconess Medical Center	$170,000
5R01MH063323-03	Szymusiak, Ronald	Median Preoptic Nucleus And The Control Of Sleep	Sepulveda Research Corporation	$177,150
5R01MH067122-02	Taghert, Paul H	Mechanisms Of Circadian Clock Output	Washington University	$331,530
5U01MH061915-04	Takahashi, Joseph S	Mouse Mutagenesis: Phenotype-Driven Neuroscience Screens	Northwestern University	$3,348,957
5K01MH001798-05	Thakkar, Mahesh	Electrophysiology & Pharmacology Of Sleep-Wakefulness	Harvard University (Medical School)	$133,014

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
5R01MH065135-04	Tononi, Giulio	Functional Changes Induced By Sleep Deprivation	University Of Wisconsin Madison	$254,625
1R01MH071912-01	Tsuang, Ming T.	Translational Studies Of Cycling In Bipolar Disorder	University Of California San Diego	$411,769
5T32MH018399-19	Turner, Eric E.	Fellowship In Biological Psychiatry And Neuroscience	University Of California San Diego	$324,037
5R21MH065062-04	Vazquez, Delia M	Depression Risk, Infant-Mother Attachment And Cortisol	University Of Michigan At Ann Arbor	$459,736
5R01MH064797-02	Vicini, Stefano	Cerebellar Inhibitory Synapses In Gabar Subunits Ko Mice	Georgetown University	$304,328
1R03MH069935-01A1	Walker, Matthew P	The Neural Correlates Of Sleep-Dependent Motor Learning	Beth Israel Deaconess Medical Center	$85,000
5K08MH067657-02	Welsh, David K	Circadian Clock Cells: Autonomy, Coupling, And Subtypes	University Of California San Diego	$162,520
1Z01MH002800-02	White, Benjamin H	Identifying Neural Substrates Of Behavior In Drosophila		$1,365,439
5R01MH061976-03	Wilson, Matthew Alden	Hippocampal Prefrontal Cortical Interactions In Memory	Massachusetts Institute Of Technology	$289,625
5R01MH062119-04	Wohlgemuth, William K	Combined Behavioral/Pharmacological Therapy For Insomnia	Duke University	$241,751
5R21MH065967-02	Wyatt, James K	Basic Mechanisms Of Delayed Sleep Phase Syndrome	Rush University Medical Center	$145,000
5R01MH059284-05	Yamuy, Jack	Neurotrophin Control Of Rem Sleep	University Of California Los Angeles	$152,500
5R01MH064104-04	Yehuda, Rachel	Relationship Between Bio And Psych Correlates Of PTSD	Mount Sinai School Of Medicine Of Nyu	$163,500
5R01MH050030-07	Young, Elizabeth Ann	Stress And Reproductive Hormones In Depression	University Of Michigan At Ann Arbor	$333,285
1Z01MH000422-33	Zatz, Martin	Regulation Of Circadian Rhythms		$1,591,616
5R44MH066488-03	Zemlan, Frank P	Melatonin Analog For Sleep Disorders	Phase 2 Discovery, Inc.	$463,162
5R01MH065528-02	Zhdanova, Irina V.	Melatonin, Behavior And Neuronal Activity In Zebrafish	Boston University Medical Campus	$269,172
1R01MH067753-01A2	Zhou, Qun-Yong	Prokineticin 2 And Suprachiasmatic Circadian Output	University Of California Irvine	$329,261
5R01MH061171-37	Zucker, Irving	Photoperiod, Behavior And Brain Function	University Of California Berkeley	$311,726
			NIMH TOTAL	***$59,785,326***

NATIONAL INSTITUTE OF NEUROLOGICAL DISORDERS AND STROKE

Grant No	PI	Title	Institution	Funding
1F30NS047802-01A1	Abbott, Sabra M	Cholinergic Regulation Of Sleep And Circadian Rhythms	University Of Illinois Urbana-Champaign	$70,333
9R01NS050939-05A1	Alam, Md N	Regulation Of Hypothalamic Sleep-Wake Neuronal System	Sepulveda Research Corporation	$237,901
2R01NS036607-05A2	Allen, Charles M	Cellular Electrophysiology Of The Suprachiasmatic Nuclei	Oregon Health & Science University	$314,269
5R01NS040782-04	Allen, Charles N	Presynaptic Mechanisms In The Suprachiasmatic Nucleus	Oregon Health & Science University	$440,672
5R21NS044862-02	Allen, Richard P	Hypocretin, Histamine And The Restless Legs Syndrome	Johns Hopkins University	$156,250
5T32NS044851-03	Block, Gene D	Temporal Biology Training Program	University Of Virginia Charlottesville	$165,662
5R01NS036590-07	Brainard, George C	Ocular Control Of Melatonin Regulation: Action Spectrum	Thomas Jefferson University	$320,680
5P01NS039546-05	Cassone, Vincent M	Coordination Of Circadian Physiology Of Diverse Species	Texas A&M University System	$993,837
5R01NS009999-30	Chase, Michael H	State Dependent Control Of Motorneuron Activity	Websciences International	$360,000

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
7R01NS023426-16	Chase, Michael H	Neurotransmitter Control Of Sleep And Wakefulness	Websciences International	$337,500
3R01NS043800-04S1	Cohen, Bruce N	Central Nicotinic Receptors And Epileptic Seizures	California Institute Of Technology	$18,400
5R01NS043800-04	Cohen, Bruce N	Central Nicotinic Receptors And Epileptic Seizures	California Institute Of Technology	$49,375
5R01NS043169-02	Colwell, Chris S.	Neuropeptides And The Mammalian Circadian System	University Of California Los Angeles	$360,013
5R01NS040982-04	Czeisler, Charles A	After-Effects Of Entrainment On Human Circadian Period	Brigham And Women's Hospital	$317,500
5R01NS041886-04	Czeisler, Charles A	Circadian Adaptation To Non-24-Hour Sleep-Wake Schedules	Brigham And Women's Hospital	$317,500
4R37NS021229-19	Dani, John	Cholinergic Influences Neuronal Circuit Excitability	Baylor College Of Medicine	$75,250
5R01NS034004-10	Datta, Subimal	Mechanisms Underlying The Cognitive Function Of Sleep	Boston University Medical Campus	$326,000
5R01NS047014-02	Ding, Jian M	Dysregulation Of Circadian Rhythm By HIV Protein Tat	East Carolina University	$236,906
5U54NS041069-05	Duffy, Lawrence	Alaskan Basic Neuroscience Program	University Of Alaska Fairbanks	$225,529
5R01NS042857-02	Earley, Christopher J	Dopamine And Iron In Restless Legs Syndrome	Johns Hopkins University	$516,682
2R01NS034958-09	Edery, Isaac	Clock Mechanism Underlying Drosophila Rhythmic Behavior	Rutgers The St Univ Of Nj New Brunswick	$350,565
5R01NS042088-04	Edery, Isaac	Seasonal Adaptation Of A Circadian Clock	Rutgers The St Univ Of Nj New Brunswick	$262,422
1R01NS050589-01	Eskin, Arnold	Circadian Modulation Of Long-Term Memory Formation	University Of Houston	$309,066
3T32NS007222-22S1	Feldman, Eva L	Training In Clinical And Basic Neuroscience	University Of Michigan At Ann Arbor	$5,312
5T32NS007222-23	Feldman, Eva L	Training In Clinical And Basic Neuroscience	University Of Michigan At Ann Arbor	$24,782
2R01NS012636-29A1	Fidone, Salvatore J	O2-Chemosensing By Reative Oxygen Species/Nadph Oxidase	University Of Utah	$155,573
5P01NS015655-24	Frey, Kirk A	Pet Study Of Biochemistry And Metabolism Of The CNS	University Of Michigan At Ann Arbor	$688,406
5R01NS020246-19	Garcia-Rill, Edgar E	Central Modulation Of Rhythms	University Of Arkansas Med Scis Ltl Rock	$277,400
1F31NS047875-01A1	Gerhold, Lynnette M	Neuromodulation Of Reproduction During Aging	University Of California Davis	$29,766
5R01NS022155-18	Gillette, Martha U	Physiological Substrates Of A Circadian Oscillator	University Of Illinois Urbana-Champaign	$377,316
5R01NS035859-08	Gillette, Martha U	Cholinergic Regulation Of The Circadian Clock	University Of Illinois Urbana-Champaign	$264,293
5R01NS035229-08	Glass, John D	Neurologic Regulation Of The SCN Circadian Clock	Kent State University At Kent	$324,518
5Z01NS002979-06	Goldstein, David	Clinical Neurocardiology: Catecholamine Systems In Stress And Disease		$664,382
5R01NS045791-02	Greco, Mary Ann K	Vacht Expression Across Sleep-Wakefulness	Sri International	$384,362
2T32NS007473-06	Greenberg, Michael E	Developmental Neurology	Children's Hospital (Boston)	$20,012
5Z01NS002667-20	Hallett, Mark	Physiological Analysis Of Involuntary Movements		$107,307
3U54NS039407-05S1	Haxhiu, Musa A	Neuronal And Chemical Control Of Breathing An Airways Fu	Howard University	$93,000
5R01NS045248-02	Hochman, Shawn	Dopaminergic Control Of Spinal Cord And Restless Legs	Emory University	$289,745
1R01NS046750-01A1	Holmes, Todd C	Electrical Signaling In A Circadian Pacemaker Circuit	New York University	$284,432
1R13NS047105-01	Hortobagyi, Tibor	International Symposium On Motor Control Using TMS	East Carolina University	$2,250
5R01NS045817-02	Jackson, F Rob	Role Of Andante/Ckiib In The Drosophila Circadian Clock	Tufts University Boston	$301,150
1F32NS044756-01A2	Johnson, Erik C	Drosophila Neuropeptide Gpcr Identity And Function	Washington University	$50,548
1K01NS047422-01A1	Johnson, Sheree M	Co2/H+ Modulation Of Rhythmogenic Inspiratory Neurons	Howard University	$136,242

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
5R01NS027250-17	Krueger, James M	Sleep Regulation-The Involvement Of GHRH	Washington State University	$338,075
5R01NS031453-12	Krueger, James M	Sleep Regulation And Tumor Necrosis Factor	Washington State University	$362,500
5R01NS042566-02	Lai, Yuan-Yang Y	Ventral Mesopontine Junction And Motor Activity	University Of California Los Angeles	$209,475
5R01NS027881-10	Leonard, Christopher S	Synaptic Modulation Of Mesopontine Cholinergic Neurons	New York Medical College	$297,350
5R01NS046062-03	Lindsey, Bruce G	Computational Studies Of The Respiratory Brainstem	University Of South Florida	$317,763
5R01NS045829-02	Liu, Rugao	Ros In Intermittent Hypoxia-Mediated Neuronal Cell Death	University Of Louisville	$313,322
5R01NS038523-04	Longstreth, W T	Epidemiology Of Narcolepsy	University Of Washington	$378,632
5R01NS042859-02	Louis, Elan D	Pathogenesis Of Essential Tremor: Cerebellar Metabolism	Columbia University Health Sciences	$234,560
5R21NS045086-02	Macchi, Mariana M	Sleep And Circadian Rhythms After Pineal Resection	New York State Psychiatric Institute	$186,256
5R42NS039271-03	Macchi, Mariana M	Light Visor For Treating Jet Lag: Controlled Field Trial	Bio-Brite, Inc.	$222,803
1R01NS045859-01A1	Mack, Serdia O	Hypothalamic Control Of Energy Expenditure And Breathing	Howard University	$232,579
3U54NS034194-10S1	Macleish, Peter R	Developmental Neuroscience Research Program	Morehouse School Of Medicine	$8,750
5U54NS034194-11	Macleish, Peter R	Developmental Neuroscience Research Program	Morehouse School Of Medicine	$375,000
5R01NS042698-03	Malow, Beth A	Effects Of Treating Obstructive Sleep Apnea In Epilepsy	Vanderbilt University	$586,423
5T32NS007292-19	Marder, Eve E	Neurobiology: Genes, Channels, And Behavior	Brandeis University	$94,832
5R44NS040597-03	Michalos, Antonios	Absolute Near Infrared Brain Oximeter	Iss, Inc.	$303,652
5P50NS023724-18	Mignot, Emmanuel J	Center For Narcolepsy And Related Disorder	Stanford University	$1,302,184
5R37NS033797-11	Mignot, Emmanuel J	Molecular Genetics Of Human Narcolepsy	Stanford University	$512,531
1F31NS047799-01	Miller, Brooke H	Reproductive Defects In The Clock Mutant Mouse	Northwestern University	$29,341
5R01NS022168-19	Morin, Lawrence P	Brain, Behavior And Biological Rhythms	State University New York Stony Brook	$313,228
5R01NS043239-02	Nakajima, Yasuko	Neuropharmacology Of Arousal And Sleep Disorders	University Of Illinois At Chicago	$333,172
1R01NS044199-01A1	Ohayon, Maurice M	Spectrum Of Narcolepsy In The Probands Families	Stanford University	$300,625
1F32NS049789-01	Pigeon, Wilfred R	Treatment Of Insomnia Secondary To Chronic Pain	University Of Rochester	$47,296
1K08NS048914-01	Raizen, David M	Studies Of Behavioral Quiescence In C. Elegans	University Of Pennsylvania	$174,442
1R01NS047141-01	Reppert, Steven M	Circadian Clock: Transcriptional Control	Univ Of Massachusetts Med Sch Worcester	$367,688
5R01NS039303-06	Reppert, Steven M	Circadian Clock Mechanism In The SCN	Univ Of Massachusetts Med Sch Worcester	$338,634
1R13NS049947-01	Rucker, Hubert K	4th Annual Conference Of Specialized Neurosci. Res. Prog	Meharry Medical College	$4,469
5R01NS030989-12	Rudy, Bernardo	Expression And Function Of K+ Channel Genes In Brain	New York University School Of Medicine	$41,250
5R01NS043374-03	Rye, David B	Circuitry Of Midbrain Dopamine In Sleep & Wake	Emory University	$252,700
1R01NS046605-01A1	Schwartz, William J	Neurobiology Of Circadian Dysrhythmias	Univ Of Massachusetts Med Sch Worcester	$294,150
1R13NS047173-01	Schwartzkroin, Philip A	Seizures And Autism	University Of California Davis	$7,000
5R01NS040110-04	Selverston, Allen I	Stability And Flexibility Of Oscillatory Neural Circuits	University Of California San Diego	$372,200
3R01NS031720-09S1	Shaffery, James P	Brain Maturation: Function For Rapid Eye-Movement Sleep	University Of Mississippi Medical Center	$56,536
5R01NS031720-09	Shaffery, James P	Brain Maturation: Function For Rapid Eye-Movement Sleep	University Of Mississippi Medical Center	$224,250

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
5R01NS030140-12	Shiromani, Priyattam J	Brain Mechanisms In Sleep And Narcolepsy	Harvard University (Medical School)	$275,738
5R01NS042947-02	Siegel, Jerome M	Sleep In Cetaceans	University Of California Los Angeles	$265,480
5R37NS014610-25	Siegel, Jerome M	Immunological Factors In Narcolepsy	University Of California Los Angeles	$308,861
5R01NS037919-07	Silver, Rae	Physiological Dissection Of The SCN	Barnard College	$325,964
2R44NS044626-02A1	Smith, Jack R	Time Domain Description Of Polysomnography Data	Neurotronics, Inc.	$375,000
1K23NS047168-01	Smith, Michael T	Sleep Disturbance And Pain Sensitivity In Chronic Pain	Johns Hopkins University	$151,302
1R21NS051771-01	Smith, Michael T	Sleep Deprivation And Pain Modulation	Johns Hopkins University	$191,146
5R01NS037056-07	Storm, Daniel R	Calcium And Camp Regulation Of The Circadian Clock	University Of Washington	$320,350
5F32NS045512-02	Tapper, Andrew R	Design And Analysis Of Adnfle Mutant Nachr Knock-In Mice	California Institute Of Technology	$47,296
5R01NS043459-02	Tosini, Gianluca	Photic And Circadian Regulation Of Retinal Melatonin.	Morehouse School Of Medicine	$284,000
5R01NS041454-03	Van Den Pol, Anthony N	Hypocretin Neurons	Yale University	$279,585
5R01NS040829-03	Walters, Arthur S	Study Of L-Dopa In ADHD And RLS/PLMS	Jfk Medical Center	$413,256
2R13NS042577-02	Wayne, Nancy L	Conference On Neural Control Of Behavior	University Of California Los Angeles	$2,250
5R01NS043491-03	Weitz, Charles J	Secreted SCN Factors And Circadian Locomotor Activity	Harvard University (Medical School)	$502,181
1R43NS046978-01A1	Zikov, Tatjana	Wireless EEG/PSG System With Novel Artifact Removal	Cleveland Medical Devices, Inc.	$51,119
N44NS002345	,	Evoked Potential G-Wave Detection for Sleep Anal	Abratech Corporation	$481,733
			NINDS TOTAL	***$ 24,952,037***

NATIONAL INSTITUTE OF NURSING RESEARCH

Grant No	PI	Title	Institution	Funding
1R01NR008681-01A1	Barroso, Julie V	Fatigue In HIV-Positive People	Duke University	$469,931
5R01NR004573-05	Barsevick, Andrea M	Management Of Cancer-Related Fatigue And Sleep Quality	Fox Chase Cancer Center	$591,597
5R01NR007762-03	Berger, Ann M.	Fatigue & Breast Cancer-A Behavioral Sleep Intervention	University Of Nebraska Medical Center	$312,375
5R01NR008044-02	Brandon, Debra H	Preterm Infants: Light Effects On Health And Development	Duke University	$354,200
5R01NR008032-03	Carlson, Barbara Waag	Respiratory Peridocity And Cognitive Decline In Elders	University Of North Carolina Chapel Hill	$332,581
5R01NR008381-03	Carskadon, Mary A	Phase Preference, Sleepiness, And Adolescent Development	Emma Pendleton Bradley Hospital	$248,800
5R01NR008024-02	Davis, Jean E	Exercise & Sleep: A Clinical Trial In Menopausal Women	Wayne State University	$318,874
5F31NR008830-02	Davis, Katherine F	Health Outcomes Related To Preschooler's Sleep Behaviors	Emory University	$25,329
2R01NR004281-09	Dinges, David F	Neurobehavioral Effects Of Partial Sleep Deprivation	University Of Pennsylvania	$618,945
5R01NR007677-05	Eastman, Charmane I	Reducing Jet-Lag With Practical Circadian Treatments	Rush University Medical Center	$286,000
1F31NR009341-01	Erickson, Jeanne M	Patterns Of Fatigue In Adolescents With Cancer	University Of Utah	$36,521
5R01NR008585-02	Gross, Cynthia R	Impact Of Mind-Body Interventions Post Organ Transplant	University Of Minnesota Twin Cities	$441,146

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
1F31NR008979-01	Heaton, Karen L	Performance Actigraphy And Sleep In Long-Haul Truckers	University Of Kentucky	$29,545
5R01NR004142-07	Heitkemper, Margaret M	Nursing Management Of Ibs: Improving Outcomes	University Of Washington	$606,780
5R01NR005005-04	Higgins, Patricia A	Adult Failure To Thrive In Long-Term Ventilator Patients	Case Western Reserve University	$315,735
1F31NR008471-01A1	Horgas, Patricia J	Traumatic Grief And Suicide Ideation In College Students	Johns Hopkins University	$45,917
5R01NR008238-02	Kieckhefer, Gail M	Sleep And Nocturnal Asthma In Youth	University Of Washington	$300,272
5R01NR008136-02	Landis, Carol A	Sleep In Children With Juvenile Rheumatoid Arthritis	University Of Washington	$350,644
2R01NR005345-04	Lee, Kathryn A	Sleep Disruption In New Parents: An Intervention Trial	University Of California San Francisco	$431,936
5T32NR007088-09	Lee, Kathryn A	Nursing Research Training In Symptom Management	University Of California San Francisco	$377,053
1F31NR009164-01	Marino, Jennifer L	Night-Shift Work, Clock Gene And Risk Of Endometriosis	University Of Washington	$28,688
5F31NR007850-03	Mentro, Anne M	Autonomic Influences Infant Growth Chronic Lung Disease	Ohio State University	$38,551
5T32NR007074-13	Metzger, Bonnie L	Neuroscience/Neurobehavior Nursing Research Training	University Of Michigan At Ann Arbor	$138,082
5T32HL007953-05	Pack, Allan I.	Training In Sleep And Sleep Disorders	University Of Pennsylvania	$100,000
5R01NR004340-05	Parker, Kathy P	The Effects Of Hemodialysis On The Sleep/Wake Cycle	Emory University	$451,378
5R01NR008125-03	Parker, Kathy P	Pain, Opioids, And Sleep In Cancer Patients	Emory University	$386,047
1R21NR009080-01	Perlis, Michael L	CBT For Secondary Insomnia In Chronic Pain Patients	University Of Rochester	$231,978
5R01NR008022-02	Redeker, Nancy S	Sleep And Functional Performance In Heart Failure	Univ Of Med/Dent Nj Newark	$421,429
5R01NR007771-03	Richards, Kathy C	Effect Of Activities And Exercise On Sleep In Dementia	University Of Arkansas Med Scis Ltl Rock	$440,200
5F31NR008458-02	Rodway, George W	Intermittent Hypoxia: CV Impact And Biologic Markers	University Of Pittsburgh At Pittsburgh	$27,202
5R42NR004952-03	Rowe, Meredeth A	Night Alert Prompting System	Amron Corporation	$178,721
3R42NR004952-03S1	Rowe, Meredeth A	Night Alert Prompting System	Amron Corporation	$67,046
1F31NR009315-01	Sawyer, Amy M	Obstructive Sleep Apnea: African American Perceptions	University Of Pennsylvania	$39,636
5R01NR005075-04	Sidani, Souraya	Alternative Methods For Clinical Research	University Of Toronto	$381,553
5R01NR004828-05	Smith, Carol E	Rural Dwelling Older Adults: CPAP Adherence Support	University Of Kansas Medical Center	$499,998
1R03NR009038-01	Thomas, Karen A.	Testing Measures Of Maternal And Infant Circadian Rhythm	University Of Washington	$75,800
1F31NR009304-01	Valderrama, Amy L	Fatigue And Atrial Fibrillation	Emory University	$24,510
			NINR TOTAL	***$10,025,000***

OFFICE FOR RESEARCH ON WOMEN'S HEALTH

Grant No	PI	Title	Institution	Funding
5R01NR004142-07	Heitkemper, Margaret M	Nursing Management Of IBS: Improving Outcomes	University Of Washington	Refer to NINR
5R01MH059919-05	Parry, Barbara L	Menopausal Depression: Chronobiologic Basis	University Of California San Diego	Refer to NIMH

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

NATIONAL CENTER FOR RESEARCH RESOURCES

Grant No	PI	Title	Institution	Funding
5 M01RR000069-42	Accurso, Frank J	Eval. Of Sleep Efficiency In Young Cf Pts. During Hospitalization: A Pilot Study	University Of Colorado Hlth Sciences Ctr	$7,827
5 M01RR002719-19	Allen, Richard	Hypocretin, Histamine And The Restless Legs Syndrome	Johns Hopkins University	$32,043
5 M01RR000055-43	Alverdy, John	Gastric Bypass Effects On Sleep & Glucose Reg	University Of Chicago	$137,154
5 M01RR008084-11	Amin, Raouf	Effect Of Obstructive Sleep Apnea On Cardiac Function	Children's Hospital Med Ctr (Cincinnati)	$26,907
5 M01RR008084-11	Amin, Raouf	Mechanisms Mediating Cardiovascular Disease	Children's Hospital Med Ctr (Cincinnati)	$55,924
5 M01RR000827-30	Ancoli-Israel, Sonia	Cognitive Benefits Of Treating Sleep Apnea In Dementia	University Of California San Diego	$83,792
5 M01RR000240-40	Arens, Raanan	MRI Imaging Of The Upper Airway Of Children With OSAS	Children's Hospital Of Philadelphia	$2,922
3 M01RR000073-41S1	Atanasov, Strahil	Assessment Of Sleep Disorders In Brain Injured Adults	University Of Texas Medical Br Galveston	$4,306
3 M01RR000073-41S1	Atanasov, Strahil	The Effect Of Adenotonsillectomy On Behavior Of Children With Sleep Apnea	University Of Texas Medical Br Galveston	$319
2 P51RR013986-06	Ator, Nancy A	Functional Analysis Of Gabaerglc Sedative/Anxiolytics	Southwest Foundation For Biomedical Res	$5,516
2 M01RR000096-43	Ayappa, Indu	Automated Analysis Of Sleep Disordered Breathing	New York University School Of Medicine	$20,159
5 M01RR008084-11	Beebe, Dean	Obstructive Sleep Apnea Among Obese Teens And Preteens	Children's Hospital Med Ctr (Cincinnati)	$20,576
5 M01RR000048-43	Benloucif, Susan J	A Pilot Study On The Phase Shifting Response To 2-Hour Light Exposure	Northwestern University	$277,835
5 M01RR000048-43	Benloucif, Susan J	Responsiveness Of The Aging Circadian Clock To Light	Northwestern University	$190,647
5 M01RR000048-43	Benloucif, Susan J	Supplement To Responsiveness Of The Aging Circadian Clock To Light	Northwestern University	$105,409
5 M01RR000240-40	Bhandari, Anita	Sleep Disturbances In Children With Cf During Pulmonary Exacerbation	Children's Hospital Of Philadelphia	$1,461
5 M01RR010732-10	Bixler, Edward O	Sleep Disordered Breathing In Children	Pennsylvania State Univ Hershey Med Ctr	$30,250
5 M01RR002719-19	Bolla, Karen I	Sleep Disturbance In Marijuana Withdrawal	Johns Hopkins University	$7,394
5 M01RR000042-44	Brower, Kirk J	Gabapentin Treatment Of Alcohol And Sleep Problems	University Of Michigan At Ann Arbor	$7,624
5 M01RR000240-40	Brown, Lawrence	Single Dose Pharmacokinetic And Pharmacodynamic Evaluation	Children's Hospital Of Philadelphia	$8,349
2 M01RR000056-43	Buysse, Daniel J	Psychobiology And Treatment Response In Primary Insomnia	University Of Pittsburgh At Pittsburgh	$61,050
2 M01RR000056-43	Buysse, Daniel J	Brief Behavioral Treatment Of Insomnia In Primary Care	University Of Pittsburgh At Pittsburgh	$2,035
5 M01RR000032-44	Calhoun, David A	Obstructive Sleep Apnea-Induced Hyperaldosteronism	University Of Alabama At Birmingham	$4,427
5 M01RR013987-05	Carley, David W	Neurobiology Of Sleep Apnea In Aging	University Of Illinois At Chicago	$14,034
2 M01RR000037-44	Cherrier, Monique M	Testosterone Effects On Cognition In Aging And Ad: Oxygen And Sleep Quality	University Of Washington	$33,830
5 M01RR000042-44	Chervin, Ronald D	Behavioral Effects Of Obstructive Sleep Apnea In Children	University Of Michigan At Ann Arbor	$14,613
5 M01RR000044-43	Ciafaloni, Emma	Causes Of Excessive Sleepiness In Myotonic Dystrophy	University Of Rochester	$3,797
5 M01RR000827-30	Clark, Camellia P	Sleep Deprivation, Eeg And Fmri In Depression	University Of California San Diego	$75,532
5 M01RR002635-20	Cohen, Richard	Effects Of Disruptive Sleep On Hormonal And Renal Responses To Posture	Brigham And Women's Hospital	$268,172
5 M01RR010732-10	Craig, Timothy	Role Of Montelukast On Perennial Allergic Rhinitis & Associated Sleep Disturbanc	Pennsylvania State Univ Hershey Med Ctr	$9,599
5 P51RR000166-43	Crockett, Carolyn M	Predicting And Reducing Severe Behavior Disorders In Laboratory Monkeys	University Of Washington	$100,658
5 M01RR000042-44	Crofford, Leslie J	Evaluation Of Sleep Dysfunction In Fibromyalgia	University Of Michigan At Ann Arbor	$145,372

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
2 M01RR000096-43	Cronstein, Bruce N	Testing For Single Nucleotide Polymorphisms Associated With Fibromyalgia	New York University School Of Medicine	$1,778
5 M01RR002635-20	Czeisler, Charles	Homeostatic Sleep Regulation In Older People	Brigham And Women's Hospital	$177,905
5 M01RR002635-20	Czeisler, Charles	After Effects Of Entrainment On Human Circadian Period	Brigham And Women's Hospital	$177,467
5 M01RR002635-20	Czeisler, Charles	Effects Of Extended Work Hours On Interns	Brigham And Women's Hospital	$417,596
5 M01RR002635-20	Czeisler, Charles	The Efficacy And Safety Of 12 Weeks Of Provigil (Modafinil) Therapy	Brigham And Women's Hospital	$7,011
5 M01RR002635-20	Czeisler, Charles	Circadian Adaptation To Night Work In Older People	Brigham And Women's Hospital	$1,315
5 M01RR002635-20	Czeisler, Charles	Circadian Adaptation To Night Work In Young People	Brigham And Women's Hospital	$159,063
5 M01RR002635-20	Czeisler, Charles	Disrupted Sleep In The Elderly: Light Exposure Studies	Brigham And Women's Hospital	$110,862
5 M01RR000065-42	De Wit, Marjolein	Pk/Pd In Patients Randomized To Once Daily Awakening And Sedated Algorithm	Virginia Commonwealth University	$26,925
5 M01RR000827-30	Dimsdale, Joel E	Sleep Apnea And Hypertension: Role Of The Sympathetic Nervous System	University Of California San Diego	$34,816
5 M01RR000827-30	Dimsdale, Joel E	Effects Of Opioid Medications On Sleep And Fatigue	University Of California San Diego	$134,540
5 M01RR000040-44	Dinges, David F	Neurobehavioral Effects Of Partial Sleep Deprivation	University Of Pennsylvania	$211,997
5 M01RR000040-44	Dinges, David F	Countermeasures To Neurobehavioral Deficits From Sleep Loss	University Of Pennsylvania	$256,740
2 M01RR000079-41	Dodd, Marylin	Exercise: An Intervention For Fatigue In Cancer Patients	University Of California San Francisco	$25,859
5 M01RR003186-19	Dopp, John M	Effect Of Obstructive Sleep Apnea On Humoral And Cell-Mediated Vaccine Response	University Of Wisconsin Madison	$1,733
5 M01RR000827-30	Drummond, Sean Pa	Influence Of Task Difficulty On Cerebral Response Following Sleep Deprivation	University Of California San Diego	$29,505
5 M01RR000827-30	Drummond, Sean Pa	Effects Of Modafinil On Behavioral And Cerebral Responses To Sleep Deprivation	University Of California San Diego	$93,824
5 M01RR000827-30	Drummond, Sean Pa	Sleep And Medicinal Cannabis	University Of California San Diego	$26,554
5 M01RR000827-30	Drummond, Sean Pa	Cognitive Performance Following Total Sleep Deprivation	University Of California San Diego	$135,129
5 M01RR000827-30	Drummond, Sean Pa	Effects Of Total Sleep Deprivation And Recovery Sleep On Brain Function	University Of California San Diego	$60,778
5 M01RR002635-20	Duffy, Jeanne	Circadian Sleep-Wake Regulation In Older People	Brigham And Women's Hospital	$484,200
5 M01RR002719-19	Earley, Christopher J	Dopaminergic Function In Restless Legs Syndrome	Johns Hopkins University	$59,155
5 M01RR002719-19	Earley, Christopher J	Determining The Genetics Of The Restless Legs Syndrome	Johns Hopkins University	$36,151
5 M01RR002719-19	Earley, Christopher J	Iv Iron Metabolism In RLS	Johns Hopkins University	$39,437
5 M01RR000055-43	Ehrmann, David A	Sleep Apnea And Polycystic Ovary Syndrome	University Of Chicago	$6,193
5 K23RR017636-02	Emens, Jonathan S	Genetics Of Morning/Evening Types In The Blind/Sighted: Sleep	Oregon Health & Science University	$129,648
2 M01RR014288-06	Fann, Alice	Auditory Evoked Potential Study In Patients With Chronic Low Back Pain	University Of Arkansas Med Scis Ltl Rock	$6,380
5 M01RR000645-33	Fifer, William	Perinatal Assessment Of At-Risk Populations	Columbia University Health Sciences	$41,380
5 M01RR001032-29	Fogel, Robert	Tonic Activation Of The Genioglossus	Beth Israel Deaconess Medical Center	$6,731
5 M01RR001032-29	Fogel, Robert	Control Of Pharyngeal Dilator Muscle Activation	Beth Israel Deaconess Medical Center	$12,427
5 M01RR002635-20	Fogel, Robert	Ventilatory Stability In Normals And Sleep Apneics	Brigham And Women's Hospital	$6,573
5 M01RR002635-20	Fogel, Robert	Effect Of CPAP On Upper Airway Activity In Older Vs. Younger Men At Sleep Onset	Brigham And Women's Hospital	$2,629
5 P51RR000167-44	Freedman, Robert	Menopausal Hot Flashes	University Of Wisconsin Madison	$19,946
5 M01RR001070-28	George, Mark	Creating A Man-Portable Transcranial Magnetic Stimulation System	Medical University Of South Carolina	$86,166

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
5 M01RR001070-28	George, Mark	Efficacy And Safety Of A Single Dose Of The Ampakine (R) Compound, Cx516, On	Medical University Of South Carolina	$208,364
5 M01RR000047-44	Gerber, Linda	Race SES And Diurnal Blood Pressure Rhythms	Weill Medical College Of Cornell Univ	$24,779
2 M01RR000056-43	Germain, Anne	Sleep-Related Pathways Mediating Post-Traumatic Stress Disorder	University Of Pittsburgh At Pittsburgh	$7,122
5 M01RR000827-30	Gillin, J Christian	Tryptophan Free Amino Acid Drink Effect On Mood And Sleep	University Of California San Diego	$81,432
5 M01RR000042-44	Gilman, Sid	Neurochemical Basis Of Sleep Disorders In Neurodegenerative Diseases	University Of Michigan At Ann Arbor	$67,603
5 M01RR000188-40	Glaze, Daniel	Pharmacodynamic Evaluation Of Three Different Zolpidem Doses In Children	Baylor College Of Medicine	$5,111
5 M01RR000040-44	Goldberg, Lee R	Autoset Cs vs. Oxygen For The Treatment Of Cheyne-Stokes Respiration	University Of Pennsylvania	$27,698
5 M01RR000040-44	Gooneratne, Nalaka S	Role Of Melatonin In Secondary Insomnia In The Elderly	University Of Pennsylvania	$3,196
5 M01RR000533-36	Gottlieb, Daniel	Obstructive Sleep Apnea In Congestive Heart Failure	Boston University Medical Campus	$9,041
5 M01RR000533-36	Gottlieb, Daniel	Neurobehavioral Consequences Of Sleep Apnea In Children	Boston University Medical Campus	$70,164
5 K23RR016068-05	Gurubhagavatula, Indira	Compare Screening Tools For Obstructive Sleep Apnea In Hypertension Pts	University Of Pennsylvania	$129,347
5 M01RR000040-44	Gurubhagavatula, Indira	Study Of Effects Of CPAP On Hypertension	University Of Pennsylvania	$25,567
5 M01RR000052-43	Halbower, Ann	Respiratory And Arousal Patters In Normal Childhood Sleep	Johns Hopkins University	$470
5 M01RR000052-43	Halbower, Ann	Cerebral Impact Of Childhood Sleep Apnea	Johns Hopkins University	$784
5 M01RR000052-43	Halbower, Ann	Cerebral Impact Of Childhood Sleep Apnea	Johns Hopkins University	$6,111
5 M01RR001066-27	Hall, Janet E	Impact Of Sleep Disruption On Menstrual Cycle Dynamics	Massachusetts General Hospital	$11,062
5 M01RR000055-43	Hall, Jesse	The Effects Of Critical Illness On Sleep In ICU	University Of Chicago	$1,771
2 M01RR000056-43	Hall, Martica	Sleep As A Mediator Of The Stress-Health Relationship	University Of Pittsburgh At Pittsburgh	$12,719
2 M01RR000056-43	Hall, Martica	Sleep During The Perimenopause In A Multi-Ethnic Cohort	University Of Pittsburgh At Pittsburgh	$38,666
2 M01RR000056-43	Hall, Martica	Reducing Stress & Sleep Disturbances In Caregivers Of Alzheimer's Disease	University Of Pittsburgh At Pittsburgh	$3,307
5 M01RR001271-23	Harmatz, Paul	MPS II	University Of California San Francisco	$92,252
5 M01RR000052-43	Harris, James C	Correlation Of Regional Cerebral Blood Flow With REM Sleep Eye Movement …	Johns Hopkins University	$1,724
5 P41RR006009-15	Harris, Kenneth D	Computational Analysis Of Neuronal Cell Assemblies	Mellon Pitts Corporation (Mpc Corp)	$1,063
3 U54NS039407-05S2	Haxhiu, Musa A	Central Determinants Of Airway Instability During Sleep	Howard University	$8,300
3 U54NS039407-05S2	Haxhiu, Musa A	Core B: Centralized Resource For Neurotransmitter Receptors In CNS	Howard University	$8,500
1 S10RR019426-01	Helfert, Robert H	Laser Capture Microdissection (Lcm) Syst: Sleep	Southern Illinois University Carbondale	$24,895
5 M01RR000048-43	Hill, Pamela D	Milk Availability And Lactation Status In Mothers Of Preterm And Term Infants	Northwestern University	$9,110
5 M01RR013987-05	Hill, Pamela D	Milk Availability And Lactation Status In Mothers Of Preterm & Term Infants	University Of Illinois At Chicago	$585
3 P41RR013622-05S1	Hilton, Michael F	Sleep Apnea & Reduced Waking Cardiac Vagal Tone	Beth Israel Deaconess Medical Center	$9,770
5 M01RR000052-43	Hong, Charles	Functional MRI Assessment Of The Eye-Movement-Control Circuit During Rem Sleep A	Johns Hopkins University	$2,664
5 M01RR000052-43	Hong, Charles	Fmri Assessment Of Eye Movement During REM Sleep	Johns Hopkins University	$314
3 P41RR013622-05S1	Hoshiyama, Masaki	Dynamics Of Rapid Eye Movements During Sleep	Beth Israel Deaconess Medical Center	$6,514
5 M01RR000533-36	Howland, Jonathan	Hangover, Congeners, Sleep, And Occupational Performance	Boston University Medical Campus	$38,699
5 M01RR000051-43	Hoyt, Brian	Effect Of Noc. Hypoxemia On Cognitive Exec Function In Obstructive Sleep Apnea	University Of Colorado Hlth Sciences Ctr	$20,185

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
5 M01RR000847-31	Huerta, Milagros G	Evaluation Of SDB As An Independent Risk Factor For Ir In Children	University Of Virginia Charlottesville	$8,831
5 M01RR000064-40	Hunt, Steven	Mortality And Morbidity Related To Gastric Bypass Surgery	University Of Utah	$369,564
5 M01RR000865-31	Irwin, Michael	Alcoholism: Sleep And Cytokines	University Of California Los Angeles	$182,548
5 M01RR000865-31	Irwin, Michael	Cancer-Related Symptoms And Immune Activation In Breast Cancer Survivors	University Of California Los Angeles	$2,183
5 M01RR000865-31	Irwin, Michael	Cocaine Dependence: Sleep And Cytokines	University Of California Los Angeles	$76,676
3 P41RR013622-05S1	Ivanov, Plamen C H	Cardiac Dynamics During Sleep & Exercise	Beth Israel Deaconess Medical Center	$6,514
5 M01RR000334-38	Johnson, Kyle	Melatonin Levels In Sleep-Disordered Smith-Magenis Syndrome: A Pilot Study	Oregon Health & Science University	$22,000
5 P51RR000167-44	Kalin, Ned H	Primate Sleep And The Amygdala	University Of Wisconsin Madison	$1,390
2 M01RR002172-22	Katz, Eliot	Sleep-Disordered Breathing In Children With Marfan's Syndrome	Children's Hospital (Boston)	$1,117
2 M01RR002172-22	Katz, Eliot	Genioglossus Activity In Children With Sleep-Disordered Breathing	Children's Hospital (Boston)	$27,554
2 M01RR002172-22	Katz, Eliot	Influence Of Negative Airway Pressure On Upper Airway Motor Controln In	Children's Hospital (Boston)	$6,516
2 M01RR002172-22	Katz, Eliot	Pulse Transit Time & Pediatric Sleep Disordered Breathing	Children's Hospital (Boston)	$559
5 M01RR000240-40	Kelly, Andrea	Obstructive Sleep Apnea And The Metabolic Syndrome In Children	Children's Hospital Of Philadelphia	$13,497
2 M01RR000056-43	Keshavan, Matcheri	Effect Of Quetiapine On Delta Sleep Deficits In Schizophrenia	University Of Pittsburgh At Pittsburgh	$11,447
3 P41RR013622-05S1	Khalsa, Sat Bir	Effects Of Yogic Meditation On Sleep	Beth Israel Deaconess Medical Center	$6,514
5 M01RR002635-20	Khalsa, Satbir	Nonpharmacological Treatment Of Sleep Disorders	Brigham And Women's Hospital	$32,426
5 M01RR014467-04	Kinasewitz, Gary	Effect Of One Week CPAP Trt. In Obstructive Sleep Apnea In Pts. With Gerd	University Of Oklahoma Hlth Sciences Ctr	$9,758
5 M01RR002635-20	Klerman, Elizabeth	Clinical Trials Of Light Pulses On Circadian Entrainment	Brigham And Women's Hospital	$101,660
5 M01RR002635-20	Klerman, Elizabeth	Impact Of Sleep Disruption On Menstrual Cycle Dynamics	Brigham And Women's Hospital	$58,718
5 M01RR000833-30	Kline, Lawrence E	Nasal Inflammation In Obstructive Sleep Apnea Treated With Nasal CPAP	Scripps Research Institute	$58,084
5 G12RR017581-03	Koban, Michael	Act 3: Sleep Deprivation Stress & Energy Metabolism	Morgan State University	$80,081
5 M01RR000585-33	Kotagal, Suresh	Vagus Nerve Stimulation On Sleep Architecture Of Pts. With Intractable Epilepsy	Mayo Clinic Coll Of Medicine, Rochester	$2,086
2 M01RR000096-43	Krieger, Ana	A Novel Technique To Monitor Respiratory Disturbance During Sleep In Copd Pts.	New York University School Of Medicine	$10,645
5 M01RR002635-20	Kwong, Kenneth	Neuroimaging At The Transition From Sleep To Wakefulness	Brigham And Women's Hospital	$49,516
1 K23RR020049-01	Leblanc, Erin S	The Role Of Estradiol In The Menopause	Oregon Health & Science University	$130,924
3 M01RR000073-41S1	Legator, Marvin S	A Study Of Cytogenetic Tests During Therapy With Methylphenidate	University Of Texas Medical Br Galveston	$1,276
5 M01RR010732-10	Leuenberger, Urs	Effects Of Posture On Maximal Peripheral Vasodilator Capacity	Pennsylvania State Univ Hershey Med Ctr	$1,745
5 M01RR010732-10	Leuenberger, Urs	Effects Of Repetitive Hypoxic Apnea On Bp & Sympathetic Reflex Function	Pennsylvania State Univ Hershey Med Ctr	$2,327
3 M01RR013297-05S1	Lewin, Daniel	Psychological Sequelae (Effects) Of Distrubed Sleep In Pediatrics	Georgetown University	$24,203
5 M01RR000334-38	Lewy, Alfred J	Melatonin For Circadian Sleep Disorders In The Blind	Oregon Health & Science University	$610,489
5 M01RR000334-38	Lewy, Alfred J	Melatonin Studies Of Totally Blind Children	Oregon Health & Science University	$20,777
5 M01RR000334-38	Lewy, Alfred J	Melatonin Entrainment Of Elderly Blind Free-Runners	Oregon Health & Science University	$95,942
5 M01RR000059-43	Lichtor, J Lance	The Effects Of Bright Light And Caffeine On Alterness After Sedation	University Of Iowa	$58,017
5 M01RR000059-43	Lichtor, J Lance	Sedation For Colonoscopy: Sleepiness After Midazolam/Meperidine Or Propofol	University Of Iowa	$1,012

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
3 P41RR013622-05S1	Lo, Chung-Chuan	Dynamics Of Sleep Wake Transitions During Sleep	Beth Israel Deaconess Medical Center	$6,514
5 M01RR000827-30	Loredo, Jose S	Role Of Chemoreceptors In Hypertension And Sleep Apnea	University Of California San Diego	$72,581
2 M01RR000080-42	Ludington, Susan M	Preterm Skin Contact Effects Of Electrophysiologic Sleep	Case Western Reserve University	$367
5 M01RR000188-40	Lupski, James	Clinical Correlations Of Contiguous Gene Syndromes	Baylor College Of Medicine	$21,298
5 M01RR000847-31	Lyons, Debra E	Cranial Stimulation For Chemotherapy Symptoms In Breast Cancer	University Of Virginia Charlottesville	$5,520
5 M01RR000645-33	Macchi, Mariana Mila	Pinealectomy Or Pin-X	Columbia University Health Sciences	$4,166
5 P51RR000168-43	Madras, Bertha K	Non-Amine Dopamine Transport Inhibitors Retain Properties Of Amines	Harvard University (Medical School)	$14,843
5 P51RR000168-43	Madras, Bertha K	Molecular Targets Of The Anti-Narcoleptic Drug Modafinil	Harvard University (Medical School)	$14,843
5 M01RR000125-41	Malison, Robert T	Effects Of Cocaine Self Administration And Abstinence On Sleep Incognition	Yale University	$73,691
5 M01RR000095-44	Malow, Beth	Effects Of Obstructive Sleep Apnea On Epilepsy	Vanderbilt University	$550
2 M01RR006192-11	Mansoor, George	Circadian Blood Pressure Profile	University Of Connecticut Sch Of Med/Dnt	$46,039
5 K23RR015545-05	Mansoor, George A	Circadian Blood Pressure Profile: Sleep Quality & Hypertensive Organ Damage	University Of Connecticut Sch Of Med/Dnt	$127,658
5 M01RR000052-43	Marcus, Carole L	Respiratory-Related Evoked Potentials In Children With OSAS	Johns Hopkins University	$2,977
5 M01RR000052-43	Marcus, Carole L	Evaluation Of The Relationship Between Upper Airway Collapsibility And Body Size	Johns Hopkins University	$940
5 M01RR000052-43	Marcus, Carole L	Obstructive Sleep Apnea In Adults With Down Syndrome	Johns Hopkins University	$3,134
5 M01RR000052-43	Marcus, Carole L	Upper Airway Collapsibility During Rem Sleep	Johns Hopkins University	$157
5 M01RR000052-43	Marcus, Carole L	Passive Motion Ventilation In Children With Cchs	Johns Hopkins University	$314
5 M01RR000240-40	Mason, Thornton B	Periodic Limb Movements In Williams Syndrome	Children's Hospital Of Philadelphia	$30,866
5 K23RR016566-03	Mason, Thornton B Ii	Periodic Limb Movements In Williams Syndrome	Children's Hospital Of Philadelphia	$131,652
1 L30RR020489-01	Mehra, Reena	Sleep-Disordered Breathing As A Risk Factor For CVD	University Hospitals Of Cleveland	$49,379
5 M01RR013987-05	Merritt, Sharon	Pupillometric Sleepiness In Treated Sleep Disorders	University Of Illinois At Chicago	$15,204
3 P41RR013622-05S1	Mietus, Joseph E	New Techniques For Heart Rate Variability Analysis	Beth Israel Deaconess Medical Center	$9,770
5 M01RR000997-29	Mitchell, Ron	Role Of Allergy Treatment In The Management Of Children With Sleep Apnea	University Of New Mexico Albuquerque	$12,850
5 M01RR000997-29	Mitchell, Ron	Prevalence Of Sleep Disburbance In Children	University Of New Mexico Albuquerque	$101,117
2 M01RR000037-44	Moe, Karen E	Sleep In Older Women: Effects Of Estrogen	University Of Washington	$7,807
2 M01RR000037-44	Moe, Karen E	Progesterone And Sleep In Older Women	University Of Washington	$312,281
2 M01RR000056-43	Monk, Timothy	Performance & Sleep Consequences Of Repeated Phase Shifts Within Appendix K	University Of Pittsburgh At Pittsburgh	$114,470
2 M01RR000056-43	Monk, Timothy	Phase Shift Tolerance In Oder People Iii (Modafinil)	University Of Pittsburgh At Pittsburgh	$45,788
2 M01RR000056-43	Monk, Timothy	Circadian Interventions For The Recently Bereaved Elderly	University Of Pittsburgh At Pittsburgh	$4,579
3 P41RR013622-05S1	Moody, George B	Sleep Heart Health Study Polysomnography Database	Beth Israel Deaconess Medical Center	$9,770
5 M01RR001032-29	Mullington, Janet M	The Effects Of Cumulative Sleep Deficit In Human Host Response	Beth Israel Deaconess Medical Center	$405,435
5 M01RR008084-11	Nelson, Erik B	Phenomenology Of Major Depression	Children's Hospital Med Ctr (Cincinnati)	$1,056
2 M01RR000079-41	Neylan, Thomas C	Sleep And Hypothalamic Pituitary Adrenal Function In PTSD	University Of California San Francisco	$49,589
2 M01RR000056-43	Nofzinger, Eric	Sleep Guided PET Studies In Depression	University Of Pittsburgh At Pittsburgh	$12,210

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
2 M01RR000056-43	Nofzinger, Eric	Effects Of Obstructive Sleep Apnea Treatment On Brain Function	University Of Pittsburgh At Pittsburgh	$6,868
2 M01RR000056-43	Nofzinger, Eric	Neurobiology Of Sleep And Sleep Interventions In The Elderly	University Of Pittsburgh At Pittsburgh	$4,579
2 M01RR000056-43	Nofzinger, Eric	Sleep, Regional Cerebral Metabolism And Serotonin In Depression	University Of Pittsburgh At Pittsburgh	$15,263
2 M01RR000056-43	Nofzinger, Eric	The Localization Of Sleep Homeostasis	University Of Pittsburgh At Pittsburgh	$5,342
5 P41RR003655-19	Olson, Jane M	Mapping Genes For Fibromyalgia Syndrome	Case Western Reserve University	$4,447
2 M01RR000080-42	Olson, Jane M	Mapping Of Genes For Fibromyalgia Syndrome	Case Western Reserve University	$17,994
5 M01RR000585-33	Olson, Lyle J	Central Sleep Apnea Exacerbates Neurohumoral Activation In Chf	Mayo Clinic Coll Of Medicine, Rochester	$20,162
5 M01RR000040-44	Pack, Allan I	Case-Control Study Of Insomnia In Non-Depressed Elderly	University Of Pennsylvania	$32,314
5 M01RR000040-44	Pack, Allan I	Treatment For Sleep Apnea In The Elderly	University Of Pennsylvania	$44,032
5 M01RR000040-44	Pack, Allan I	Sleep Homeostasis (Drive For Sleep) In Twins	University Of Pennsylvania	$1,776
5 P41RR003655-19	Palmer, Lyle	Genetic Analyses Of Obstructive Sleep Apnea	Case Western Reserve University	$8,894
5 M01RR000827-30	Parry, Barbara L	Chronobiology Of Postpartum Depression	University Of California San Diego	$61,370
5 M01RR000827-30	Parry, Barbara L	Estradiol And Progesterone Circadian Rhythms In Postmenopause	University Of California San Diego	$12,392
5 M01RR001032-29	Pascual-Leone, Alvaro	Motor Learning In Human Subjects	Beth Israel Deaconess Medical Center	$1,036
1 L30RR020491-01	Patil, Susheel P	Neuromodulation Of Upper Airway Obstruction During Sleep	Johns Hopkins University	$77,737
5 M01RR010732-10	Paul, Ian	Eval Of Dextromethorphan & Diphenydramine On Nocturnal Cough & Sleep Quality	Pennsylvania State Univ Hershey Med Ctr	$19,779
5 M01RR000055-43	Penev, Plamen	Sleep And Testosterone Decline In Older Men	University Of Chicago	$45,128
5 M01RR000055-43	Penev, Plamen	Role Of Sleep Duration In Metabolic Aging	University Of Chicago	$257,494
5 M01RR000071-41	Pickering, Thomas	Psychosocial Factors And Cardiovascular Disease, (Program Project) Project #1	Mount Sinai School Of Medicine Of Nyu	$14,245
5 M01RR000833-30	Poceta, Steven J	Melatonin Treatment For Sleep Disturbances During Menopause	Scripps Research Institute	$3,556
5 M01RR000833-30	Poceta, Steven J	Estrogen And Melatonin For The Improvement Of Sleep Quality During Menopause	Scripps Research Institute	$23,115
5 M01RR002719-19	Polydefkis, Michael	A Trial Of Gabapentin In Restless Legs Syndrome	Johns Hopkins University	$4,930
2 M01RR006192-11	Prestwood, Karen	Healthmat	University Of Connecticut Sch Of Med/Dnt	$3,439
5 M01RR002719-19	Punjabi, Naresh M	Early Identification Of Sleep Apnea (Eisa)	Johns Hopkins University	$56,691
5 M01RR002719-19	Punjabi, Naresh M	Altered Metabolism In Sleep Apnea (Amsa)	Johns Hopkins University	$4,109
5 M01RR010732-10	Ramer, Jeanette	Oral Iron Supplementation In Attention Deficit Hyperactivity Disorder	Pennsylvania State Univ Hershey Med Ctr	$11,344
2 M01RR000096-43	Rapoport, David	Comparison Of Minimal To Full Polysomnography For The Diagnosis Of Osahs	New York University School Of Medicine	$81,311
2 M01RR000080-42	Redline, Susan S	Familial Aggregation Of Sleep Apnea (Ii)	Case Western Reserve University	$258,165
2 M01RR000080-42	Redline, Susan S	Outcomes Of Sleep Disordered Breathing In Adolescents	Case Western Reserve University	$149,519
2 M01RR000080-42	Redline, Susan S	CPAP Therapy For Sleep Apnea And Its Relationship To Metabolic Syndrome	Case Western Reserve University	$15,424
2 M01RR000096-43	Ren, Christine	The Impact Of Weight Loss After Bariatric Surgery On Sleep & Esophageal Function	New York University School Of Medicine	$10,276
2 M01RR000056-43	Reynolds, Charles Iii	Geriatric Depression: Neurobiology Of Treatment	University Of Pittsburgh At Pittsburgh	$21,368
2 M01RR000056-43	Reynolds, Charles Iii	Paroxetine In The Treatment Of Chronic Primary Insomnia	University Of Pittsburgh At Pittsburgh	$2,289
2 M01RR000056-43	Reynolds, Charles Iii	Protecting Sleep Quality In Later Life	University Of Pittsburgh At Pittsburgh	$11,193

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
5 M01RR002719-19	Ricaurte, George A	Mdma Neurotoxicity In Humans: Occurrence And Consequences	Johns Hopkins University	$317,140
2 M01RR014288-06	Richards, Kathleen C	Effect Of Activities And Exercise On Sleep In Dementia	University Of Arkansas Med Scis Ltl Rock	$33,378
3 M01RR000073-41S1	Rose, Mary	Sleep Disturbance In Pediatric Burn Survivors	University Of Texas Medical Br Galveston	$1,914
5 P51RR000168-43	Rowlett, James K	Behavioral Effects Of The Functionally Selective Gaba-A Agonist Sl651498	Harvard University (Medical School)	$11,895
5 P51RR000168-43	Rowlett, James K	Abuse-Related Effects Of Benzodiazepine-Type Hypnotics	Harvard University (Medical School)	$11,895
5 P51RR000166-43	Sackett, Gene P	Sleep And Abnormal Behavior	University Of Washington	$111,746
2 M01RR000056-43	Sanders, Mark	Sleep-Related Oxidative Stress In Patients With Copd	University Of Pittsburgh At Pittsburgh	$6,105
2 M01RR000080-42	Scher, Mark S	Assessment Of Biological And Social Risk In Pre-Term Infants	Case Western Reserve University	$735
2 M01RR000080-42	Scher, Mark S	Sleep And Outcome In High Risk Infants	Case Western Reserve University	$26,808
5 P20RR015567-05	Schlenker, Evelyn H	Usd Med: Adaptation Of Respiratory Pattern Generator To Hypoxia	University Of South Dakota	$153,777
5 M01RR002719-19	Schwartz, Alan R	Neural Control Of Upper Airway Collapsibility	Johns Hopkins University	$43,546
5 M01RR002719-19	Schwartz, Alan R	Stress Biomarkers In Sleep Apnea	Johns Hopkins University	$84,624
5 M01RR002719-19	Schwartz, Alan R	Surgical Weight Loss Intervention In Sleep Apnea	Johns Hopkins University	$104,343
5 M01RR000042-44	Selwa, Linda	Sleep Disorders Associated With Epilepsy	University Of Michigan At Ann Arbor	$33,040
5 M01RR000042-44	Selwa, Linda	Effects Of Levetiracetam On Sleep And Interictal Epileptiform Discharges	University Of Michigan At Ann Arbor	$31,515
5 M01RR000058-43	Shaker, Reza	Esophageal Motor Function In Health And Disease	Medical College Of Wisconsin	$141,962
5 M01RR002635-20	Shea, Steven	Circadian And Sleep/Wake Aspects Of Nocturnal Asthma	Brigham And Women's Hospital	$88,076
5 M01RR002635-20	Shea, Steven	Circadian And Sleep-Wake Aspects Of Epilepsy	Brigham And Women's Hospital	$5,696
5 M01RR003186-19	Sheth, Raj D	Abnormalities In Sleep Architecture In Children With Epilepsy	University Of Wisconsin Madison	$38,132
5 M01RR005096-15	Simakajornboon, Narong	Association Between Periodic Limb Movement Disorders And Ferritin Level In Child	Tulane University Of Louisiana	$530
5 M01RR005096-15	Simakajornboon, Narong	Sleep Quality In Children With Cystic Fibrosis And Association With Hypoxemia	Tulane University Of Louisiana	$1,767
5 M01RR002719-19	Smith, Michael T	Effects Of Sleep Continuity Disturbance And Sleep Deprivation On Pain-Mod…	Johns Hopkins University	$97,772
5 M01RR002719-19	Smith, Philip L	Neurohumoral Effects Of Weight Loss In Sleep Apnea	Johns Hopkins University	$9,859
5 M01RR002719-19	Smith, Philip L	Baseline Characterization Of Sleep Disordered Breathing	Johns Hopkins University	$4,930
5 P20RR011091-10	Soll, Bruce	Csr, Ccf & Sleep Posture	University Of Hawaii At Manoa	$34,130
5 M01RR000585-33	Somers, Virend	Cardiovascular Disease Mechanisms In Sleep Apnea	Mayo Clinic Coll Of Medicine, Rochester	$55,387
5 M01RR000585-33	Somers, Virend	Interaction Between Leptin And Neural Circulatory Control	Mayo Clinic Coll Of Medicine, Rochester	$927
5 M01RR000585-33	Somers, Virend	Genetic Background Of Cardiovascular And Sleep Disorders In Humans	Mayo Clinic Coll Of Medicine, Rochester	$65,583
5 M01RR000645-33	Stern, Yaakov	Darpa	Columbia University Health Sciences	$41,658
5 M01RR000847-31	Suratt, Paul M	The Effect Of Subatmospheric Pressure Around Abdomen On Upper Airway Resistance	University Of Virginia Charlottesville	$1,103
5 M01RR000847-31	Suratt, Paul M	Sleep Apnea In Children	University Of Virginia Charlottesville	$115,894
5 M01RR000847-31	Suratt, Paul M	Nasal Flow Analysis As An Accurate Means Of Assessing Sleep Disordered Breathing	University Of Virginia Charlottesville	$9,934
5 M01RR000065-42	Taliaferro, Donn	The Effects Of Melatonin On Sleep In HIV	Virginia Commonwealth University	$134,788

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
5 M01RR000054-43	Tanios, Maged A	Evaluation Of Ventilator Dyssynchrony & Sleep Fragmentation During Weaning	New England Medical Center Hospitals	$7,791
3 P41RR013622-05S1	Thomas, Robert	Cardiopulmonary Coupling In Sleep Disordered Breathing Syndromes	Beth Israel Deaconess Medical Center	$16,284
5 M01RR001032-29	Thomas, Robert	Effect Of Modafinil On Working Memory And Visual Motion Perception	Beth Israel Deaconess Medical Center	$3,107
5 M01RR001032-29	Thomas, Robert	Functional Imaging Of Sleep Deprivation	Beth Israel Deaconess Medical Center	$10,874
5 K26RR017543-03	Toth, Linda A	Behavioral And Physiologic Pathobiology Of Mice: Sleep Research	Southern Illinois University Carbondale	$122,848
2 P51RR000163-45	Urbanski, Henryk F	Menopause In The Rhesus Macaque	Oregon Health & Science University	$82,173
5 M01RR000055-43	Vancauter, Eve	Sleep-Wake Regulation In Gh Deficiency	University Of Chicago	$26,546
5 M01RR000055-43	Vancauter, Eve	Paying The Sleep Debt To Improve Glucose Tolerance	University Of Chicago	$112,376
5 M01RR000055-43	Vancauter, Eve	Sleep Loss And Circadian Disruption	University Of Chicago	$109,722
5 M01RR000055-43	Vancauter, Eve	Sleep And Glucose Regulation	University Of Chicago	$27,430
5 M01RR000055-43	Vancauter, Eve	Functions In Short And Long Sleeps	University Of Chicago	$69,903
5 M01RR000040-44	Vandongen, Hans	Individual Differences In Response To Sleep Deprivation	University Of Pennsylvania	$188,560
5 M01RR000046-44	Vaughn, Bradley V	Sleep Disorders Associated With Epilepsy	University Of North Carolina Chapel Hill	$7,642
5 M01RR010732-10	Vgontzas, Alexandros N	Il-6 Secretion And Quantity And Quality Of Sleep: Age And Gender Effects	Pennsylvania State Univ Hershey Med Ctr	$16,870
5 M01RR010732-10	Vgontzas, Alexandros N	Administration Of Enbrel (Etanercept) In Patients With Sleep Apnea	Pennsylvania State Univ Hershey Med Ctr	$18,907
5 M01RR010732-10	Vgontzas, Alexandros N	Effects Of Sleep Depriv & Daytime Napping On Sleep, Sleepiness & Perform & Horm	Pennsylvania State Univ Hershey Med Ctr	$34,031
5 M01RR000827-30	Viirre, Erik	Eyetracking Measures Of Neural States Of Fatigue	University Of California San Diego	$17,703
5 M01RR000046-44	Waag, Barbara	Respiratory Periodicity And Cognitive Decline In Elders	University Of North Carolina Chapel Hill	$5,094
5 P20RR015576-05	Wang, Guang Jian	Cobre: Ul: Cellular Mechanisms Of Neuronal Vulnerability To Intermittent Hypoxia	University Of Louisville	$64,726
5 M01RR001032-29	Weiss, J Woodrow	The Cerebrovascular Response To Sleep And Arousal	Beth Israel Deaconess Medical Center	$1,553
5 M01RR001032-29	White, David	Ventilatory Stability In Normals And Sleep Apneics	Beth Israel Deaconess Medical Center	$12,427
5 M01RR001032-29	White, David	Lung Volumes And Sleep	Beth Israel Deaconess Medical Center	$3,107
5 M01RR001032-29	White, David	Hormonal Regulation Of Ventilatory Control In Ohs	Beth Israel Deaconess Medical Center	$22,784
5 M01RR001032-29	White, David	Respiratory Control Stability And Upper Airway Anatomy In Sleep Apnea	Beth Israel Deaconess Medical Center	$17,087
5 M01RR001032-29	White, David	Radio Frequency Bion Stimulator System As A Treatment For Osa	Beth Israel Deaconess Medical Center	$1,553
5 M01RR002635-20	White, David	Respiratory Control Stability And Upper Airway Anatomy In Sleep Apnea	Brigham And Women's Hospital	$12,708
5 M01RR002635-20	White, David	Ventilatory Response To Brief Arousal From Sleep In Men And Women With Osa	Brigham And Women's Hospital	$7,887
5 M01RR000059-43	Wilson, Jeffrey S	Noninvasive Positive Pressure Ventilation In Managing Copd	University Of Iowa	$9,782
5 M01RR000048-43	Wolfe, Lisa	Relationship Between Sleep Apnea Severity And Simulated Driving Performance	Northwestern University	$15,616
5 M01RR000058-43	Woodson, Btucker	MRI Upper Airway Evaluation With Waking Controlled Ventilation	Medical College Of Wisconsin	$5,313
5 M01RR000051-43	Wright, Ken	Effects Of Chronic Sleep Loss On Daytime Cognitive And Neurobehavioral Function	University Of Colorado Hlth Sciences Ctr	$1,170
5 M01RR002635-20	Wright, Kenneth	Circadian Adaptation To Non-24 Hour Sleep-Wake Schedules	Brigham And Women's Hospital	$127,513

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

Grant No	PI	Title	Institution	Funding
5 M01RR000827-30	Wu, Joseph C	The Antidepressant Effects Of Sleep Deprivation And Sertraline	University Of California San Diego	$39,535
5 M01RR000070-42	Yesavage, Jerome A	Treatments For Insomnia.	Stanford University	$40,892
5 M01RR003186-19	Young, Terry B	Epidemiology Of Sleep-Disordered Breathing	University Of Wisconsin Madison	$678,692
5 M01RR000048-43	Zee, Phyllis C	Sleep/Wake Rhythms In Aging: Responsiveness Of The Clock To Light	Northwestern University	$8,458
5 M01RR000048-43	Zee, Phyllis C	Genetic Components Of Advanced And Delayed Sleep Phase Syndrome	Northwestern University	$7,808
5 M01RR000048-43	Zee, Phyllis C	A Countermeasure For Sleep Loss In Older Adults	Northwestern University	$10,410
3 P41RR013622-05S1	Zong, Wei	Archive Of Mouse Physiologic Data For Nhlbi Cardiogenomics Pga	Beth Israel Deaconess Medical Center	$9,770
			NCRR TOTAL	***$14,647,668***

NATIONAL INSTITUTE OF ENVIRONMENTAL HEALTH SCIENCES

Grant No	PI	Title	Institution	Funding
R21ES012952-01	Yolton, Kimberly	Exploration Of ETS Effects On Child Behavior And Sleep	Children's Hospital Med Ctr (Cincinnati)	$189,981
			NIEHS TOTAL	***$189,981***

NATIONAL CENTER ON MINORITY HEALTH AND HEALTH DISPARITIES

Grant No	PI	Title	Institution	Funding
L60 MD000901-02	Girardin, Jean-Louis	Screening and Treatment for Sleep Disordered Breathing	Kingsbrook Jewish Medical Center	$7,133
			NCMHD TOTAL	***$7,133***

NATIONAL INSTITUTE OF BIOMEDICAL IMAGING AND BIOENGINEERING

Grant No	PI	Title	Institution	Funding
5 R21 EB001780-02	Brennick, Michael J	Pharyngeal Mechanics By Tagged MRI In A Zucker Rat Model	University Of Pennsylvania	$178,313
5 R01 EB003320-07	Kennedy, Robert T	In Vivo Chemical Monitoring Using Capillary Separations	University Of Michigan At Ann Arbor	$64,950
			NIBIB TOTAL	***$243,263***

TRANS-NIH SLEEP RESEARCH – FISCAL YEAR 2004

NATIONAL INSTITUTE OF DENTAL AND CRANIOFACIAL RESEARCH

Grant No	PI	Title	Institution	Funding
2 R44 DE014944-02	Brown, William P	A 3-D Interactive Atlas Of The Maxilla, Mandible & TMJ	Brown And Herbranson Imaging	33,640
1 R21 DE016317-01	Morris-Wiman, Joyce A	Mast Cell Role In Masseter Muscle Repair	University Of Florida	64,929
			NIDCR TOTAL	***$98,569***

NIH SLEEP RESEARCH: FISCAL YEAR 2004 TOTAL 196,239,197

Appendix A

Sleep Research Contacts

Trans NIH Sleep Research Coordinating Committee – Fiscal Year 2004

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Appendix A

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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

Appendix B

Sleep Disorders Research Advisory Board – FY 2004

Terms expire June 30 of year indicated

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Appendix B

Sleep Disorders Research Advisory Board – FY 2004

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Appendix B

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

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