RESEARCH HIGHLIGHT

‘To Sleep: Perchance to Dream’

Seun Johnson-Akeju, MD, Massachusetts General Hospital
Written by: David M. Nathan, M.D.

“To sleep: perchance to dream...” says Hamlet in his “To be, or not to be” soliloquy. He might have been describing an ongoing study at the MGH CRC that is examining a potential new treatment for insomnia.

Sleep is a natural human behavioral state that is crucial for survival, maintenance of health and consolidation of newly learned information. It also normally includes dream cycles that have been popularly characterized based on the occurrence of “REM” and “non-REM” sleep. Unfortunately, 25 to 35 percent of American adults suffer from transient insomnia and 10 to 15 percent suffer from chronic insomnia. Insomnia not only affects quality of life but also causes poor memory, impaired work performance and productivity, reduced concentration and increased risk of accidents. Approximately, 5 percent of the population takes medications to treat their insomnia.

While some of the many over-the-counter and prescription medications to treat insomnia may be effective, the mechanism of their action is poorly understood. In addition, many of them disrupt the sleep cycle patterns that are felt to be an important component of a healthy, normal sleep. As a result many people taking medications to treat insomnia report feeling “groggy” and not well rested.

Seun Johnson-Akeju, M.D. of the MGH Department of Anesthesia, Critical Care and Pain Medicine is using brain imaging with Magnetic Resonance-Positron Emission Tomography (MR-PET) and Electroencephalography (EEG) at the MGH CRC to study the altered state of arousal induced by dexmedetomidine, a sedative agent commonly used by anesthesiologists and intensivists. Successfully deciphering the neural circuitry involved in this altered state of consciousness will provide a new fundamental understanding of brain arousal control. The interest in dexametomidine is stimulated by preliminary reports that sedation with dexametomidine approximates non-REM sleep.

Dexametomidine is known to activate inhibitory pathways emanating from the ventral lateral preoptic

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The BOD POD

Boston Children’s Hospital CRC now has the ability to perform body composition analysis using the BOD POD (Cosmed; Concord, CA). In collaboration with the Gastroenterology Procedure Unit (GPU), the Clinical and Translational Study Unit (CTSU) is able to offer this service to Harvard Catalyst approved studies. The BOD POD uses Air Displacement Plethysmography (ADP) to determine fat and fat free mass using the equation: density=mass/volume. Mass is obtained from a daily calibrated digital scale and volume is measured within the chamber during the testing period. Body density (percent fat mass and percent fat free mass) can then be determined using age and gender-specific equations. ADP is a validated and non-invasive way to obtain body composition data in people of all ages (1,2). A report is produced which includes the following information: percent of fat, percent of fat free mass, fat mass (kg), fat free mass (kg), body mass (kg), body volume (L), body density (Kg/L) and thoracic gas volume (L). For patients more than 18 years old, the percent body fat results are then interpreted as Excess Fat, Moderately Lean, Lean, Ultra Lean and Risky ratings within parameters determined by Cosmed, the BOD POD manufacturer. Estimated resting metabolic rate is also calculated (Kcals/day).

ADP is an easy, safe and quick procedure. The total test time is approximately 5-10 minutes with less than two minutes within the chamber. The patient is required to wear a swimsuit or other skintight workout clothing and swim cap. For best results, subjects or patients should not consume food or water and have done no exercise for 2 hours prior to the test. The BOD POD provides accurate body composition data for most children and adults, approximately 10 to 250 kg.

Summer Research Mentors

The Harvard Catalyst Program for Faculty Development and Diversity (PFDD) is seeking faculty mentors from Harvard Medical School and the affiliated hospitals for their two competitive summer internship programs.

The Visiting Research Internship Program (VRIP) is an eight-week mentored summer internship program for first and second year medical students, while the Summer Clinical and Translational Research Program (SCTRP) offers college students (sophomores and above) the opportunity for ten weeks of mentored research. Both of these programs are intended to enrich students’ interest in research and health-related careers, particularly clinical/translational research careers, as well as to increase the exposure of underrepresented minority and disadvantaged students to such research.

The PFDD covers travel, housing, and salary costs, and matches students in both internship programs with laboratories at HMS and the affiliated hospitals in order to give the students an intensive experience that exposes them to the breadth of work that falls under the umbrella of clinical and translational science.

http://www.mfdp.med.harvard.edu/catalyst/announcement.html

Surviving the Snowfall

When planning research, many different factors are taken into consideration long before participants are selected. This winter, the one factor investigators couldn’t predict was the snow.

The weekend of February 8th, Boston was pummeled with almost 25 inches of snow. This prompted a 3 p.m. shut down of the MBTA, a 2 p.m. driving ban, and a Boston-wide parking ban—no travel of any kind was allowed in the Boston area. As anyone in the medical field knows, hospitals don’t close because of inclement weather. The same can be said for research centers.

That weekend, the Brigham and Women’s CRC had three circadian sleep studies in progress, which require that subjects not know what is occurring in the outside world. Thirteen members of the staff trekked in the snow, worked double shifts, and came in early to make sure everything went off without a hitch. With no inpatient studies, Boston Children’s CRC staff remained in constant contact with study teams to cancel all appropriate appointments.

At Beth Israel Deaconess Medical Cen-
**CRC updates**

**HCCRC @ BIDMC**

**“Through the Wall” System**

The HCCRC @ BIDMC is in the process of a renovation to create an additional “through the wall” system to be used for frequent blood sampling or continuous monitoring for physiologic studies, without disturbing the study participant. This renovation involves creating an antechamber for the most efficient access to patients without entering the private sleeping room. With the significant growth in demand for rooms with a through the wall system, this renovation will improve CRC room access, thereby better enabling investigators to meet enrollment targets. The “through the wall” system will be completed at the end of April 2013.

For questions, please contact:
Linda Godfrey-Bailey, Nurse Director, 
lgodfrey@bidmc.harvard.edu

**HCCRC@ BCH**

**New CTSU Program Manager**

Bridget Koryak is the new CTSU Program Manager. She started at the end of January and previously worked in the Children’s Anesthesia Department. She’ll manage the day-to-day administrative and Catalyst needs of the CTSU.

**Behavioral Science Consultations**

Investigators whose studies involve behavioral science outcomes are invited to access the Clinical Behavioral Science core, housed within the Department of Psychiatry Program for Behavioral Science. This service, directed by Deborah Waber, Ph.D. and co-directed by Michelle Bosquet Enlow, Ph.D., provides consultation services for the preparation of grants, protocols and clinical trials as well as psychometrician services, including the new NIH Toolbox.

For more information:
www.childrenshospital.org/crc
Deborah Waber, 617-355-6523, Michelle Bosquet Enlow, 617-919-4680

**BOD POD!**

In Partnership with the GPU (Gastroenterology Procedure Unit), the CTSU Core has the capabilities of measuring % body fat via a BOD POD (see article page 2). The BOD POD uses air displacement plethysmography (ADP) to measure body mass and body volume, with a calculation of body density, percent fat, and percent fat free mass using age and sex-specific equations. ADP is an easy, safe and quick (approximately 5 minutes total test time) procedure. The BOD POD provides accurate body composition data for most children and adults, approximately 10 to 250 kg. The machine is located on Pavilion 5 in the GPU clinic and is available on Mondays, Tuesdays, Thursdays and Fridays.

For questions or to schedule an appointment, please contact:
Nicolle Quinn, Metabolism and Nutrition Research Director, 
nicolle.quinn@childrens.harvard.edu

**Project Management Services**

Project Management Services may be provided by a single member or a team of clinical research nurse project managers, non-clinical project managers, data managers and study coordinators depending on the needs of the investigator. Under the direction of the PI, CRC staff can assist with the planning, coordination and implementation of a research study. The CRC can provide project management services to studies conducted both within and outside the discrete CTSU, including inpatient units, outpatient settings or in the community.

Apply via the Harvard Catalyst Clinical Research Center Resource Request: http://catalyst.harvard.edu/services/hccrcrequest/

**HCCRC @ MGH**

**Continued Sleep Research**

The MGH Clinical Research Center has a long history of supporting a wide range of sleep studies, including six active studies led by four Principal Investigators. Research conducted at the CRC by Emery Brown, MD, Ph.D. led to a recent article in the Proceedings of the National Academy of Sciences: “How the brain loses and regains conscious-

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Presentations, May 10, 2013—Register by May 3

Course: Models of Disease Boot Camp, July 8-26, 2013—Application due May 1

Course: A Primer on Complex Trait Genetics: Principles for the Clinical Investigator, April 29, 2013—Registration open


Laboratory RFA Award

Congratulations to the 15 junior investigators receiving awards for laboratory support and genotyping. Each will each receive up to $5,000 support. Funds support sample testing at MGH CLR and LabCorp, as well as genotyping services provided by Harvard Catalyst-affiliated genotyping facilities.

Heidi Ashih, MD, PhD, MS—MGH
Sherry Chou, MD, MMSc—BWH
Alina Gavrila, MD, MMSc—BIDMC
Elizabeth Lawson, MD, MMSc—MGH
Sara Looby, PhD, MSN—MGH
Hideo Makimura, MD, PhD—MGH
Margaret McCabe, PhD—BCH
Raquelle Mesholam-Gately, PhD—BIDMC
William Stone, PhD—BIDMC
Sarah Morton, MD, PhD—BCH
Jose Romero, PhD—BWH
Aditi Rao Saxena, MD, MMSc—BWH
Frank A. J. L. Scheer, BSc, MSc, PhD—BWH
Anand Vaidya, MD, MMSc—BWH
Jonathan Williams MD, MMSc—BWH

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nucleus, an important sleep promoting pathway. Dr. Johnson-Akeju’s study will examine whether this medication promotes a normal sleep pattern, which would be a highly desirable feature for insomnia treatment. In addition, Dr. Johnson-Akeju is establishing the neurophysiological architecture of sleep patterns in insomnia, which will help better understand insomnia and the effects of future treatments for this prevalent and disruptive condition.

Detailed studies such as the one being conducted by Dr. Johnson-Akeju at the MGH CRC are necessary to advance our understanding of normal physiology and disease and to develop innovative treatments that provide the best benefit with the fewest side-effects.

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alyst approved research studies.

To schedule a research BOD POD appointment, please contact:

Nicolle Quinn, CTSU Nutrition Director:
nicolle.quinn@childrens.harvard.edu.

For questions please email:

christopher.duggan@childrens.harvard.edu,
lori.becharl@childrens.harvard.edu.

References:
