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NEWS

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New sleep labs at UTHSCD
to delve into sleep stages
and dreams.

DALLAS--Contrary to the ancient philosophers' idea that sleep is a state akin to death, researchers at Southwestern Medical School say certain sleep stages are chock full of life and activity.

Sleep is still an unfolding mystery, however, with plenty of questions yet to be answered, according to the team of three psychiatry faculty members who have set up new sleep research laboratories at Southwestern at The University of Texas Health Science Center at Dallas.

Professor Howard Roffwarg, the director of the new unit, and Assistant Professors John Herman and Jorge Farber will continue the work on sleep that they began at Montefiore Hospital in New York City.

They are interested in the different sleep stages and their cycling, but particularly in the active state when internal stimulation takes place. These rhythmically occurring periods emerge when specific lower portions of the brain turn on and issue bursts of phasic electrical activity that, among other effects, cause the eyes to dart rapidly behind closed lids and the middle ear muscles to contract, as the latter do in response to loud sound in the awake state. This active state gets its name from the prominent eye activity that occurs--Rapid Eye Movement Sleep (REMS).

REMS occurs most often in the fetus, and a baby experiences more REMS than an adult. The researchers have theorized that the brain activity going on during the phasic bursts of REM and middle ear muscle activity (MEMA) enhance the processes of maturation in the brain. Consequently, REM sleep may have its prime functional effects during infancy.

The new sleep labs will be more involved in basic than in clinical questions, explained the investigators, whose grants were recently renewed by the National Institute of Mental Health. The funded studies focus on the pattern and effects of REMS activation, and on the role of eye movements in perception and dreaming.

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first add sleep

"We are interested in neurophysiological aspects of sleep; that is, can you relate the measurable physical events of brain activity to issues like, 'Where do dreams come from? What is the function of the sleep stage in which dreams are produced? What chemistries fuel the mechanisms of the REM and non-REM stage alternations that characterize normal sleep?'" said Dr. Roffwarg.

"We do not know for sure, but we believe today that biogenic amines (organic nitrogen compounds), produced by the nerve cells, act as the neurotransmitters regulating the activities within single sleep stages as well as their cycling," he added.

"The right combinations of amines at the right time in a specific area probably initiates sleep, and we are getting more certain about where that area is," said Dr. Farber.

The scientists point to sleep as an active process that requires an active "turn-on" system. Dr. Farber's work has shown the connection of the REMS system to the drive-reward system in animals. He has been exploring the generators of the explosive phasic activity that is initiated in the lower brain and radiates throughout the entire brain in REMS. He feels that the REMS generator activity is directed to the functions most used by a given species in its waking state. For example, a rat experiences frequent nose twitches during REMS, and it relies greatly on the sense of smell in the awake state.

Dr. Herman is interested specifically in the process of dreaming in relation to our daily perceptual experiences and concurrent brain activity.

"Dreaming is a mind-body event, and we're trying to sketch in this relationship," he said. He pointed out that the human is the only animal able to recount dreams. Still, the specific purpose of dreaming remains elusive.

The group will be doing a number of animal experiments centered around REMS and the more recently discovered MEMA during REMS.

"We think REMS is extremely fundamental. It is inherent in the normal sleep of all mammals and is an important biological rhythm," said Dr. Roffwarg.

Dr. Roffwarg came to Southwestern this year from Albert Einstein College of Medicine and Montefiore Hospital. A graduate of Columbia University College of Physicians and Surgeons, he has received a number of research awards, including the Joseph Mather Smith Prize and an Anna Monika Foundation Award.

He is a charter member of the Association for the Psychophysiological Study of Sleep and holds memberships in a number of scientific societies dedicated to psychiatric research. He is editor of "Sleep Forum" and has been editor-in-chief of the Brain Information Service's publication, "Sleep Reviews." He is a member of the Clinical Projects Research Review Committee of the National Institute of Mental Health.

second add sleep

Dr. Herman received his Ph.D. in social psychology from Yeshiva University. He was instructor in the Department of Psychiatry at Albert Einstein College of Medicine and attending psychologist at Montefiore Hospital before coming to Dallas. He is a member of the Association for the Psychophysiological Study of Sleep, American Psychosomatic Society and American Psychological Association.

Dr. Farber has a Ph.D. in cognitive psychology from City University of New York. He is a 1977 recipient of a Sloan Foundation Fellowship in Neuroscience, Phi Beta Kappa Award in Science, Gardner Murphy Award and is a lifetime member of the New York Academy of Sciences. He served as a post-doctoral research fellow at Einstein College of Medicine and Montefiore with Dr. Roffwarg. Recently he was named winner of a Henry Moses Award for a paper on brain areas responsible for self-stimulation in the rat, published in "Brain Research."

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