

News

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****Top sleep researcher makes predictions
about future of sleep research

DALLAS -- Many of the mysteries about sleep that had eluded mankind for years have been solved. Yet today researchers say they stand on the verge of new discoveries that will affect almost everyone.

Dr. Howard Roffwarg, professor of psychiatry at The University of Texas Southwestern Medical Center, recently gave an address on the future of sleep research and treatment at a seminar for physicians and other health personnel in Dallas. The seminar, called "Uncovering the Veil of Sleep," was sponsored by the Sleep/Wake Disorders Center at Presbyterian Hospital of Dallas and UT Southwestern's Department of Psychiatry. Roffwarg is director of sleep research at UT Southwestern, where Presbyterian's sleep specialists hold academic appointments. The psychiatrist is also president-elect of the American Sleep Disorders Association.

Roffwarg, whose research interests include the generating mechanisms of sleep and the relationship between sleep and the maturation of the brain, said that researchers once thought sleep was a simple passive activity. Only in 1935 was it discovered that there are states of sleep characterized by separate and distinctive brain wave patterns on an EEG (electroencephalogram). In the mid-1950s scientists learned that bursts of rapid eye movements appear periodically during sleep. A few years later the periods of rapid eye movement (or REM sleep) were linked to dreaming and, even more importantly, to a major change in the state of the brain--the REM state.

Today many sleep disorders can be treated -- from simple insomnia to the serious problems of patients who move all over their rooms in the night, acting out dreams and sometimes hitting unfortunate roommates. However, the causes of many severe sleep complaints are still unknown. Future strides in sleep research will come from learning more about sleep in both healthy and diseased states, Roffwarg said. As more is understood, more effective treatments can be developed.

The development of better drugs for sleep problems is a good example. Hypnotics, or sleeping pills, may work well for temporary emergencies but may cause addiction and are dangerous when mixed with alcohol. In addition, longtime use of hypnotics probably contributes to poor sleep rather than improving insomnia, Roffwarg said.

Of the two major types of hypnotics, benzodiazepines and barbiturates, the "benzes" are used most often today. The "benzes" are neither innocuous nor ideal. However, they can be used for a longer period of time (up to a month) than the commonly prescribed barbiturates of the past. Fatal overdoses are rare, and they are less physically addictive. Also, there is less respiratory depression associated with "benzes," and they are not as likely to interfere with other drug therapy. But "benzes" don't always work because the brain stem, which is associated with waking, sleeping and REM sleep, has few receptors for them. In such cases, barbiturates may be used.

As more knowledge is gained about how the sleep and related systems function and how they work together, researchers hope to develop natural drugs for sleep problems from peptides and other neurochemicals, Roffwarg said. Another approach to sleep problems would be to develop new substances "targeted" to the stages of sleep during which they could do the most good.

For example, it is known that narcolepsy, a condition that causes its victim

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to fall asleep at inappropriate times during the day, is a disturbance of REM sleep. Roffwarg said it might be possible to develop a drug for narcolepsy that would be specifically targeted to block REM sleep outbreaks during the day rather than giving stimulants to the patient to keep him or her awake during the day. Also, as researchers gain more understanding about the brain mechanisms in sleep, they may find clues to developing other kinds of treatment intervention, he said.

Roffwarg also said he hopes that with more understanding about sleep cycles, more behavioral interventions can be developed. It is already common practice for sleep centers to use techniques like biofeedback and relaxation with patients who have various sleep problems.

Probably the most exciting work today focuses on the relationship of sleep to other circadian rhythms, Roffwarg said. Circadian rhythms are certain physiological events, such as hunger, related to a 24-hour cycle. There are more than 100 of these biological rhythms.

Jet lag, a condition that occurs after long trans-meridian or east-west flights, is probably the most widely experienced example of a circadian rhythm's effect. The traveler's body clock lags behind local clocks, and he or she feels groggy in the daytime but has trouble sleeping at night. Workers changing shifts often have the same problem because they also must change their internal clock. And accidents increase when truckers are on the road for periods longer than 12 hours because they miss the rest and food breaks their body clocks expect.

Help is not far off for persons who suffer from these time-related sleep problems, Roffwarg said. Researchers already know that people--not just nocturnal animals--are much more sensitive to light than once thought. A great deal of work in light sensitivity and depression has established relationships in this area, and researchers are now investigating possible treatments that incorporate light to counteract some kinds of depression.

Roffwarg said similar investigations are now using light to adjust body cycles for shift workers. It is known that one to two hours of light treatment can be used to re-set the rhythm of sleep, first to "tone down the amplitude, that is, to flatten out, the circadian rhythm," he said, and then with more light exposure to re-build the rhythm to another pattern. In fact, Dr. John Herman, a sleep psychologist who works with Roffwarg, said he envisions booths in airports where foreign travelers can drop in for a "dose" of light to re-set their biological clocks.

Roffwarg said that the circadian rhythm system appears to be much more complicated than had been imagined. Rather than the system's being tied primarily to sleep, there are indications that body temperature may be the key pacemaker.

"We know that as we change sleep stages, the body changes temperature," said Roffwarg. Also, the body's temperature slowly drops as one falls asleep, and the best sleep is at lower temperatures. "If you try to sleep when your body temperature is on the rise, you don't sleep long," he said. And because light can shift the temperature cycle, many new treatments for sleep problems may evolve from increased knowledge about the relationship between light and body temperature.

Another relationship between body temperature and sleep involves exercise. Researchers have learned that exercise earlier in the day raises body temperature and leads to better sleep that night. Hot baths and hot-tub soaks, which mimic the effects of exercise by raising body temperature, also help sleep. Exactly why is unknown.

Both Roffwarg and Herman said they see increased specialization in the field of sleep disorders as physicians become more familiar with treatments for patients with sleep problems and as new physiological understandings lead to new and better treatments. Accredited sleep centers already have the tools to diagnose 85 percent to 90 percent of sleep problems and the ability to reverse the problems with treatment. And researchers believe the situation will continue to improve as new knowledge is gained.

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Distribution: AC,AC1,AF,AF1,AG,AG1,AH,AK,AK1,ADM,ADM1,SL

Note: The University of Texas Southwestern Medical Center at Dallas comprises Southwestern Medical School, Southwestern Graduate School of Biomedical Sciences and Southwestern Allied Health Sciences School.