Penn Medicine Says That Sleep Loss Could Lead to Permanent Cognitive Loss

By Nora Al baghdadi

Most people know that they cannot stay alert and function at their best when they have not had enough sleep. However, most people also believe that they can always sleep it off later and recover. A new research study by the Perelman School of Medicine at the University of Pennsylvania, called Penn Medicine, says that chronic sleep deprivation can lead to permanent physical damage and loss of cognitive function. This study's findings were outlined in a Penn Medicine press release called *Penn Medicine Researchers Show How Lost Sleep Leads to Lost Neurons*. This research was partially funded by a grant from the National Institute of Health.

Dr. Sigrid Veassey is an M.D. who works as an associate professor of Medicine and a member of the Center for Sleep and Circadian Neurobiology at Penn Medicine. The doctor collaborated with other researchers at Peking University to complete the study.

Mice, not human subjects, were used for this research study. The mice were subjected to different sleep patterns that resembled that of human shiftworkers. They had periods of rest and periods of extended wakefulness.

Certain proteins help protect brain neurons from injury in both humans in mice. The scientists found that after several days of abnormal sleep patterns the mice suffered from brain cell loss, increased brain cell death, and a reduced level of these protective proteins. They concluded that the mice could adapt to short-term sleep deprivation, but they could not adapt fo extended sleep deprivation over several days.

The researchers admitted that this particular study did not establish exactly how humans react under similar circumstances. Humans could have other protective mechanisms in place than mice do. However, it did provide enough information, Dr. Veassey says, that more work needs to be done to figure out exactly how long people can endure periods of extended wakefulness before they can no longer adapt. Of course, tolerance for sleep deprivation might vary slightly from person to person. But more information and clearer guidelines could help protect the health and safety of shift workers who need to stay awake or endure irregular sleep schedules.

The results of the study surprised the researchers who initially did not think that sleep deprivation caused permanent damage. Like most people, they assumed that grogginess associated with the lack of adequate sleep would clear after a period of rest. They also

assumed people might have to sleep more later to make up for a previous lack of sleep, but they thought that *makeup* sleep would clear a temporary lack of rest. Most of all, they did not believe that getting enough sleep was as important to permanent health as they now believe it to be.

The positive result of the study is that scientists believe that they have discovered a possible therapy that might be developed for people who do need to stay awake for extended periods of time. It might involve giving these people synthetic versions of the natural proteins that they need to protect their neurons from damage. In fact, they believe that their research may even extend beyond helping people who are merely sleep deprived. Dr. Sigrid Veassey said that this protein may also help people with diseases like Parkinson's and Alzheimer's.

However, these results may partially confirm what most college students and shift workers have already figured out. Relatively healthy people can pull of an *all nighter* without problems. However, having to lose sleep more than once every few days or for more than one night in a row can produce very severe symptoms. These symptoms may simply be the body's way of sounding an alarm clock that it's time to go to bed before brain cells start dying off.