

To nap or not, one of sleep's puzzles

How best to benefit from strategic naps is one of the questions being examined by a new research focus on the mysteries of sleep, writes **Lynnette Hoffman**

If you've ever emerged from a trip abroad only to find yourself in a foggy haze courtesy of jet lag, worked rotating shifts or pulled an all-nighter, you know what it's like to have your sleep and circadian rhythms disrupted. And for all but a fortunate few, it isn't pretty.

As most people can testify, sleep deprivation causes fatigue and impairs the ability to perform at the optimal level. Concentration, alertness, memory and reaction time are all inhibited. All that probably helps explain why shift-workers have higher risks of errors and accidents at work, and why drowsy drivers account for up to 20 per cent of road fatalities, says associate professor Naomi Rogers, director of Sydney University's new Chronobiology and Sleep Laboratory at the Brain and Mind Research Institute.

"As well as the performance effects, we know that people who aren't getting enough sleep are at risk of other health problems such as weight gain, obesity, diabetes and cardiovascular disease," Rogers says.

The Chronobiology and Sleep Lab was launched two weeks ago to research ways sleep deprivation can be better managed to improve health and safety, as well as performance. For example, while many workplaces already provide facilities for workers to nap, there's little understanding of what the ideal circumstances are to get the most out of a siesta.

"We know that some sleep is better than no sleep, so how do you maximise the benefit? When is the best time to nap? For how long?" Rogers says. And how long do you need when you wake up so that groggy "sleep inertia" — which makes you feel more tired than you were to begin with — doesn't make you a liability? Rogers says all those conundrums are the sorts of questions researchers at the new lab are hoping to answer.

Disrupted sleep is also connected with a number of neurodegenerative diseases such as Parkinson's disease and Alzheimer's and dementia, as well as psychological illnesses such as depression and bipolar disorder.

In all of these disorders sleep problems are often present before the full-blown disease develops, Rogers says, and treating it in the early stages could have a major impact on patients' overall wellbeing.

"We want to look at improving sleep as part of the overall treatment. So if you're looking at someone who has depression or Alzheimer's disease, we want to not only look at the primary disorder, not only treat them with things like antidepressants or cognitive behaviour therapy, but also specifically treat the sleep disorder," she says.

"People feel better and have improved quality of life and alertness when they have improved sleep."

Shift-workers are at particular risk of sleep loss and the health concerns it leads to.

They report lower quality of sleep and more wakefulness than other types of workers. Along with the physiological effects of sleep loss, they are also more likely to experience social isolation "because they're working when everyone else is partying", says Drew Dawson, director of the Centre for Sleep Research at the University of South Australia. That can also lead to bad habits such as poor eating, smoking and drinking.

Your internal body clock (or circadian clock) is a part of your brain that monitors the light you see and releases various chemicals at different times. Everything from your body temperature to digestion, from how alert you feel to your heart-rate and blood pressure, are linked to that internal clock, which operates on a 24-hour cycle. If you work nights, start your day before 6am or travel across multiple time zones, you run counter to your circadian rhythm, and the normal processes it's designed to help regulate get thrown out of whack.

Last year researchers at the University of Surrey found that a genetic difference in a "clock gene" known as PERIOD3 makes some people particularly sensitive to the effects of sleep deprivation. The research, published in the journal *Current Biology*, compared how people with each of the two variants of the gene coped with being kept awake for two days (2007.17613-618).

People with one form of the gene tended to struggle to stay awake, while the other group experienced no problems with the tasks they were given.

The differences were most obvious in the late night and early morning hours, with one group performing very poorly on tests for attention and working memory between 4am and 8am, for example.

That fits with other research that shows the body is most inclined to rest during that time period, the authors say. And they point out it's also the time when many sleepiness-related accidents occur "and the greatest impairment is seen in shift-work sleep disorders".

Back at Sydney University's sleep lab, researchers are looking at other target genes that could be responsible for the differing responses, and trying to identify the mechanisms behind them. They are also looking at other biological responses to sleep disruption.

For example, studies have shown that when you aren't getting enough sleep you produce more of the hormone that tells you when you're hungry, and less of the hormone that



Performance watch: Naomi Rogers observes Bradley Whitwell on a car simulator, to study the effects of sleep deprivation. Picture: James Croucher

tells you when you're full. Researchers at the lab hope to identify precisely how that link works.

"We want to find out exactly what are the metabolic changes that are taking place to make this happen, and what interventions can we put in place," says Rogers.

But what should the millions of shift-workers who are at increased risk of lifestyle diseases do in the meantime?

Short of getting another job, Dawson says the best thing they can do is adapt their lifestyle to counteract the predisposition. In short: stop smoking, drink less, eat healthier and exercise more.

And if you are struggling to get enough sleep, try to find ways to relax and "wind down" before you hit the sack, and do what you can to make your bedroom as "sleep conducive" as possible, Rogers says.

"Look around the environment you're sleeping in and see what you can change to help you sleep better. Make sure your bedroom is dark, not too hot and not too cold, don't watch TV, make sure your bed is comfortable and only use it for sleep and sex," she says.

So how much sleep should you be getting to avoid the perils of sleep deprivation? Experts recommend about eight hours a night for most adults.

"If you just want to struggle through the day and not kill yourself, four or five hours is probably enough. But if you want to be bright-eyed and bushy-tailed and function at a high-level job, an average of eight hours is ideal," Dawson says.

But needs do vary according to lots of factors such as age, gender, whether a woman is breastfeeding, genes and lifestyle, he says.

For comparison, the average Australian gets about 7.5 hours. Left to our own devices, freed from the tyranny of the alarm clock, it's more like nine to 9.5, though that's not necessarily a good thing as people have a tendency to sleep as a way to fill in time, Dawson says.

There's also a strong link between the amount of sleep people are getting and their risk of accident or injury at work, he says.

"There's good evidence that getting an average of less than six hours of sleep a night leads to significantly elevated risk of accident or injury. Less than seven hours is connected with an increased risk, but it's relatively minor. If you're getting less than five it's a serious problem."

One of the things that makes work-related sleep loss so harmful is that most people's bodies never get a chance to fully recover.