



# RESEARCH2REALITY

Shining a light on research & innovation.

## What Goes into a Good Night's Sleep?

An interview with **John Peever**, Neurobiologist  
University of Toronto

In my research lab we're interested in trying to understand why we sleep and how we sleep. It's very clear that sleep is biologically important for our brains. One of our goals is to apply what we understand about healthy sleep so that we can understand when those natural processes go wrong, how or why you develop a particular sleep disorder. And one of the things that we're most interested in my lab is called narcolepsy. Narcolepsy is a disorder of wakefulness, and so people with narcolepsy have a really hard time staying awake.

### How does your research work?

The brain is actually incredibly busy when you're sleeping. The brain doesn't simply shut off, and what we do here in my laboratory is we try to understand what parts of the brain are turning on and turning off during sleep so that you have a natural night of sleep.

We use a lot of different technologies. We put little electrodes all over the skull and we're able to measure the brain wave activity. And those brain waves are what tell us what type of sleep you're engaged in.

We're now using new tools that come from engineering and chemical engineering and genetics. And those tools are amazing because what we can actually do now is target a very specific group of cells in the brain, and we can either turn those cells on or turn those cells off, with an amazing ability to do that quickly, as if we were manipulating their normal behaviour. And why



this is so useful for us is that we can, in a sense, replicate disease. So I mentioned earlier that we're interested in narcolepsy, and people with narcolepsy fall asleep very, very quickly. So what we can do is start asking what cells in the brain are responsible for narcolepsy using these new technological advances called optogenetics and chemogenetics.

### **What is your message to the public?**

Losing half a night of sleep impairs your brain to the same level as it does when you're legally drunk. Yet people do this routinely, some of them my dear colleagues, who will in a sense brag about how hard they worked, how little sleep they get. And I always say to them, "You could do so much better if you got a good night of sleep."