

Body clock genes unravelled

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International travellers, shift workers and even people suffering from obesity-related conditions stand to benefit from a key discovery about the functioning of the body's internal clock.

Professor Chris Liddle, from the Westmead Millennium Institute for Medical Research, the University of Sydney, worked with a team from the Salk Institute based in California, to demonstrate the importance of circadian receptors found in the brain and the liver. Their findings are published in *Nature* .

"The research is important as these are the first core component of the circadian clock identified that can be targeted with drugs, which could provide relief for those affected by disrupted [circadian rhythms](#)," said Professor Liddle.

The [circadian clock](#) is an internal daily body clock that controls alertness, appetite, sleep timing and hormone [secretions](#).

"Previously we have known that there are body 'clocks' not only in the brain but in most other body tissues including the liver, part of the focus of this study. While the brain clock is mainly cued by light, these other clocks are cued by factors such as exercise and diet as well as receiving nerve and hormone signals from the central clock in the brain."

People with circadian disturbances tend to have a higher incidence of health concerns such as obesity, diabetes and related [metabolic disorders](#). It is much more than simply a problem of disturbed sleep.

"People tend to think that the clock is just something that happens in the brain but it's a whole-body issue. Literally you do not feel like exercising and your metabolism slows when you are in a certain part of the cycle. This contributes to obesity-related problems.

"When you fly overseas, not only do you wake up in the middle of the night, you probably notice you want to eat in the middle of the night, and that during the day you have reduced energy. The liver is a key player in the regulation of energy and we now understand quite a bit more how liver genes 'clock in' to the circadian cycle."

Professor Liddle, a liver expert who has worked on liver genes for more than a decade with the Salk Institute, said the team had been able to show that these receptors in the liver were important in controlling the metabolism of fats and other genes related to diet, nutrition, digestion and energy expenditure.

"This is a very exciting discovery. We have now shown that these receptors in the body's tissues do not have a peripheral role but are core components for setting our [body clock](#) that we can potentially use drugs on.

"The promise of this research for the future is that we can specifically

target drug treatments at these receptors. The hope is that not only problems like jet lag and disturbed sleep can be more easily managed but other associated health concerns can be addressed more effectively," Professor Liddle said.

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