Study reveals how anaesthesia causes jet-lag

April 17 2012

(Medical Xpress) -- Researchers from The University of Auckland have discovered why people feel as though they have jet-lag after surgery, and the findings may have implications for post-operative recovery.

“Our work shows that general anaesthesia effectively shifts you to a different time zone, producing chemically-induced jet-lag,” explains lead researcher Dr Guy Warman from the Department of Anaesthesiology and School of Biological Sciences at The University of Auckland. “It provides a scientific explanation for why people wake up from surgery feeling as though very little time has passed.”

The study showed for the first time that general anaesthetic alters the activity of key genes that control the biological clock, shifting them to a different time zone. The effect persists for at least three days, even in the presence of strong light cues telling the brain the correct time of day.

“It’s been known for some time that after anaesthesia people’s biological clocks are disrupted, and this can compromise their sleep pattern and mood as well as wound healing and immune function. By understanding why this happens we can work out how to treat it and potentially improve post-operative recovery,” says Dr Warman.

The work was done using honey bees. “It might sound unusual, but in fact bees are an ideal species to study time perception. Honey bees have an amazingly accurate sense of time, which allows them to forage and find flowers in the right place at the right time of day. By looking at their behaviour we can get a clear idea of what time of day they think it

is, and quantify the effects of anaesthesia. An added advantage is that their biological clocks work in a very similar way to mammals."

In the research, bees were trained to travel to a specific food source before being given a commonly-used anaesthetic. By tracking the direction they flew after waking from anaesthesia, or how long their foraging behaviour was delayed, researchers could work out what time of day the bees thought it was. The results showed that the bee's sense of time was significantly slowed during anaesthesia.

The researchers are already putting their findings to use in clinical studies in New Zealand, examining the extent of post-operative jet-lag in patients and how it may be treated.

The honey bee work was funded by a Marsden grant and has been published in the latest issue of the *Proceedings of the National Academy of Sciences.*

More information:
www.pnas.org/content/early/2012/04/09/1201734109

Provided by University of Auckland