

Roles of Orexin in Energy Metabolism during Sleep in Humans

Orexin, a hypothalamic neuropeptide, is known to regulate arousal and energy metabolism. In this study, researchers at University of Tsukuba demonstrated that suvorexant, a clinically used orexin receptor antagonist for treating insomnia, modulates energy metabolism in humans by influencing fat oxidation and protein catabolism.

Tsukuba, Japan—Orexin, named after its role in feeding regulation, is a potent endogenous sleep/wake state regulator and is expected to play an essential role in controlling the cross-talk mechanism between sleep/wake and energy metabolism. In 2014, suvorexant, an orexin receptor antagonist, was approved for treating insomnia, allowing for the physiological functions of orexin to be studied in humans. However, the role of orexin system in the regulation of energy metabolism remains unclear in humans. In this randomized, double-blind, placebo-controlled, crossover study, the researchers evaluated the impact of suvorexant (20 mg) on energy metabolism during sleep and the subsequent wake-up period in 14 healthy men. The total sleep time did not change significantly following suvorexant treatment; however, there was an increase in rapid eye movement (REM) sleep and a decrease in non-REM sleep stage 1. Notably, suvorexant promoted fat oxidation during sleep, with the effect persisting up to the first hour after waking up in the morning. In addition, suvorexant decreased protein catabolism, although it did not impact overall energy expenditure during sleep. These results suggest that the orexin system affects fat oxidation and protein catabolism independent of its roles in sleep/wake control, indicating another potential clinical use of orexin receptor antagonists in the long term. The findings of this study shed light on choosing hypnotic agents for patients with insomnia.

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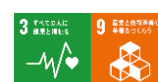
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