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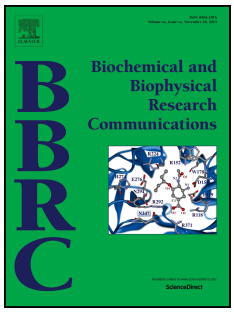

Time-fixed feeding prevents obesity induced by chronic advances of light/dark cycles in mouse models of jet-lag/shift work

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Time-fixed feeding prevents obesity induced by chronic advances of light/dark cycles in mouse models of jet-lag/shift work

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Abstract

Recent findings have uncovered intimate relationships between circadian clocks and energy metabolism. Epidemiological studies have shown that the frequency of obesity and metabolic disorders increases among shift-workers. Here we found that a chronic shift in light/dark (LD) cycles comprising an advance of six hours twice weekly, induced obesity in mice. Under such conditions that imitate jet lag/shift work, body weight and glucose intolerance increased, more fat accumulated in white adipose tissues and the expression profiles of metabolic genes changed in the liver compared with normal LD conditions. Mice fed at a fixed 12 hours under the LD shift notably did not develop symptoms of obesity despite isocaloric intake. These results suggest that jet lag/shift work induces obesity as a result of fluctuating feeding times and it can be prevented by fixing meal times. This rodent model of obesity might serve as a useful tool for understanding why shift work induces metabolic disorders.

Key words: Jet lag, Shift work, Obesity, Metabolic disorders, Circadian rhythm, Clock genes