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## Acute effect of ambient light intensity on glucose and lipid metabolism and appetite in healthy humans and obese patients with type 2 diabetes

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Artificial light is ubiquitous in present society. Observational studies show correlations between artificial light exposure, obesity, hyperglycemia and dyslipidemia<sup>(1–3)</sup> and may contribute to the increasing prevalence of obesity and type 2 diabetes mellitus (T2DM). However, the acute effect of light on appetite and glucose and lipid metabolism in humans has never been investigated.

In this randomised cross-over study, 8 healthy lean men and 8 obese men with T2DM were admitted to the clinical research unit twice in balanced order with a one week interval. After a standardised mixed meal in the evening, subjects slept in darkness for 8 hours. In the morning they were exposed to either bright light (4000 lux) or dim light (10 lux) for 5 hours. Subjects consumed a mixed meal 60 minutes after lights on and blood samples were taken and appetite scores were assessed at regular intervals.

In the lean subjects, bright light did not affect glucose concentrations, but increased fasting and postprandial plasma triglycerides compared to dim light ( $P < 0.05$ ). In patients with T2DM, bright light increased fasting and postprandial glucose and postprandial triglycerides compared to dim light ( $P < 0.05$ ). Furthermore, postprandial appetite scores, including hunger, satiety, fullness and prospective food consumption, were significantly lower in patients with T2DM under bright light condition ( $P < 0.05$ ). In both groups, heart rate variability analysis of continuous ECG recordings indicated higher sympathetic activity in the bright light condition.

Our data show that exposure to bright light in the morning increases appetite scores, plasma glucose and triglyceride levels and sympathetic drive in patients with type 2 diabetes. These data support a role for artificial light exposure in derangements of food intake and glycemia in obese patients with T2DM.

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