A single night of sleep deprivation increases ghrelin levels and feelings of hunger in normal-weight healthy men

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Sleep loss is currently proposed to disturb endocrine regulation of energy homeostasis leading to weight gain and obesity. Supporting this view, a reduction of sleep duration to 4 h for two consecutive nights has recently been shown to decrease circulating leptin levels and to increase ghrelin levels, as well as self-reported hunger. We hypothesized that similar endocrine alterations occur even after a single night of sleep restriction. In a balanced order, nine healthy normal-weight men spent three nights in our sleep laboratory separated by at least 2 weeks: one night with a total sleep time of 7 h, one night with a total sleep time of 4.5 h and one night with total sleep deprivation (SD). On a standard symptom-rating scale, subjects rated markedly stronger feelings of hunger after total SD than after 7 h sleep (3.9 +/- 0.7 versus 1.7 +/- 0.3; P = 0.020) or 4.5 h sleep (2.2 +/- 0.5; P = 0.041). Plasma ghrelin levels were 22 +/- 10% higher after total SD than after 7 h sleep (0.85 +/- 0.06 versus 0.72 +/- 0.04 ng mL(-1); P = 0.048) with intermediate levels of the hormone after 4.5 h sleep (0.77 +/- 0.04 ng mL(-1)). Serum leptin levels did not differ between conditions. Feelings of hunger as well as plasma ghrelin levels are already elevated after one night of SD, whereas morning serum leptin concentrations remain unaffected. Thus, our results provide further evidence for a disturbing influence of sleep loss on endocrine regulation of energy homeostasis, which on the long run may result in weight gain and obesity.

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