



POSTER NO 8

Nighttime Caloric Intake is not Associated with Weight Gain

Sullivan, Elinor L; Daniels, Alejandro J; Koegler, Frank H; and Cameron, Judy L; "Evidence in Female Rhesus Monkeys (*Macaca mulatta*) that Nighttime Caloric Intake is not Associated with Weight Gain", **OBESITY RESEARCH**, Vol.13 No. 12:2072-2080 December 2005

ABSTRACT

Objective: To evaluate the hypothesis that nighttime consumption of calories leads to an increased propensity to gain weight.

Research Methods and Procedures: Sixteen female rhesus monkeys (*Macaca mulatta*) were ovariectomized and placed on a high-fat diet to promote weight gain, and we examined whether monkeys that ate a high percentage of calories at night were more likely to gain weight than monkeys that ate the majority of calories during the day.

Results: Within 6 weeks post-ovariectomy, calorie intake and body weight increased significantly (129.14%, $p < 0.04$; 103.091%, $p < 0.02$, respectively). Subsequent placement on high-fat diet led to further significant increases in calorie intake and body weight (368.56%, $p < 0.001$; 113.40%, $p < 0.03$, respectively). However, there was no correlation between the increase in calorie intake and weight gain ($p < 0.34$). Considerable individual variation existed in the percentage of calories consumed at night (6% to 64% total daily caloric intake). However, the percentage of calorie intake occurring at night was not correlated with body weight ($r = 0.04$; $p < 0.87$) or weight gain ($r = 0.07$; $p < 0.79$) over the course of the study. Additionally, monkeys that showed the greatest nighttime calorie intake did not gain more weight ($p < 0.94$) than monkeys that showed the least nighttime calorie intake.

Discussion: These results show that eating at night is not associated with an increased propensity to gain weight, suggesting that individuals trying to lose weight should not rely on decreasing evening calorie intake as a primary strategy for promoting weight loss.

Conclusion: In conclusion, our findings indicate that eating at night is not associated with increased propensity to gain weight. These results suggest that individuals trying to lose weight should not rely on decreasing evening calorie intake as a primary weight loss strategy but should focus on other strategies such as decreasing overall caloric intake and increasing activity level. . .

COMMENT

This elegant animal study demolishes the myth that "eating late turns to fat", a myth prevalent throughout western culture. Eating small portions before retiring has been known for many decades as part of the Mediterranean Diet. The benefits of this diet have been ignored in northern Europe and America. A large body of scientific literature focuses on the benefits of the Mediterranean Diet with respect to the types of food groups consumed. Little focus is given to the time of eating, the effect of liver glycogen replenishment prior to bedtime, and how this may positively impact both quality of sleep and recovery mechanisms during rest. This is strange because the relation between locomotion-food seeking (light) and sleep-satiety (dark) is well established in the literature as illustrated in this quote:

". . . Yet the evidence is increasingly strong that the neurophysiologic and metabolic mechanisms responsible for the control of food-seeking behavior and the control of sleep and wakefulness are coordinated so that hunger and vigilance are paired during the daylight hours, and satiety and sleep are paired during darkness."¹

The key energy store during the night fast is the liver glycogen store, in so far as it must provide fuel for the brain over the 8 hour fast. Honey provides the perfect nutrient in terms of replenishing the liver glycogen store, and activating both sleep and recovery without digestive burden.

¹ Vantallie, Theodore B, From "Sleep and energy balance: interactive homeostatic systems", *Metabolism Clinical and Experimental*, 55 (supplement 2) (2006) s30-s35.