

Ghrelin is not Related to Hunger or Calories Consumed at Breakfast in Lean and Obese Women

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Background: The mechanisms that result in greater caloric intake in obese individuals are incompletely understood. Ghrelin administration increases ad lib food intake in humans. We investigated the relationship of ghrelin to calorie consumption and hunger at breakfast on two separate occasions in lean and obese women.

Methods: 23 lean (BMI 22.3 ± 0.5 kg/m², 26.5 ± 1.0 yr) and 25 obese (BMI 36.9 ± 0.7 kg/m², 27.8 ± 1.1 yr) women participated in a noncontiguous 2 day study. The minimum and maximum days between visits were 6 and 43 days. Participants were given the same breakfast on both days (turkey sausage, French toast with margarine/syrup, fruit cup, coffee, tea, diet soda, or water) with portions adjusted to provide 20% of the daily energy requirement for weight maintenance. Subjects were instructed to eat until full. Hunger was evaluated on a Satiety Labeled Intensity Magnitude Scale (SLIM) before and after the meal. Anchors were "greatest imaginable fullness" at 0 and "greatest imaginable hunger" at 100. Blood samples were collected over 120 minutes for measurement of active ghrelin.

Results: Lean subjects consumed an equivalent number of calories on both days (380.0 ± 14.6 vs 378.2 ± 14.9 kcal), as did the obese (419.4 ± 16.2 vs 428.8 ± 15.4 kcal). On average for both days, obese consumed significantly more breakfast calories than lean (424.1 ± 11.1 vs 379.1 ± 10.3 kcal; $P < 0.01$), but the same percentage of calories provided (85.7 ± 1.8 vs 86.1 ± 1.7 %kcal). Lean subjects rated hunger before breakfast the same on both days (69.2 ± 1.6 vs 71.7 ± 1.4), as did the obese (69.8 ± 1.6 vs 69.6 ± 1.8), and there was no difference between the groups. Lean subjects rated hunger after breakfast the same on both days (27.8 ± 1.9 vs 30.3 ± 2.4), as did the obese (25.0 ± 1.7 vs 24.3 ± 1.8). The reduction in hunger score following breakfast was significant for both groups ($P < 0.0001$), with the obese reporting significantly less hunger/more fullness after breakfast than the lean ($P = 0.02$). Fasting ghrelin was significantly greater in the lean than obese women (549.9 ± 58.9 vs 231.0 ± 29.1 pg/ml; $P < 0.0001$). Ghrelin was significantly reduced at 60 min following breakfast in the lean (375.8 ± 49.2 pg/ml; $P = 0.028$) but not the obese (212.2 ± 26.4 pg/ml). Ghrelin was not related to hunger score prior to breakfast, and there was no relationship between reduction in ghrelin and hunger score in the lean or obese.

Conclusion: Caloric intake (as a percentage provided) and hunger scores before breakfast on two occasions were the same for both lean and obese women. Fasting ghrelin was significantly different between lean and obese women but did not predict hunger score or calories consumed. Our findings do not support a role for ghrelin in driving food intake at breakfast.