The role of gut hormones in bariatric surgery

C. LE ROUX . *Metabolic Medicine, Imperial College London, UK*

Gut hormones are a collective term to describe small peptide structures produced from the gastrointestinal tract which have paracrine and endocrine effects. Increasing calorie content of meals in normal weight humans and rodents cause a graded rise in the "satiety gut hormone" Peptide YY (PYY) and a progressively lower nadir level of the "hunger hormone" ghrelin. Infusions of exogenous PYY showed reductions in appetite and food intake in a dose responsive manner. Obese humans and rodents have lower postprandial PYY responses, suggesting that obesity causes a PYY deficiency, thus reducing satiety and reinforcing obesity. Tissue and mRNA levels of PYY in obese rodents suggested normal production, but defective release of the gut hormone. Bariatric surgery is a good model to investigate mechanisms of appetite reduction associated major weight loss in humans and rodents. Gastric bypass, but not gastric banding caused increased postprandial PYY and glucagon-like peptide 1 (GLP-1) favouring enhanced satiety and improved glycaemic control. Moreover, after gastric bypass in humans and rodents, blockade of endogenous gut hormones increased food intake. Prospective human studies of gastric bypass show rapid and sustained increased PYY and GLP-1 responses associated with enhanced satiety. The sustained nature of these changes may be explained by gut adaptation and chronic hormone elevation. Thus, following gastric bypass, a pleiotrophic endocrine response may contribute to improved glycaemic control, appetite reduction, and long-term lowering of body weight.

doi:10.1016/j.appet.2008.04.145

Gender differences in basic taste perception

M. LESHEM*, M. HALIWA, A. HOCHMAN, M. MANASHEROV, A. YACCOBI. *Department of Psychology, University of Haifa, Haifa, Israel*

Gender differences are documented in smell, pain and colour perception. Gender differences in taste responses in rats are known. However, despite occasional observations of gender differences in human taste perception, there are no systematic studies. Here we assessed gender differences in intensity and hedonics of six concentrations each of NaCl, citric acid, sucrose and quinine HCl using linear visual analogue scales. Men ($n = 53$) reported lower intensity of taste than women ($n = 41$). Specifically men reported NaCl, citric acid and quinine HCl as less intense, but not sucrose. Despite these perceptual differences, hedonic evaluation only differed for quinine, men finding it less aversive then women. Menstrual cycle marginally influenced perception of taste intensity and hedonics, and did not account for the gender differences. Smoking, age (23–35 years), hunger, and cuisine (Ashkenazi *vs.* Sephardi) influenced assessment of specific tastes, but BMI did not. However, these variables did not detract from the gender differences. Men and women experience basic tastes differently. Whether these differences are significant to daily ingestive behavior requires further inquiry.

doi:10.1016/j.appet.2008.04.146

Food power scale predicts dessert eating, but not meal eating or portion size effect

D.A. LEVITSKY*, X. SHEN. *Cornell University, Ithaca, USA*

Two paper and pencil tests of eating behavior, Herman and Polivy's Restraint Scale and Lowe's Food Power scale were examined for their capacity to predict the portion size effect, the amount consumed at a meal, and dessert eating (as a measure of eating in the absence of hunger). Eighty-eight students were asked to eat lunch in the Cornell Metabolic Unit on two occasions, 1 week apart. Prior to the first meal, the subjects completed the Restraint Scale and the Food Power Scale. The lunch then offered buffet styled. The amount of food the participants removed from the buffet table and the amount they consumed were determined by weighing. Food for the second lunch consisted at the same foods the subjects ate the previous week but served restaurant style and in amounts equivalent to 150% of the foods served at first meal. Measures of hunger and satiety were taken before and after consuming each meal. After the second meal, the subjects were offered chocolate cake and ice cream for dessert. A significant portion size effect was observed indicated by a greater consumption of the second meal (minus the dessert) relative to the first. The consumption of the second meal caused a significantly greater reduction in hunger and increase in satiety than the first meal. Despite the increased feeling of satiety almost all subjects consumed dessert. The Restraint Scale failed to predict any the portion size effect or any other aspect of eating behavior. The Food Power scale also failed to predict the portion size effect by was a significant predictor of the amount of dessert consumed.

doi:10.1016/j.appet.2008.04.147

The influence of warming and cooling of the tongue on the activity of ethanol/sucrose-responsive neurons in the parabrachial nuclei in the hamster

C.S. LI*, Y.K. CHO. *Southern Illinois University, Carbondale, USA*

Gustatory responses of taste neurons in the nucleus of the solitary tract (NST) and parabrachial nuclei (PbN) are modulated by various physiological factors related to ingestive behavior. The purpose of the present study was to investigate the effect of warming and cooling of the tongue on neuronal activity of ethonal (EtOH)/sucrose-sensitive neurons in the hamster PbN. In the first set of experiments, 55 gustatory PbN neurons were recorded extracellularly in response to four basic taste stimuli, 25% EtOH, and 40 °C and 4 °C distilled water in the urethane-anesthetized hamster. Among these 55 taste-responsive PbN neurons, 32, 28, and 36 neurons responded to 25% EtOH, 40 °C and 4 °C distilled water, respectively. The response to 25% EtOH was positively related to sucrose response ($r = 0.82$, $p < 0.001$). In the second set of experiments, 30 sucrose-sensitive neurons in the PbN were recorded, in response to a series of EtOH concentrations (3–40%) alone and mixtures with 32 mM sucrose at room temperature, 40 °C and 4 °C. Neuronal responses to EtOH at room temperature (26 °C) and 40 °C increased as the concentration was raised. The response to a mixture of EtOH and sucrose was greater than EtOH or sucrose responses alone. The responses of EtOH alone or EtOH/sucrose were enhanced by applying solution at 40 °C but were flat at 4 °C. These data demonstrate that EtOH responsiveness is closely associated with sucrose sensitivity in the PbN taste neurons, and that warming augments this interaction.

Acknowledgment: Supported by NIDCD 006623.

doi:10.1016/j.appet.2008.04.148