Symposium: Ghrelin: Its Role in Energy Balance

Ghrelin: Its Role in Energy Balance

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Ghrelin was initially described as the endogenous ligand for growth hormone secretagogue receptors (1), which mediate the release of pituitary growth hormone through an alternative to the classical mechanisms of growth hormone release mediated by the growth hormone releasing factor (2). The unexpected observation that stomach was the source of ghrelin led Tschop et al. (3) to investigate its effects on energy balance. They demonstrated that exogenous ghrelin stimulates food intake and reduced fatty acid oxidation to promote positive energy balance.

Since these initial observations, rapid progress has been made in delineating the role of ghrelin in energy balance. The 4 papers in this symposium review recent advances in the physiological role of ghrelin in energy balance regulation. Castaneda et al. (4) show that, in addition to its effects on food intake and metabolism, ghrelin and other peptides modulate spontaneous physical activity. In general, the effects of these peptides on spontaneous physical activity are consistent with their effects on food intake. For example, ghrelin suppresses spontaneous physical activity and leptin stimulates it. Williams and Cummings (5) review the relation between ghrelin and both short- and long-term regulation of food intake. Ghrelin levels fluctuate in synchrony with meals and are influenced by the composition of the meal. The site of the nutrient sensor is likely to be intestinal, rather than in the stomach itself. Ghrelin levels also vary over the long term in response to adiposity, insulin resistance, and gastric surgeries. Geliebter et al. (6) show that ghrelin levels are also influenced by binge-eating disorder in humans. Subjects with binge-eating disorder had lower plasma ghrelin levels prior to a meal, and successful treatment for binge-eating disorder increased their plasma ghrelin levels. Finally, Kalra et al. (7) describe a reciprocal regulatory relation between ghrelin and leptin and propose that leptin suppresses ghrelin release at the periphery and also suppresses the effects of ghrelin on appetite centrally. These presentations describe a rich web of interactions among ghrelin and other central and peripheral regulators of energy balance under a variety of physiological and pathological conditions.

LITERATURE CITED