EXERCISE AND SPORT SCIENCES REVIEWS

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ESSR Journal Club

Covered Article: "Nonhomeostatic Control of Human Appetite and Physical Activity in Regulation of Energy Balance" by Katarina T. Borer.
Exercise and Sport Sciences Reviews. 38(3):114-121, July 2010.
Journal Club Author: Barry Braun

1. The regulatory mechanisms governing body weight/fat would be far less complex if all of the regulation was "tonic"; that is, responsive solely to changes in body energy stores. What advantages are provided by incorporating the episodic signaling pathways?

2. One of the take-home messages of the paper is that key circulating hormones are sensitive to energy balance but perceived appetite is sensitive to recent energy intake. What are the implications of that message for the design of research studies focused on physical activity and weight management?

3. Is it fair to say that, if the regulation of energy balance was perfectly homeostatic, physical activity would be totally ineffective as a tool for weight loss?

4. A distinction between studies done in humans and in non-human animal models is that animals don't know they are participating in a research study whereas humans do (assuming they have been properly informed and consented). Does that distinction help explain some of the contradictory literature regarding, for example, the effects of underfeeding on spontaneous physical activity?

5. Do the final paragraphs about circadian rhythms in circulating leptin concentrations suggest a mechanism/mechanisms to explain the link between obesity and inadequate sleep?

6. The regulation of body weight is asymmetric; that is, a robust response to weight loss that serves to restore the initial weight, and a far less potent response to weight gain. The asymmetry is usually explained by contrasting the need to adapt to millions of years of food scarcity, in which starvation was the enemy, with merely dozens of years of food plenty; in which obesity is the enemy. It's a tidy story but is there any evidence to support it? Since most animals need to move; to catch their dinner and/or avoid becoming dinner; isn't there also selective pressure to minimize weight gain?

7. How can the non-homeostatic control of energy balance be reconciled with what we teach undergraduate students on the first day of a Human Physiology class; *i.e.* homoeostasis is the "1st Law of Physiology"?

