MedicalXpress

Researchers find link between psychological stress and overeating

May 13 2008

Researchers at the Yerkes National Primate Research Center, Emory University, have found socially subordinate female rhesus macaques over consume calorie-rich foods at a significantly higher level than do dominant females.

The study, which is available in the online edition of *Physiology and Behavior*, is a critical step in understanding the psychological basis for the sharp increase in obesity across all age groups since the mid-1970s. The study also is the first to show how food intake can be reliably and automatically measured, thus identifying the optimal animal model and setting for future obesity studies.

Because the relationship between diet, psychological stress and social and environmental factors is complex, Mark Wilson, PhD, chief of the Division of Psychobiology at Yerkes, and his research team set out to determine whether individuals chronically exposed to psychologically stressful environments over consume calorie-rich foods. To do this, they studied the feeding patterns of socially housed female rhesus macaques, which are organized by a dominance hierarchy that maintains group stability through continual harassment and threat of aggression. Such structure is a constant psychological stress to subordinates.

During the study, female macaques were given access to a sweet but low-fat diet and a high-fat diet for 21 days each. For a 21-day period between each test diet, the group was able to access standard monkey chow only. To track feeding patterns, automated feeders dispensed a

pellet of either the low-fat or high-fat chow when activated by a microchip implanted in each female's wrist. Researchers found socially subordinate females consumed significantly more of both the low-fat diet and the high-fat diet throughout a 24-hour period, while socially dominant females ate significantly less than subordinate animals and restricted their feedings to daytime hours.

This difference in feeding behavior resulted in accelerated weight gain and an increase in fat-derived hormones in subordinate females. Dr. Wilson believes this may suggest profound changes in metabolism and the accumulation of body fat.

"Subordinates may be on a trajectory for metabolic problems. As this study shows, they prefer the high-fat diet and, as a result of the stress of being a subordinate, they have higher levels of the hormone cortisol. This may be involved in the redistribution of fat to visceral locations in the body, something that is clinically associated with type II diabetes metabolic syndrome," continued Dr. Wilson.

Using Yerkes' extensive neuroimaging capabilities, Dr. Wilson and his research team next will attempt to determine the neurochemical basis for why subordinate females overeat; specifically, whether appetite signals and brain areas associated with reward and satisfaction differ between subordinate and dominant females.

Source: Emory University