

Study shows calories drive earlier puberty

February 9 2012, by Jordana Lenon

(Medical Xpress) -- Environmental pollutants, eating habits, lack of exercise and genetic traits have all been raised as possible causes of earlier puberty onset in girls in recent years.

Now we may now know why: It's the calories, as reported by Ei Terasawa, Joe Kurian, Ricki Colman and colleagues at the Wisconsin National Primate Research Center at the University of Wisconsin-Madison.

Their findings, the first to document a connection between diet, growth and puberty in nonhuman primates, appear today in the journal *Endocrinology*.

Armed with the knowledge that [human societies](#) in developed countries are trending toward a declining age at [menarche](#), the team fed a group of preteen (12-month-old) female [rhesus monkeys](#) with either increased calories or a [control diet](#).

"We found that increased caloric intake accelerated body growth and puberty onset, with consistently elevated levels of the hormones [leptin](#) and IGF-1," says Terasawa, a professor of pediatrics in the School of Medicine and Public Health who has studied puberty in rhesus macaques at the Primate Center since the 1970s. "These hormones are associated with fat and with bone and [muscle growth](#), respectively."

Kurian, a research associate at the center, adds that the animals eating more and reaching puberty earlier were not obese, but they did grow

faster and larger than their age-matched controls.

Colman points out that, because puberty timing in humans is also influenced by other factors such as [genetic traits](#), living conditions, geographical location and [environmental chemicals](#), it is difficult to distinguish the effect of diet and body size from other factors on puberty in a [human population](#).

"In our rhesus monkeys, whose reproduction and development are closely matched to humans — but with the monkeys growing up faster — we could better control all other factors and were finally able to determine a single factor that affects early puberty onset," says Colman, a senior scientist with a nutritional background who also heads the well-publicized caloric restriction and aging studies at the center.

Before beginning the study, the researchers had noticed from carefully kept center records over the past 30 years that colony females were growing up faster and seemed to reach menarche at an earlier age. During this period, [caloric intake](#) in colony animals likely increased, as the animal care staff was introducing more fruit and other treats for foraging activities, snacks and training.

So the scientists decided to create controlled experiments based on these observations. Four juvenile females were fed a normal calorie diet, while another four ate an excessive amount of calories. Six to seven months later, all four overfed monkeys exhibited menarche, which should have begun 12 to 14 months later.

The findings suggest the increased importance of closely monitoring children's eating behaviors and intervening as necessary to reduce the prevalence of precocious development and metabolic diseases in adulthood. Such diseases include type II diabetes, obesity, cancer, heart disease and metabolic syndrome, Kurian says.

The average age that girls begin menstruating has declined over the past 150 years by four years, Terasawa says.

"This can be very traumatic physically and psychologically to a young girl who is already showing signs of being a woman at age 8 rather than age 12," Terasawa says.

The research not only shines a stark light on why human girls may be growing up too soon, but also has implications for laboratory animal care, veterinary medicine and agriculture, says Buddy Capuano, one of the study's authors and head of the center's Animal Services Division.

Capuano and his staff have been keeping a closer eye on how much sugar and fat center monkeys are getting to improve the overall health of the colony.

Also working on the study were Kim Keen, a senior research specialist in Terasawa's lab, and Nicholas Shiel, an undergraduate student previously in the lab.

Provided by University of Wisconsin-Madison

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