Childhood viral infection may be a cause of obesity

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The emerging idea that obesity may have an infectious origin gets new support in a cross-sectional study by University of California, San Diego School of Medicine researchers who found that children exposed to a particular strain of adenovirus were significantly more likely to be obese.

The study will be published in the September 20 online edition of the journal *Pediatrics*. September is National Childhood Obesity Awareness Month.

Jeffrey B. Schwimmer, MD, associate professor of clinical pediatrics at UC San Diego, and colleagues examined 124 children, ages 8 to 18, for the presence of antibodies specific to adenovirus 36 (AD36), one of more than 50 strains of adenovirus known to infect humans and cause a variety of respiratory, gastrointestinal and other infections. AD36 is the only human adenovirus currently linked to human obesity.

Slightly more than half of the children in the study (67) were considered obese, based on a Body Mass Index or BMI in the 95th percentile or greater. The researchers detected neutralizing antibodies specific to AD36 in 19 of the children (15 percent). The majority of these AD36-positive children (78 percent) were obese, with AD36 antibodies much more frequent in obese children (15 of 67) than in non-obese children (4 of 57).

Children who were AD36-positive weighed almost 50 pounds more, on average, than children who were AD36-negative. Within the group of

obese children, those with evidence of AD36 infection weighed an average of 35 pounds more than obese children who were AD36-negative.

"This amount of extra weight is a major concern at any age, but is especially so for a child," said Schwimmer, who is also director of Weight and Wellness at Rady Children's Hospital in San Diego. "Obesity can be a marker for future health problems like heart disease, liver disease and diabetes. An extra 35 to 50 pounds is more than enough to greatly increase those risks."

Schwimmer said he hopes this research will help shift some of the burden that falls so heavily upon obese people, in particular children.

"Many people believe that obesity is one's own fault or the fault of one's parents or family. This work helps point out that body weight is more complicated than it's made out to be. And it is time that we move away from assigning blame in favor of developing a level of understanding that will better support efforts at both prevention and treatment. These data add credence to the concept that an infection can be a cause or contributor to obesity."

While an association between AD36 and obesity in both animals and human adults has been previously described, the particulars remain poorly understood. For example, it is not known how often or under what circumstances AD36 infects, why the virus affects people differently and whether weight gain is the result of an active infection or a lasting change in a person's metabolism.

In cell cultures, Schwimmer said, the virus infects pre-adipocytes or immature fat cells, prompting them to develop more quickly and proliferate in greater numbers than normal. "This might be the mechanism for obesity," Schwimmer said, "but more work needs to be

done."

An estimated 17 percent of American children and adolescents are obese. Obese children have a 70 to 80 percent chance of becoming obese adults. Many risk factors for childhood obesity have been identified: poor eating habits or overeating, lack of exercise, family history, ethnicity, psychological problems such as stress or depression, family circumstances or socioeconomic status. Overall, obesity is linked to more than 300,000 deaths in the United States each year, with an annual estimated total economic cost of nearly $100 billion, according to the CDC.

Provided by University of California -- San Diego