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Study Shows Link Between Morbid Obesity, Low IQ In Toddlers

ScienceDaily (Sep. 3, 2006) — University of Florida researchers have discovered a link between morbid obesity in toddlers and lower IQ scores, cognitive delays and brain lesions similar to those seen in Alzheimer's disease patients, a new study shows.

Although the cause of these cognitive impairments is still unknown, UF researchers suspect the metabolic disturbances obesity causes could be taking a toll on young brains, which are still developing and not fully protected, they write in an article published in the *Journal of Pediatrics* this month.

"It's well-known that obesity is associated with a number of other medical problems, such as diabetes, hypertension and elevated cholesterol," said Daniel J. Driscoll, M.D., Ph.D., a UF professor of pediatrics and molecular genetics and microbiology in the College of Medicine and the lead author of the study. "Now, we're postulating that early-onset morbid obesity and these metabolic, biochemical problems can also lead to cognitive impairment."

Researchers compared 18 children and adults with early-onset morbid obesity, which means they weighed at least 150 percent of their ideal body weight before they were 4, with 19 children and adults with Prader-Willi syndrome, and with 24 of their normal-weight siblings. Researchers chose lean siblings as a control group "because they share a socioeconomic group and genetic background," Driscoll said. The links between cognitive impairments and Prader-Willi syndrome, a genetic disorder that causes people to eat nonstop and become morbidly obese at a very young age if not supervised, are well-established. But **researchers were surprised to find that children and adults who had become obese as toddlers for no known genetic reason fared almost as poorly on IQ and achievement tests as Prader-Willi patients. Prader-Willi patients had an average IQ of 63 and patients with early-onset morbid obesity had an average of 78. The control group of siblings had an average IQ of 106, which falls within the range of what is considered normal intelligence.**

"It was surprising to find that they had an average IQ score of 78, whereas their control siblings were 106," Driscoll said. "We feel this may be another complication of obesity that may not be reversible, so it's very important to watch what children eat even from a very young age. It's not just setting them up for problems later on, it could affect their learning potential now."

While performing head MRI scans of subjects, researchers also discovered white-matter lesions on the brains of many of the Prader-Willi and early-onset morbidly obese patients. White-matter lesions are typically found on the brains of adults who have developed Alzheimer's disease or in children with untreated phenylketonuria, the researchers wrote.

These lesions could be affecting food-seeking centers of the brain, causing the children to feel hungrier. But they are most likely a result of metabolic changes that damage the young, developing brain, Driscoll said.

More studies are needed to understand what is causing these cognitive impairments, said Merlin Butler, M.D., Ph.D., a professor of pediatrics at the University of Missouri and chief of genetics and molecular medicine at Children's Mercy Hospital and Clinics.

"This could be a really significant observation," Butler said. "It's an interesting concept. It's a whole new area of investigation."

The findings are preliminary and additional studies are planned, Driscoll said. Jennifer Miller, M.D., a UF assistant professor of pediatric endocrinology and the first author of the study, and other researchers from UF, All Children's Hospital in St. Petersburg, Fla., and Baylor College of Medicine also took part in the research.

Although there was no known genetic cause for early-onset morbid obesity in the subjects studied, Driscoll said there are likely genetic and hormonal factors at play that researchers have yet to discover, particularly since these children are becoming obese at a time when their parents still control what they eat. The researchers studied several sets of fraternal twins where one twin was lean and the other morbidly obese, yet their parents reported that each ate the same amount of food. In one case, the obese child actually ate less, Driscoll said.

Driscoll is also careful to point out that adults or children who become obese later in childhood are not at-risk for these cognitive impairments because their brains are sufficiently developed to fend off damage from obesity.

"We're all mindful that this is an obese society," he said. "We all need to be more careful with respect to what we eat, but in particular, that's very important for children under 4."

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