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Caloric moderation can reverse link between low birth weight and obesity, early study indicates

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Babies who are born small have a tendency to put on weight during childhood and adolescence if allowed free access to calories. However, a new animal model study at UCLA found when small babies were placed on a diet of moderately regulated calories during infancy, the propensity of becoming obese decreased.

Because this is an early study, UCLA researchers do not recommend that mothers of low-birth weight infants start restricting their child's nutrition and suggest they consult with their child's pediatrician regarding any feeding questions.

Previous studies have shown that growth restriction before birth may cause lasting changes of genes in certain insulin-sensitive organs like the pancreas, liver and skeletal muscle. Before birth, these changes may help the malnourished fetus use all available nutrients. However, after birth these changes may contribute to health problems such as obesity and diabetes.

"This study shows that if we match the level of caloric consumption after birth to the same level that the growth-restricted baby received in the womb, it results in a lean body type. However, if there is a mismatch where the baby is growth-restricted at birth but exposed to plenty of calories after birth, then that leads to obesity," said the lead author, Dr. Sherin Devaskar, professor of pediatrics and executive chair of the

department of pediatrics at Mattel Children's Hospital UCLA. "While many trials that include exercise and various drug therapies have tried to reverse the tendency of low birth weight babies becoming obese, we have shown that a dietary intervention during early life can have long lasting effects into childhood, adolescence and adult life."

The study appears in the June issue of the journal *Diabetes* and is currently available online.

About 10 percent of babies in the United States are born small, defined as less than the 10th percentile by weight for a given gestation period, said the study's first author, Dr. Meena Garg, professor of pediatrics and a neonatologist and medical director of the neonatal intensive care unit at Mattel Children's Hospital UCLA. She added that some organizations define low birth weight as less than 2,500 grams or 5 pounds, 5 ounces at term.

Low birth weight can be caused by malnutrition due to a mother's homelessness or hunger or her desire not to gain too much weight during pregnancy. Additional causes include illness or infection, a reduction in placental blood, smoking or use of alcohol or drugs during pregnancy.

To conduct the study, researchers used rodent animal models and simulated a reduced calorie scenario during pregnancy. The results showed that low-birth weight offspring exposed to moderately tempered caloric intake during infancy and childhood resulted in lean and physically active adults related to high energy expenditure, as opposed to unrestricted intake of calories, which resulted in inactive and obese adults due to reduced energy expenditure. The authors concluded that early life dietary interventions have far reaching effects on the adult state.

Future studies will follow this study over the stages of aging to see if

early regulation of calorie intake reverses diabetes and obesity while aging.

"This is an early pre-clinical trial that first needs to be tested in clinical trials before any form of guidelines can be developed," Devaskar said. "More importantly, we must make sure that control of caloric intake during infancy and childhood does not have any unintended side effects before taking on clinical trials. More research is required to ensure that these metabolic advantages will persist later in life."

Provided by University of California - Los Angeles