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Age at puberty linked to mother's prenatal diet

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A high-fat diet during pregnancy and nursing may lead to the child having an early onset of puberty and subsequent adulthood obesity, according to a new animal study. The results were presented Monday, June 16, at The Endocrine Society's 90th Annual Meeting in San Francisco.

An early first menstrual period, often used as a marker for early-onset puberty in girls is a risk factor for obesity, insulin resistance, teenage depression, and breast cancer in adulthood, said Deborah Sloboda, PhD, lead author of the study. She is a researcher at The Liggins Institute of the University of Auckland in New Zealand.

"Other research suggests that a combination of prenatal and postnatal influences in girls can affect the onset of menarche [menstruation]," Sloboda said.

She and her colleagues therefore studied how prenatal nutrition and nutrition during childhood interact to alter reproductive maturation. The study was done in rats.

The investigators fed pregnant rats a high-fat diet throughout pregnancy and lactation (breastfeeding). Control rats received a regular diet of rat chow. After weaning from their mother's milk, the offspring ate either regular chow or a high-fat diet. Onset of puberty was determined using established techniques. The researchers also evaluated the offspring as adults in regard to body fat composition and blood levels of sex

hormones.

The onset of puberty was much earlier in all rats whose mothers had a high-fat diet, compared with the offspring of controls that ate a regular diet, the study showed. Controls' offspring that ate a high-fat diet after weaning also entered puberty early. The combination of a high-fat maternal diet—that is, inside the mother's womb—and a high-fat diet after birth did not make the early-onset puberty any earlier, Sloboda said.

"This might suggest that the fetal environment in high fat fed mothers plays a greater role in determining pubertal onset than childhood nutrition," she said.

Later in life, rats born to mothers fed a high-fat diet had a higher amount of body fat than controls did, even if they ate a regular diet while young.

Among the adult rats that had a maternal high-fat diet, the study showed alterations in sex hormones, including increased levels of the ovarian hormone progesterone in females.

"Maternal high-fat nutrition may influence reproductive maturation and reproductive capacity in adult offspring," Sloboda said.

Source: The Endocrine Society