Bone development of the unborn young rats of obese mothers impaired

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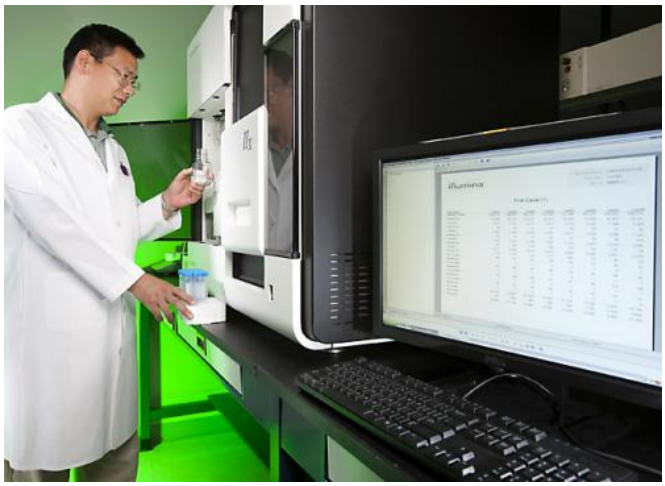

ARS-funded researcher Jin-Ran Chen has shown that bone development of unborn young of mother lab rats (dams) fed high-fat rations to induce obesity was significantly impaired when compared to bones of fetal young of dams that were given lower-fat rations.

Does obesity during pregnancy impact the baby's chances of developing strong, healthy bones? No one knows for certain, but ongoing U.S. Department of Agriculture (USDA)-funded studies at the Arkansas Children's Nutrition Center in Little Rock are helping to provide clues.

In an early investigation, Jin-Ran Chen, a principal investigator with the center's Skeletal Development Laboratory, showed that bone development of the unborn young of mother lab rats (dams) fed high-fat rations to induce obesity was significantly impaired, in contrast to the bones of the fetal young of dams that were given lower-fat rations.

Analysis of fetal bone cells from the skull and vertebrae suggests that changes in the functioning of a gene, HoxA10, may help explain this difference in early bone formation, according to Chen.

Studies by scientists elsewhere have already established that HoxA10 is important to bone formation and growth. But Chen's investigation, documented in a 2012 article in the Federation of American Societies for Experimental Biology's *FASEB Journal*, is apparently the first to suggest that obesity, induced by the high-fat regimen, may turn off or "downregulate" this gene, thus suppressing robust bone development.

Chen and his team found that HoxA10 was downregulated as a result of high levels of DNA methylation, a biochemical process also referred to as gene methylation. If the results seen in rats hold true for humans, elevated DNA methylation of HoxA10 may increase the baby's risk of developing bone disease, such as osteoporosis, later in life.

The results also suggest that it is critical to start early in ensuring that a mother's nutrition benefits the developing child's bone health.

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