

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](#).

Provided by Agricultural Research Service

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