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# Blueberries help lab rats build strong bones

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Compounds in blueberries might turn out to have a powerful effect on formation of strong, healthy bones, if results from studies with laboratory rats turn out to hold true for humans.

Jin-Ran Chen and his colleagues are exploring this idea in research funded by the U.S. Department of Agriculture (USDA) at the Arkansas Children's Nutrition Center (ACNC) in Little Rock. Chen is a principal investigator and lead scientist at the center's Skeletal Development Laboratory, and an assistant professor in the department of pediatrics at the University of Arkansas for Medical Sciences, also in Little Rock.

Chen specializes in research on how what we eat during infancy, childhood and early adulthood affects growth and development of bones and the risk of developing osteoporosis or other degenerative bone diseases in later years.

Chen's studies with young, rapidly growing laboratory rats suggest that polyphenols, the compounds that give blueberries their blue, purple, and red coloration, might aid in building strong bones. The work has paved the way for new research that might reveal whether blueberries could be used in the future in treatments to boost development of bone mass and to help prevent osteoporosis.

Published in the Journal of Bone and Mineral Research in 2010, the investigation showed that animals fed rations that contained 10 percent freeze-dried blueberry powder had significantly more bone mass than their counterparts whose rations were blueberry-free.

When the researchers exposed laboratory cultures of bone-forming cells (osteoblasts) to blood (serum) from the animals, the scientists found that serum from the blueberry-fed rats was associated with an increase in development of osteoblasts into mature, functional bone cells.

Serum in the blueberry-fed rats was high in phenolic acids, derived from the color-impacting polyphenols. The research suggests that the phenolic acids may have had bone-building effects in the rats. Studies are needed to determine whether these benefits occur in humans, Chen noted.

Chen's research also suggests that the phenolic acids stimulated bone building via a pathway that may involve, for example, two genes, TCF and LEF, and a protein, beta-catenin. Beta-catenin is responsible for prompting osteoblasts to become mature and functional, while TCF and LEF are responsible for promoting synthesis of beta-catenin.

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