

Omega-3 linked to healthier, stronger bones: Rat study

By Stephen Daniells, 07-May-2010

Increased intakes of omega-3 fatty acids, and DHA in particular, may increase bone mineral content and produce healthier, stronger bones, suggest results from a study with rats.

Omega-3 is one of the stars of the nutrition industry, with the ingredients market valued at a whopping \$1.6 billion by Frost & Sullivan. The fatty acids, most notably EPA (eicosapentaenoic acid) and DHA (docosahexaenoic acid), have been linked to a wide-range of health benefits, including reduced risk of cardiovascular disease (CVD) and certain cancers, good development of a baby during pregnancy, joint health, and improved behaviour and mood.

According to findings of a new study with rats, DHA *"appears to be a vital constituent of marrow"* and enhances bone mineral content (BMC). The findings did not extend to EPA, however.

Scientists from Purdue University, Indiana University School of Medicine, Korea Maritime University, and the US National Institutes of Health (NIH), report their findings in the *British Journal of Nutrition*.

Study details

Led by Purdue's Dr Bruce Watkins, the researchers used dual-energy X-ray absorptiometry to assess the impact of DHA on bone mineral content, compared with the omega-6 DPA (docosapentaenoic acid) or DHA plus DPA.

Rat pups bred to be omega-3 deficient were randomly assigned to receive linoleic acid (LA)- enriched rat milk, or the LA milk supplemented 1 per cent DHA, 1 per cent DPA, or 1 per cent DHA plus 0.4 per cent DPA. Once the animals reached adulthood, the fatty acid levels in their tissues were measured, and their bone mineral density (BMD) determined.

Data showed that the DPA-supplemented animals *"generally had the lowest BMC and BMD values"*, said the researchers. They also noted that DPA did not replace DHA in the bones and this indicated *"an indispensable role of DHA in bone health"*.

One small step for mice...

Scientists from NASA recently reported in the *Journal of Bone and Mineral Research* that the omega-3 EPA may protect against bone loss during space flight, a result that challenges the Purdue data.

Led by Dr Sara Zwart from the Universities Space Research Association in Houston the researchers looked at levels of a protein called NF-kappaB that is linked to a range of functions, including bone resorption, muscle wastage, and immune health. Data showed that NF-kappaB levels were higher in astronauts following periods of spaceflight. However, astronauts who reported higher intakes of fish, and therefore the omega-3s they contain, had lower levels of bone loss after spaceflight.

These observations were supported by cell studies, said the researchers, which showed that EPA decreased the activation of NF-kappaB.

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"Bone mineral content is positively correlated to n-3 fatty acids in the femur of growing rats"

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