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## **The effect of dietary fatty acids on bone marrow fat in a murine model of senile osteoporosis**

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**INTRODUCTION:** Aging induces high levels of marrow fat infiltration, which have a deleterious effect on bone mass. In contrast, fatty acids may exert protective effects on bone. Nevertheless, mechanisms and potential regulation of these phenomena remain poorly understood.

**AIM:** To analyse the changes in bone parameters and fat distribution induced by different dietary fatty acids in a murine model of senile osteoporosis.

**METHODS:** Two-month-old senescence accelerated P8 (SAMP8) mice and their SAMR1 normal controls were divided in different groups (n=20/group) and subjected to the following diets: (1) standard “growth”; (2) “sunflower” (high  $\omega 6/\omega 3$  ratio); (3) borage (high  $\gamma$  linoleic acid); (4) “fish” (high in long  $\omega 3$ ). Mice were fed ad-libitum for 10 months and then euthanized for bone and fat investigation using microCT technologies. CT scan images were analysed by SliceOmatic (Tomovision™, Montreal, Canada). Images were blind-assessed by two evaluators. Hundred slices of the region of interest were selected for each mouse. Total marrow fat volume was determined and compared to changes in bone mass and total body and visceral adipose weights.

**RESULTS:** Whereas sunflower diet exacerbated bone loss, fish and borage diets countered bone alteration in SAMP8 osteoporotic mice ( $p < 0.05$ ). This protection of bone parameters was associated with a significant raise in total body weight and visceral fat volumes for the group fed the fish diet and with a non-significant change in marrow fat volume in all of the SAMP8 groups.

**CONCLUSION:** Dietary regulation of bone mass by borage and fish oils is independent of an effect on marrow fat volume being most likely associated with their direct effect on other bone cells or by regulating fat-secreted factors. Due to their bone-protective effect, borage and fish diet could constitute a new nutritional strategy to prevent age-related bone loss in the near future.