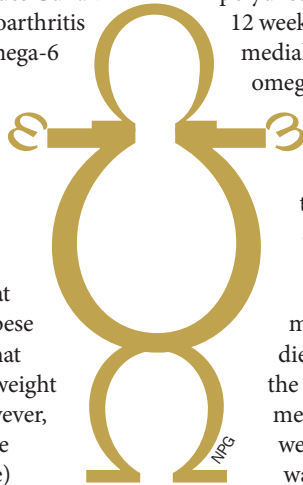


OSTEOARTHRITIS

From arthritis to omega—PUFAs regulate OA in obesity

“Supplementation of a high-fat diet with even a small amount of omega-3 fatty acids eliminates the deleterious effects of diet-induced obesity on osteoarthritis,” says Farshid Guilak, the corresponding author of a mouse study now published in *Annals of the Rheumatic Diseases*. “While the omega-3 fatty acids did not reverse injury-induced osteoarthritis,” continues Guilak “they significantly slowed osteoarthritis progression as compared to omega-6 or saturated fat diets.”

Although obesity is a risk factor for osteoarthritis (OA), researchers now suspect that body weight and body fat percentage are not the only causative factors of obesity-related OA. “Mice fed a high-fat diet containing lard become obese and show joint degeneration that is correlated to the amount of weight gained,” explains Guilak. “However, mice that are lacking leptin (the hormone that controls appetite)



and consume a low-fat control diet become morbidly obese, but do not get osteoarthritis.”

To understand dietary effects on obesity-related OA, Guilak’s team fed 4-week old mice with either a low-fat diet (control) or a high-fat diet rich in saturated fatty acids (SFAs) or omega-3 or omega-6 polyunsaturated fatty acids (PUFAs).

12 weeks later, OA was induced by medial meniscal injury. Mice fed omega-6-rich or SFA-rich diets had more heterotopic ossification of the femur (measured by μ -computed tomography) and worse synovitis with more medial macrophage infiltration (detected by histology) than mice fed an omega-3-rich diet. Of the different diets, the concentrations of serum metabolites insulin and leptin were lowest, and adiponectin was highest, in the mice fed

omega-3-rich food. Multivariate analysis showed that body weight was not a confounding factor in the association of these metabolic factors with OA.

Philip Calder an independent expert in nutritional immunology from the University of Southampton cautions that “human diets are more complex than those used in this study, as is the human condition of osteoarthritis ... nevertheless, these findings provide support for trials in humans to look at treatment effects of omega-3 fats.” Indeed, Guilak points out his team is now studying “diet and exercise effects on osteoarthritis pain, metabolic inflammation and joint biomechanics,” and they “hope to perform clinical studies on the role of different diets on osteoarthritis.”

Nicholas J. Bernard

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