Abstract


Life span is prolonged in food-restricted autoimmune-prone (NZB x NZW)F(1) mice fed a diet enriched with (n-3) fatty acids.

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OBJECTIVE: Moderate food and/or energy (calorie) restriction delays age-related immune dysfunction and prolongs life span in multiple animal models. The amount and type of dietary fatty acids can also profoundly affect life span. Marine-derived fish oils contain (n-3) fatty acids, which have potent anti-inflammatory properties.

METHODS: We therefore examined the influence of food restriction (40% overall reduction in intake of all dietary components) combined with substitution of fish oil for corn oil in a factorial design. Autoimmune-prone (NZB x NZW)F(1) (B/W) mice, which develop fatal autoimmune renal disease, were used.

RESULTS: The food-restricted/fish oil diet maximally extended median life span to 645 d (vs. 494 d for the food-restricted corn oil diet). Similarly, fish oil prolonged life span in the ad libitum-fed mice to 345 d (vs. 242 for the ad libitum/corn oil diet). Increased life span was partially associated with decreased body weight, blunting renal proinflammatory cytokine (interferon-gamma, interleukins-10 and -12 and tumor necrosis factor-alpha) levels and lower nuclear factor-kappaB (NF-kappaB). Reductions in NF-kappaB were preceded by enhanced superoxide dismutase, catalase and glutathione peroxidase activities.

CONCLUSIONS: These findings demonstrate the profound additive effects of food restriction and (n-3) fatty acids in prolonging life span in B/W mice. These observations may have additional implications in the management of obesity, diabetes, cancer and/or the aging process.

PMID: 11584100