

Abstract

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

Jolly CA, Muthukumar A, Avula CP, Troyer D, Fernandes G.

Division of Clinical Immunology, Department of Medicine, The University of Texas Health Science Center at San Antonio, San Antonio, TX 78229-3900, USA.

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.

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