

Omega-3 fatty acid rich diet prevents diabetic renal disease.

[Garman JH](#), [Mulrone S](#), [Manigrasso M](#), [Flynn E](#), [Maric C](#).

Dept. of Physiology and Biophysics, Univ. of Mississippi Medical Center, 2500 North State St., Jackson, MS 39216. cmaric@physiology.umsmed.edu).

Omega-3 polyunsaturated fatty acids (n-3 PUFA) show beneficial effects in cardiovascular disease, IgA, and diabetic nephropathy; however, the mechanisms underlying these benefits are unknown. The study was performed in male Sprague-Dawley rats randomly divided into four treatment groups: nondiabetic (ND), streptozotocin-induced diabetic (D), diabetic and fed a high n-3 PUFA diet (D+canola), and diabetic and fed a high n-6 (omega-6) PUFA diet (D+corn). Study treatments were carried out for 30 wk. D+canola significantly decreased diabetes-associated increases in urine albumin excretion (ND 17.8 +/- 6.4; D 97.3 +/- 9.4; D+canola 8.3 +/- 2.2 mg/day); systolic blood pressure (ND 153 +/- 9; D 198 +/- 7; D+canola 162 +/- 9 mmHg); glomerulosclerosis (ND 0.6 +/- 0.2; D 1.8 +/- 0.2; D+canola 0.8 +/- 0.1 AU); and tubulointerstitial fibrosis in the renal cortex (ND 1.2 +/- 0.2; D 2.0 +/- 0.2; D+canola 1.1 +/- 0.1) and the inner stripe of the outer medulla (ND 1.0 +/- 0.2; D 2.1 +/- 0.2; D+canola 1.1 +/- 0.2 AU). D+corn also exerted renoprotection, but not to the same degree as D+canola (urine albumin excretion, 33.8 +/- 6.1 mg/day; systolic blood pressure, D+corn 177 +/- 6 mmHg; glomerulosclerosis, D+corn 1.2 +/- 0.3 AU; cortical tubulointerstitial fibrosis, D+corn 1.6 +/- 0.1 AU; medullary tubulointerstitial fibrosis, D+corn 1.5 +/- 0.1 AU). In addition, D+canola attenuated D-associated increase in collagen type I and type IV, IL-6, MCP-1, transforming growth factor-beta, and CD68 expression. These observations indicate a beneficial effect of high dietary intake of n-3 PUFA in reducing diabetic renal disease.