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The Omacor®, the Combination of DHA and EPA, Decreases the Proteinuria and the Mesangial Area in the Type II Diabetic db/db Mice

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Background : Dyslipidemia in diabetes mellitus is evoked by insulin resistance and manifested as the increase of serum triglyceride (TG), mainly caused by the increase expression of SREBPs (sterol- regulatory element binding protein) which is related to glomerulosclerosis, interstitial fibrosis and proteinuria. The polyunsaturated fatty acids (PUFAs), the components of Omacor®, inhibit lipid production and enhance β - oxidation of lipid. The lipid lowering effect by PUFAs is known as the result of the decreased SREBP1cs expression. We postulate the Omacor® has the protective effect on the progression of diabetic nephropathy through the improvement of lipid profiles, especially serum TG and free fatty acid (FFA).

Methods : We gave the Omacor® to the 5 type II diabetic db/db mice (OM mice) aged 10 weeks for 2 weeks by gavage and compared the physiologic parameters with 5 control mice. The 100 glomeruli area and the ratio of mesangial area to glomerular area (M/G ratio) was measured under light microscopy in the PAS stained kidney tissues.

Results : The initial values of physiologic parameters were not different between OM and control mice. The initial serum glucose, HbA1c, and daily albuminuria was 478±73 mg/dL, 7.2±0.9 %, and 406±198 ug/day in control mice and 433 ±53 mg/dL, 8.3±2.6 %, and 903±1,603 ug/day in OM mice (All p- value >0.05 by Mann- Whitney test). After 2 week- gavage of Omacor, mean daily albuminuria in OM mice was 148±130 ug/day which was significantly lower than 562±159 ug/day in control mice (p=0.009). The three OM mice, but none of the control mice, showed to decrease daily albuminuria more than 50% after 2 week- treatment compared to basal level (p= 0.038, Pearson's chi- square test). The ccr was lower in OM mice than in control mice (24.6±13.3 ul/min vs 55.5±12.4 ul/min, p=0.014). The serum glucose, serum HbA1c, and TG in kidney homogenate were not different between both groups but the serum TG and FFA were lower in OM mice than in control mice (all p=0.047). The sum of kidney weight was lower in OM mice (0.33± 0.02 g vs 0.41±0.04 g, p=0.009) and the M/G ratio in PAS stained kidney tissues was also lower in OM mice (44.0± 7.8% vs 50.6±8.2%, p<0.001).

Conclusion : With these results, we concluded the Omacor® composed of DHA and EPA had the role of decreasing proteinuria and mesangial area in type II diabetic animals regardless of serum glucose level. This effect might be related to improve the serum TG and FFA levels by Omacor®.

Key Words : 당뇨성 신병증, 오마코, 알부민뇨
Diabetic nephropathy, Omacor, Albuminuria