Protective Role of Glycyrrhizae Radix from Peroxynitrite-induced Renal Oxidative Damages

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[Purpose]

Since peroxynitrite($ONOO^-$) formed by superoxide (O_2^-) and nitric oxide (NO) is a major factor in oxidative stress-related pathological conditions including renal failure, the recent great efforts to develop the effective and safe agents with protective activity from $ONOO^-$ has attempted us to elucidate the protective potential of Glycyrrhizae Radix from $ONOO^-$-induced oxidative damages.

[Methods]

After administration of 30 consecutive days of Glycyrrhizae Radix extract at an oral dose of 30 or 60 mg/body weight/day, renal ischemia was performed for 60 min and at 50 min during ischemia lipopolysaccharide(LPS)was injected. Six hours after LPS challenge, the samples of plasma and tissue were prepared.

[Results and Conclusion]

The LPS plus ischemia-reperfusion resulted in the elevations of plasma 3-nitrotyrosine level, renal myeloperoxidase activity and nitrated tyrosine protein concentration in kidney as the indicators of $ONOO^-$ generation. However, the administration of Glycyrrhizae Radix extract decreased the levels significantly and dose-dependently. In addition, it inhibited the reactive oxygen generation (ROS)and also showed the significant scavenging effect of NO but not that of O_2^-. Moreover, western blot analysis showed that the increased levels of inducible NO synthase(iNOS)and cyclooxygenase-2(COX-2)in kidney led to the declines by the extract, suggesting the inhibition of NO and ROS generations derived from iNOS and COX-2. The protective roles of Glycyrrhizae Radix extract from $ONOO^-$ were also observed in the elevation of the levels of glutathione and total-sulfhydryl, and reduction in the lipid peroxidation. Furthermore, the impairment of renal function induced by $ONOO^-$ ameliorated significantly assessed by the measurement of renal functional parameters, urea nitrogen and creatinine in serum. The present study indicates that Glycyrrhizae Radix would be contributed to the attenuation of $ONOO^-$-induced renal oxidative damages.