

ASSOCIATION BETWEEN OXIDATIVE DAMAGE OF MITOCHONDRIAL DNA AND PROGRESSION OF METABOLIC SYNDROME

Ta-Tsung Lin², Chen-Ling Kuo², Chin-San Liu^{1,2}

Department of Neurology¹ and Vascular and Genomic Center², Changhua Christian Hospital, Changhua, Taiwan

Objective:

Oxidative stress plays a crucial role in progression of metabolic syndrome (MetS). Mitochondrial DNA (mtDNA) is more susceptible to oxidative damage than nuclear DNA (nDNA), the amount of 8-OHdG in mtDNA may be a more meaningful index for cellular oxidative damage. Therefore, the objective of this study was to investigate the characteristics of mtDNA and nDNA oxidative damage of leukocytes in MetS. The correlation among DNA oxidative damage of leukocytes, redox molecules, lipid metabolic molecules, and MetS were also studied

Methods:

One hundred Taiwanese subjects were recruited and quantitative polymerase chain reaction (QPCR) and real time PCR were applied in this study. An unpaired t test, multi-covariate ANOVA, and Spearman's rho correlation analysis were used for statistic analysis.

Results:

Oxidative damage of nDNA in leukocytes was associated with a significant increase in Homocysteine, VCAM and 8-OHdG. Oxidative damage of mtDNA in leukocytes was associated with a significant increase in BMI, ApoB, E-selectin, GSH peroxidase, and 8-OHdG, and inversely correlated with HDL, adiponectin, coenzyme Q10, and vitamin A. Compare to control, MetS group had higher oxidative damage of mtDNA in leukocytes.

Conclusion:

The present study shows that oxidative damage of nDNA and mtDNA in leukocytes play an important role in the progression of MetS. MtDNA is more susceptible to oxidative stress than nDNA. The results may provide novel chemopreventive, diagnostic, and therapeutic strategies to MetS and other associated disorder.

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Key words:

oxidative stress, mitochondrial DNA, nuclear DNA, metabolic syndrome