Study of relationships among work-related stress, polymorphisms of Heat Shock Protein 70 gene and type 2 Diabetes in Moslem and Han people

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Background: At present, the exact association between psychological stress and polymorphisms of HSP70 gene is not clear, and no study assessing the relationships between stress and polymorphisms of HSP70 gene and T2DM in Moslem and Han people in Ningxia, China has been reported. This study is designed to explore the potential associations among work–related stress, HSP70 gene polymorphism and protein expression, and the risk of T2DM.

Methods: We applied occupational Stress Indicator (OSI), PCR-PFLP technique and ELISA respectively to detect work-related stress level, the genotype and allele frequency of HSP70-1 (+190G/C), HSP70-2 (+1267A/G) and HSP70-hom (+2437T/C), and protein expression level in serum in 201 unrelated Moslem and Han patients with T2DM and 471 healthy control.

Results: We found the high stress level, G/G genotype and G allele of 1267 HSP70-2, and high expression of HSP70 were associated with significantly higher risk of T2DM when compared with low stress level (OR after =2.406, P=0.000, 95%CI=1.535–3.773), A/A genotype (OR after =2.543, P=0.000, 95%CI=1.554–4.163), A allele (OR after =1.537, P=0.000, 95%CI=1.213–1.946), and low expression (OR after =1.780, P=0.006, 95%CI=1.176–2.694) before and after adjusting age, gender and race. But no associations were observed between the polymorphisms of HSP70 gene with the susceptibility of stress, and T2DM between Moslem and Han. The risk of high expression in G/G genotype of 1267 HSP70-2 and Moslem was higher than in A/A (OR after =1.657, P=0.014, 95%CI=1.107–2.478) before and after adjusting age, gender and race and Han (OR after =2.178, P=0.009, 95%CI=1.211–3.916) before and after adjusting age and gender.

Conclusions: High stress level, the homozygous G/G genotype and G allele of 1267 HSP70-2 and high expression of HSP70 may enhance the risk of T2DM remarkably. The genotypes of 1267 HSP70-2 may affect the expression level of HSP70. High expression in Moslem may explain partially the reason that T2DM was more common in Moslem than in Han group in Ningxia (our previous study found).

Key words: work-related stress; type 2 diabetes; HSP70; gene polymorphism; expression level; relative risk

Biography

Hui Song is a senior professor in Ningxia Medical University, and also a member of occupational psychology and stress group of China Institute of Occupational Health and Occupational Medicine and an expert of chemical toxicity appraisal in China Health Ministry. She had ever worked in McMaster University in Canada as a visiting scholar, and is invited to Japan for academic exchange and cooperation researches for three times. She has published more than 25 papers in reputed journals in China. In the recent years, she takes charge of research projects including nation natural science fund (NSFC), international cooperation of Japan-China, major project of China Education Ministry, and so on.

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