



Title	Gamma-glutamyl transferase level predicts the development of hypertension in Hong Kong Chinese
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Association of a genetic variant in adrenomedullin gene with its plasma level

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Introduction: Adrenomedullin is an adipokine with vasodilatory property. It plays a role in both acute and chronic inflammatory responses. However, there are no studies on the relationship of common single nucleotide polymorphisms (SNPs) in the gene encoding adrenomedullin (ADM) with plasma adrenomedullin. We, therefore, investigated the relationship of plasma adrenomedullin with other biomarkers related to inflammation and obesity, and SNPs in ADM.

Methods: Plasma adrenomedullin was measured by radioimmunoassay in 476 unrelated Hong Kong Chinese subjects, randomly selected from the population-based Hong Kong Cardiovascular Risk Factor Prevalence Study-2. Four SNPs (rs3814700, rs11042725, rs34354539 and rs4910118) in ADM were genotyped. Plasma C-reactive protein (CRP), fibrinogen, interleukin-6 (IL-6) and adiponectin were also measured.

Results: There was a marginally significant trend of decreasing age with increasing tertiles of plasma adrenomedullin (beta= -0.089, P=0.049). Each tertile of plasma adrenomedullin was associated with a plasma IL-6 level 11.9% (95% CI, 2.6-20.3%) lower (beta= -0.116, P=0.014). Plasma adrenomedullin level was not related to other clinical characteristics, including plasma CRP, fibrinogen and adiponectin levels. The four SNPs—rs3814700, rs11042725, rs34354539 and rs4910118—had minor allele frequencies of 31.1%, 28.7%, 33.8% and 23.4%, respectively. Carriers of the minor allele of rs4910118 had plasma adrenomedullin level 10.5% (95% CI, 2.5-17.8%) lower than the non-carriers (beta= -0.115, P=0.011). Haplotype analysis revealed a similar significant association with plasma adrenomedullin (overall P=0.040).

Conclusions: Plasma adrenomedullin is influenced by its genetic variants and is associated with plasma IL-6, but not other plasma biomarkers related to inflammation and obesity in Hong Kong Chinese.

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Introduction: Liver enzymes are elevated in cardiometabolic diseases, particularly when there is non-alcoholic fatty liver disease. We therefore investigated if hypertension is associated with elevated levels of alkaline phosphatase (ALP), alanine aminotransferase (ALT), aspartate aminotransferase and γ -glutamyl transferase (GGT).

Methods: We included 235 hypertensive and 708 normotensive subjects from the Hong Kong Cardiovascular Risk Factor Prevalence Study-2 (CRISPS-2) in 2000-2004 who had fewer than one alcoholic drink a week. In the follow-up study in 2005-2008 (CRISPS-3), 126 out of the 708 subjects had developed hypertension.

Results: In CRISPS-2, plasma ALT (OR=1.31 per SD of log-transformed level, P=0.005) and GGT (OR=1.52 per SD of log-transformed level, P<0.001) were significantly associated with prevalent hypertension after adjusting for age, sex and body mass index (BMI). Among subjects not on anti-hypertensive medication, plasma ALP and GGT were significantly associated with both systolic blood pressure (beta=0.141, P<0.001 for ALP and beta=0.096, P=0.004 for GGT) and diastolic blood pressure (beta=0.131, P<0.001 for ALP and beta=0.102, P=0.004 for GGT). In forward stepwise logistic regression analysis of subjects normotensive at CRISPS-2, the highest tertile of plasma GGT level was an independent predictor of the development of hypertension in CRISPS-3 (OR=2.40, P=0.010), together with age, BMI, systolic blood pressure and plasma CRP at baseline, and change in BMI. The other liver enzymes were not significantly predictors of new-onset hypertension.

Conclusions: Among the four liver enzymes, elevated GGT level is the strongest risk factor for hypertension in Hong Kong Chinese.

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