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Acute intake of curcumin differently affects endothelial function and nutrigenomic response in male and female smokers: a randomized controlled trial

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Objective: Curcumin, principal curcuminoid in turmeric, is obtained from the rhizomes of *Curcuma longa*. This compound exhibits potent antioxidant, anti-inflammatory, immunomodulatory or anti-angiogenic properties. Several animal studies reported hypocholesterolemic, antioxidant, anti-atherogenic and antiplatelet activities of this compound, however the cardiovascular protective effect of curcumin was still poorly investigated in humans. The aim of this study was to determine the effect of an acute intake of curcumin on vascular endothelial function in healthy smokers and its nutrigenomic impact in circulating immune cells.

Methods: in a randomized, double-blind controlled cross-over study on 18 smokers (9 men and 9 women), 50-70 yrs old, the volunteers have to consume capsules providing 5g of curcumin or a placebo. Before and two hours after the intake, the endothelial function was evaluated by measuring Flow Mediated Dilatation (FMD) in the brachial artery. The impact of curcumin on the expression of 93 genes involved in inflammation, cell adhesion, cholesterol absorption/efflux was assessed using TaqMan-Low-Density-Array (TLDA) in isolated peripheral blood mononuclear cell (PBMC)

Results: We failed to show any significant difference between curcumin and placebo for FMD when considering the entire study population mainly due to a high inter-individual variability. However, analysis of data separately for men and women revealed a significant effect of curcumin for FMD in women, but not in men. Similarly, no change in gene expression between curcumin and placebo was observed when data were analysed for all volunteers. However, analysis of gene expression data separately for men and women revealed 9 differentially expressed genes in men and 8 in women with 3 genes in common (FABP3, CXCL3, CCL20). Interestingly, the expression of the 9 and 8 genes was identified as up-regulated in men and down-regulated in women, respectively.

Conclusion: Although results did not account for a beneficial effect of curcumin in the whole studied population, sex comparison analysis suggests a difference in nutrigenomic and vascular responses to curcumin between men and women.