Zinc transporter genes are coordinately expressed in men and women independently of dietary or plasma zinc.

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BACKGROUND: The zinc transporter (ZnT; SLC30) and Zrt- and Irt-like protein (Zip, SLC39) zinc transporter families are integral to the maintenance of intracellular zinc concentrations. Few studies have examined the expression patterns of zinc transporter genes in human primary tissues.

OBJECTIVE AND METHODS: This study investigated the expression levels of a range of zinc transporter mRNA in the peripheral blood mononuclear cells of healthy men and women (n = 40) using quantitative real-time PCR. It also explored the relationships among zinc transporter expression levels, plasma zinc concentrations, and dietary zinc intake.

RESULTS: The relative expression of the zinc transporter mRNA varied considerably, with ZnT7, ZnT1, and Zip1 being the most abundantly expressed. ZnT1 and Zip1 mRNA were highly correlated with one another (r = 0.9; P < 0.001) and with ZnT5, ZnT7, Zip3, and Zip10 (P < 0.001). When analyzed by gender, a correlation between the mRNA of ZnT7 and Zip3 (r = 0.6; P < 0.01) was demonstrated only in women. Zip10 mRNA was correlated with ZnT1 and Zip1 (r = 0.9; P < 0.001) in men only. In a regression analysis, plasma zinc variability was not significantly explained by dietary zinc intake, gender, age, or any individual or combination of zinc transporters.

CONCLUSION: This study expands what is known about both the levels of zinc transporter gene transcription in humans and the extent of its variation in healthy men and women. The positive association between the mRNA of ZnT1 and Zip1, which have reciprocal roles in zinc transport across the plasma membrane, provides insight into the coordinated control of zinc homeostasis in humans.

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