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Environmental Health

P E R S P E C T I V E S

Published by the National Institute of
Environmental Health Sciences

ehponline.org

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**Marco A. Méndez, Magdalena Araya, Manuel Olivares,
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doi:10.1289/ehp.7134 (available at <http://dx.doi.org/>)

Online 17 August 2004



**The National Institute of Environmental Health Sciences
National Institutes of Health
U.S. Department of Health and Human Services**

Sex and ceruloplasmin modulate the response to copper exposure in healthy individuals.

Marco A. Méndez, Magdalena Araya, Manuel Olivares, Fernando Pizarro, Mauricio González.

Institute of Nutrition and Food Technology, University of Chile.

Mailing address:
Marco A. Méndez PhD
Institute of Nutrition and Food Technology (INTA)
University of Chile
Macul 5540
Santiago 11 - CHILE
Phone: 56 (2) 678 1545
Fax: 56 (2) 2214030
Email: mmendez@inta.cl

This investigation was funded by the International Copper Association (ICA).

Short running head: Ceruloplasmin and sex in copper response.

Key words: Copper exposure, Principal component analysis, Discriminant analysis, healthy individuals.

List of abbreviations: Cp= Ceruloplasmin; GOT= glutamic-oxalacetic transaminase); GPT =glutamic-pyruvic transaminase); GGT gamma glutamyl transferase; DA =Discriminant Análisis; DMPS¹=Dimercapto-1-propansulfonsäure(DMPS), natrium salt, monohydrate; DMPS (0-4)= urinary copper excretion from 0-4 hours after administering 300 mg; DMPS (5-24)= urinary copper excretion from 5-24 hours after administering 300 mg DMPS (24h)= 24 hour urinary copper excretion after administering 300 mg DMPS; MNC= mononuclear cells; PCA= Principal Component Analysis; LDA= Linear Discriminant Analysis; TDI= Tolerable daily intake.

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Abstract

Previous studies indicated that sex might influence the response to copper exposure. Ceruloplasmin is an indicator of copper status but it is not clear whether and how it reflects changes of copper status among healthy population. In this study, eighty-two apparently healthy women and men were chosen among 800 individuals because their ceruloplasmin values belonged to the higher and lower 10% in the group ceruloplasmin distribution curve, respectively. Before and after receiving a supplement of 10 mg Cu/day (Upper Limit of Daily Intake), for two months, blood and urinary biochemical measurement of potential copper markers were performed. Principal Component Analysis and Linear Discriminant Analysis were used to identify blood and/or urinary copper indicators that showed a differential response to copper. Results showed that Cp values in serum represent a reliable indicator to differentiate subgroups within the normal population in their response to copper exposure. The response depends on Cp values and on sex, such that women with higher and men with lower Cp values exhibit the greatest response.