Influence of estrogens on copper indicators: In vivo and in vitro studies

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Classic copper indicators are not sensitive and specific for detecting excess copper exposure when this is higher than customary but not markedly elevated. Serum copper and ceruloplasmin (Cp) are the most commonly used indicators to assess nutritional status of copper. The objective of this paper was to study the influence of estrogens on these indicators and others used to assess early effects of excess copper exposure in humans and the expression of a set of copper related proteins in a hepatic cellular model. For the studies in humans, 107 healthy participants (18-50 years) were allocated as follows: group 1 (n=39), women assessed on day 7 of their hormonal cycle; group 2 (n=34), women assessed on day 21 of their hormonal cycle, and group 3 (n=34, comparison group), healthy men. Participants received 8 mg Cu/day (as copper sulfate) during 6 months. Serum Cp and Cu, Cu-Zn-superoxide dismutase activity, liver function indicators [aspartate aminotransferase (AST), alanine aminotransfer