Estrogen Status Alters Tissue Distribution of Oral Dose of 75Se-Selenite and Enhances Hepatic Levels of SelP mRNA, GPx mRNA, GPx activity and Se

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ABSTRACT

An association between male and female sex hormones and selenium (Se) status has been reported in animals and humans. These relationships may be important relative to the use of selenium in hormone related diseases such as breast cancer. The purpose of this study was to examine the effect of estrogen status on the tissue distribution of Se and mRNA levels of selenoprotein P (SelP) and glutathione peroxidase (GPx) in liver. 60 μCi of 75Se as selenium was orally administered to each bilaterally ovariectomized rat 5 weeks after implantation with either placebo pellet (OVX) or pellet with estradiol (OVX+E2). Blood and tissues were collected 1, 3, 6, 24 h after dosing. Differences (P<0.05) in 75Se in blood, liver, heart, kidney, spleen, brain, and thymus were noted at certain times. Plasma SelP in OVX+E2 group contained a greater percentage of 75Se at 3, 6 and 24 h compared to OVX group (P<0.05). 75Se in plasma GPx also was greater in OVX+E2 compared to OVX group at 24 h (P<0.05). Real-time RT-PCR analysis showed that both hepatic SelP mRNA (0.93 vs. 0.56) and GPx mRNA (2.81 vs. 2.24) were significantly greater in OVX+E2 group than in OVX group. These results suggest that estrogen status affects distribution of ingested Se in tissue- and time-dependent manners, as well as the expression of hepatic Se and GPx at both protein and mRNA level.

INTRODUCTION

•Relationships between gender sex hormones and Se status have been observed in animals and humans.
•Preliminary findings from our laboratory strongly support the relationship between estrogen and tissue Se status.
•Insights into how estrogen on distribution and metabolism of Se is limited.
•We hypothesise that estrogen status will affect metabolism of ingested Se and that estrogen will affect Se and GPx mRNA.
•The objective of this study was to examine the effect of estrogen status on tissue distribution and metabolism of Se at both mRNA and protein levels in a rat model.
•The results of this study are important when considering the use of Se in the prevention or treatment of hormone-related diseases such as breast cancer.

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METHODS

ABSTRACT

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RESULTS

SUMMARY AND CONCLUSIONS

REFERENCES


•The results of this study are important when considering the use of Se in the prevention or treatment of hormone-related diseases such as breast cancer.

Figure 1 75Se in plasma and GPx mRNA in liver, heart, brain, and thymus.

Figure 2 75Se in plasma and GPx mRNA in liver, heart, brain, and thymus.

Figure 3 75Se in plasma and GPx mRNA in liver, heart, brain, and thymus.

Figure 4 75Se in plasma and GPx mRNA in liver, heart, brain, and thymus.

Figure 5 75Se in plasma and GPx mRNA in liver, heart, brain, and thymus.

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Figure 10 75Se in plasma and GPx mRNA in liver, heart, brain, and thymus.

Figure 11 75Se in plasma and GPx mRNA in liver, heart, brain, and thymus.

Figure 12 75Se in plasma and GPx mRNA in liver, heart, brain, and thymus.