Model of Se deprivation in Caco-2 cells and macrophages in culture

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Background and objectives:

Modern poultry industry involves high rates of animal growth, which leads to a high sensitivity to stress situations. Selenium (Se) could contribute to an optimal state of health by the formation of selenium-proteins that maintain the oxidation/reduction state. The hypothesis is that dietary supplementation with Se can protect chickens from stress. Our objective was to establish a model of Se deprivation in cultures of intestinal Caco-2 cells and macrophages to further investigate the effects of supplementation with different Se sources. The indicators considered to validate the model are glutathione peroxidase (GPx) and thioredoxin reductase (TrxR) activity and selenoprotein P (SEPP1) protein and gene expression.

Methodology:

Given that fetal bovine serum (FBS) is the main source of Se in cultures, FBS deprivation would induce Se deficiency. Caco-2 cells and macrophages were incubated in absence of FBS during 6 days and 24 h, respectively. A positive control of cells maintained with FBS was also included.

Results and conclusions:

In Caco-2 cells, GPx activity and SEPP1 protein and gene expression in the absence of FBS show statistically lower values than the positive control, whereas no differences were detected for TrxR activity. In macrophages, GPx and TrxR activity as well as SEPP1 protein and gene expression in the absence of FBS show lower values than the positive control, although only statistical differences were detected for GPx activity and SEPP1 protein expression. The results obtained allow us to conclude that the model of deprivation for both cell cultures is established.

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