SeMet protects against AFB1 and OTA - induced toxicity by improving selenoprotein expressions

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In recent years, numerous studies indicated that organic Se is more bioavailable. However, little has been done about the mechanisms of how Seleno-Methionine (SeMet) protects against AFB1 and OTA - induced toxicity. Firstly, the primary splenocytes isolated from healthy pigs were stimulated by anti-pig-CD3 monoclonal antibodies and treated by various concentrations of SeMet and AFB1. The results showed that SeMet supplementation alleviated the immunotoxicity of AFB1 in a dose-dependent manner. Addition of buthionine sulfoximine abrogated the protective effects of SeMet against AFB1. SeMet enhanced mRNA and protein expression of Glutathione Peroxidase 1 (GPx1), Selenoprotein S (SelS), and thioredoxin reductase 1 without and with AFB1 treatments. Furthermore, knockdown of GPx1 and SelS by GPx1-specific siRNA and SelS-specific siRNA diminished the protective effects of SeMet against AFB1-induced immunotoxicity. Secondly, the protective effects of SeMet against OTA-induced nephrotoxicity were investigated in PK15 cells. The results showed that OTA induced nephrotoxicity in a dose-dependent manner. SeMet at 0.5, 1, 2 and 4 μM had significant protective effects against OTA-induced nephrotoxicity. Furthermore, SeMet enhanced the activity, mRNA and protein expression of GPx1, mRNA expression of GPx4, mRNA expression of thioredoxin reductase 1 in the presence and absence of OTA. Knock-down of GPx1 by using a GPx1-specific siRNA eliminated the protective effects of SeMet against OTA-induced nephrotoxicity. In conclusion, SeMet diminishes AFB1-induced immunotoxicity and OTA-induced nephrotoxicity by improving selenoprotein expression in PK15 cells.

Recent Publications

1. Xue J, Jiang W, Chen Y, Gong F, Wang M, Zeng P, Xia C, Wang Q and Huang K (2017) Thioredoxin reductase from *Toxoplasma gondii*: an essential virulence effector with antioxidant function. FASEB Journal doi: 10.1096/fj.201700008R.
2. Qian G, Liu D, Hu J, Gan F, Hou L, Chen X and Huang K (2017) Ochratoxin A-induced autophagy *in vitro* and *in vivo* promotes porcine circovirus type 2 replication. Cell Death and Disease 8(6):e2909.
3. Gan F, Zhou Y, Hou L, Qian G, Chen X and Huang K (2017) Ochratoxin A induces nephrotoxicity and immunotoxicity through different MAPK signaling pathways in PK15 cells and porcine primary splenocytes. Chemosphere 182:630-637.
4. Xue H, Gan F, Qian G, Hu J, Hao S, Xu J, Chen X and Huang K (2017) Astragalus polysaccharides attenuate PCV2 infection by inhibiting endoplasmic reticulum stress *in vivo* and *in vitro*. Scientific Reports 7:40440.
5. Xu Haibin, Hao Shu, Gan Fang, Wang Hong, Xu Jing, Liu Dandan and Huang Kehe (2017) *In vitro* immune toxicity of ochratoxin A in porcine alveolar macrophages: A role for the ROS-relative TLR4/MyD88 signaling pathway. Chemico-Biological Interactions 272:107-116.

Biography

Kehe Huang is currently a Professor and Head of Clinical Subject, College of Veterinary Medicine, Nanjing Agricultural University, China. He earned his DVM and PhD in Veterinary Pathology from Nanjing Agricultural University in 1982 and 1994, respectively. In 1982, 1994 and 1999, he accepted Assistant Professor, Associate Professor and Full Professor positions at Nanjing Agricultural University, where he has been since that time. He has been working as Chair of Clinical Department from 1998 to 2017. He was a Visiting Scientist at universities in United States and UK in 1996-1998, 2009. He has been working in teaching of veterinary internal medicine, study on nutrient-immunity interactions, and diagnosis and treatment of veterinary clinic. His work leads to development of selenium-enriched probiotics, a new organic source of selenium and a new understanding for application of organic selenium on animal production. He has over 280 refereed publications, including over 80 SCI publications.

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