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谷氧还蛋白1和硫氧还蛋白1基因在云南乌金猪不同组织中的表达特点及*L*-组氨酸对其在氧化应激细胞中表达的影响

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Glutaredoxin 1 and Thioredoxin 1: Gene Expression Characteristics in Different Tissues and Effects of *L*-Histidine on Gene Expressions in Oxidant Stress Cells of *Yunnan Wujin* Pigs

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- 摘要
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摘要 本试验旨在研究抗氧化基因谷氧还蛋白1(*GRX*1)、硫氧还蛋白1(*TRX*1)在云南乌金猪脑垂体、下丘脑、甲状腺、胸腺、胰腺、生殖腺、肝脏、皮肤、十二指肠、空肠、回肠11种组织中的差异表达,探讨*L*-组氨酸对乌金猪氧化应激细胞中*GRX*1、*TRX*1基因表达的调节作用。采用实时荧光定量PCR(RT-qPCR)方法检测乌金猪组织中*GRX*1、*TRX*1基因表达;以过氧化氢(H_2O_2)为氧化应激源建立氧化应激细胞模型,探讨*L*-组氨酸对*GRX*1、*TRX*1基因表达的调节作用。结果表明:1)*GRX*1、*TRX*1基因在乌金猪被检测组织中均有表达,肝脏表达量最高,其次是皮肤、空肠,其他组织中的表达量相对较低;2)乌金猪组织中*TRX*1基因表达量明显高于*GRX*1基因表达量;3)细胞培养结果表明,受到H_2O_2刺激时,氧化应激细胞中*GRX*1、*TRX*1基因产生过表达,*L*-组氨酸对氧化应激细胞或非应激细胞中*GRX*1、*TRX*1基因表达具有调节作用,其适宜浓度约为280 μg/mL。乌金猪*GRX*1、*TRX*1基因表达具有明显组织特异性,H_2O_2可诱导氧化应激细胞中*GRX*1、*TRX*1基因产生过表达,添加适宜浓度的*L*-组氨酸可以调节氧化应激细胞或非应激细胞中*GRX*1、*TRX*1基因表达。结果提示,通过营养途径可诱导乌金猪体内*GRX*1、*TRX*1基因的表达,这是缓解机体氧化应激损伤和增强抗氧化能力的一种有效方式。

关键词: 乌金猪 氧化应激 谷氧还蛋白1 硫氧还蛋白1 基因表达 *L*-组氨酸

Abstract: This experiment was conducted to investigate the gene expressions of glutaredoxin 1 (*GRX*1) and thioredoxin 1 (*TRX*1) in pituitary, hypothalamus, thyroid, thymus, pancreas, gonad, liver, skin, duodenum, jejunum and ileum tissues and explore the regulation of *L*-histidine on gene expressions in oxidative stress cells of *Yunnan Wujin* pigs. Different expressions of *GRX*1 and *TRX*1 genes were determined by the method of real-time quantitative PCR (RT-qPCR), and the regulation of *L*-histidine on *GRX*1 and *TRX*1 gene expressions was explored in oxidative stress cells induced by H_2O_2. The results showed as follows: 1) *GRX*1 and *TRX*1 gene expressions in tissues of *Wujin* pigs were detected, the highest gene expressions of *GRX*1 and *TRX*1 were in the liver, and then skin and jejunum, and relatively lower gene expressions were in the other tissues. 2) *TRX*1 gene expression in tissues was higher than *GRX*1 gene expression for *Wujin* pigs. 3) The results of cell culture showed that when being induced by H_2O_2, oxidative stress cells produced the over expression of *GRX*1 and *TRX*1 genes. *L*-histidine had the regulation on *GRX*1 and *TRX*1 gene expressions in oxidative stress or no stress cells, being the adequate concentration of 280 μg/mL. *GRX*1 and *TRX*1 gene expressions had the obvious tissue characteristics for *Wujin* pigs. H_2O_2 could induce the over expression of *GRX*1 and *TRX*1 genes in oxidative stress cells. Adding adequate concentration of *L*-histidine could regulate *GRX*1 and *TRX*1 gene expressions in oxidative stress or no stress cells of *Wujin* pigs. It is suggested that this may be an important way of reducing the oxidative stress damage and improving the oxidation resistance, being *GRX*1 and *TRX*1 gene expressions of animal body induced by nutritional pathway for *Wujin* pigs.

Keywords: *Wujin* pigs, oxidative stress, *GRX*1, *TRX*1, gene expression, *L*-histidine

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