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研究报告

鸡缺氧诱导因子-1[[alpha]]基因的差异表达与低氧适应性

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摘要

低氧诱导因子-1(HIF-1)是在低氧的癌细胞中发现的一种转录激活因子, 在生物体氧平衡调节中起关键作用。藏鸡是对高原低氧、低温环境有着极强适应能力的高原土著品种, 相对而言, 白来航鸡和寿光鸡为两个低地鸡种。在常氧环境下对这3个鸡品种进行全期模拟低氧孵化, 结果显示, 藏鸡的孵化率显著高于两个低地鸡品种, 表现出了高度的耐受低氧环境的能力, 而对于低地鸡, 一定程度的低氧环境对其孵化是致命的。利用Taqman探针法FQRT-PCR技术检测了藏鸡、白来航鸡、寿光鸡HIF-1[[alpha]] 的组织特异性表达。结果表明, HIF-1[[alpha]] mRNA在3个鸡品种的大脑和骨骼肌组织均有表达, 并有明显的组织差异性, 脑的表达量最大; 并且发现常氧条件下孵化时, 藏鸡胚胎的大脑组织内*HIF*-1[[alpha]] 基因的表达量与低氧孵化的低地鸡胚胎相接近.

关键词 藏鸡 低氧诱导因子-1[[alpha]] 差异表达 低氧适应性

分类号

Differential gene expression of hypoxia inducible factor –1[[alpha]] and hypoxic adaptation in chicken

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Abstract

<P>Hypoxia inducible factor-1 (HIF-1) is a transcriptional factor first discovered in cancer cells under hypoxic conditions, and was demonstrated to play a key role in the organism's adaptation to changing oxygen tensions. The Tibetan chicken, a breed indigenous to the Tibetan plateau is particularly adaptable to the low oxygen tension and low temperature conditions in the high altitude environment. By comparison, the White Leghorn and ShouGuang chicken are low-altitude chicken breeds. The eggs of these three chicken breeds were incubated in a fitted hatcher that simulated hypoxic condition. The results demonstrated that the hatching rate for Tibetan chicken was significantly higher than the two low altitude breeds, and Tibetan chicken displayed higher endurance in the hypoxia environment. To a certain degree, the hypoxic condition proved fatal to hatching for the low-altitude chickens. Gene expression of HIF-1<FONT face=Verdana>[[alpha]]</FONT> was detected in brain and skeletal muscle tissues for three chicken varieties using the TaqMan probe FQRT-PCR method. The results showed that HIF-1a mRNA displayed tissue specific differential expression, with the highest in the brain. In addition, the expression of HIF-1<FONT face=Verdana>[[alpha]]</FONT> mRNA in the brain of Tibetan chicken embryos was similar to that of the low-altitude chickens when they were hatched under normal oxygen tensions.</P>

Key words Tibetan chicken hypoxia inducible factor –1a (HIF-1a) differential gene expression hypoxia adaptability

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