动物营养学报
CHINESE JOURNAL OF ANIMAL NUTRITION

动物营养学报 » 2012, Vol. » Issue (5) :845-851 DOI: 10.3969/j.issn.1006-267x.2012.05.008

铁过量或缺乏对新生仔猪血清生化指标及肝脏 hepcidin mRNA表达量的影响

刘庆华[1], 杨建平[2], 刘延贺[1], 朱宽佑[1], 李梦云[1,2]

1. 郑州牧业工程高等专科学校, 郑州 450011;
2. 河南省无公害饲料工程技术研究中心, 郑州 450011

Effects of Iron Overload or Deficiency on Serum Biochemical Indices and Liver Hepci mRNA Expression of Newborn Piglets

LIU Qinghua[1], YANG Jianping[2], LIU Yanhe[1], ZHU Kuanyou[1], LI Mengyun[1,2]

1. Zhengzhou College of Animal Husbandry and Engineering, Zhengzhou 450011, China;
2. Henan Pollution-Free Feed Engineering Technology Research Center, Zhengzhou 450011, China

- 摘要
- 参考文献
- 相关文章

摘要 本试验旨在研究铁过量或缺乏对新生仔猪血清生化指标及肝脏hepcidin mRNA表达量的影响。挑选新出生的"杜长大"三元杂交仔猪15头,随机分为3组,即缺铁组、正常组和铁过量组,每组5个重复,每个重复1头猪。3和7日龄时,缺铁组分别注射1 mL生理盐水,正常组分别注射1 mL右旋糖酐铁(含铁150 mg),铁过量组分别注射3 mL右旋糖酐铁(含铁450 mg)。7日龄时,将所有仔猪全部处死,采集血清,并分离肝脏和脾脏,以测定血清生化指标、机体铁含量和肝脏hepcidin mRNA表达量。结果表明:肝脏、脾脏和血清中铁的含量均随着注射铁量的增加而显著或极显著增加($P<0.05$或$P<0.01$)。与正常组相比,铁过量组血清中血红蛋白、球蛋白、总蛋白、丙二醛含量以及谷胱甘肽过氧化物酶、过氧化物酶活性显著或极显著升高($P<0.05$或$P<0.01$),超氧化物歧化酶活性显著降低($P<0.05$);而缺铁组血清中血红蛋白、球蛋白、总蛋白、丙二醛含量以及谷胱甘肽过氧化物酶、过氧化氢酶、过氧化物酶活性则显著或极显著降低($P<0.05$或$P<0.01$),超氧化物歧化酶活性显著升高($P<0.05$)。与正常组相比,铁过量组仔猪肝脏中hepcidin mRNA表达量极显著升高($P<0.01$),而缺铁组则极显著降低($P<0.01$)。由此得出,铁过量或缺乏均会影响新生仔猪机体的免疫功能和抗氧化功能;铁过量可提高新生仔猪机体铁含量和肝脏中hepcidin mRNA表达量,铁缺乏则会降低新生仔猪机体铁含量和肝脏中hepcidin mRNA表达量。

关键词: 新生仔猪 铁过量 缺铁 血清生化指标 hepcidin mRNA表达量

Abstract: This experiment was conducted to investigate the effects of iron overload or deficiency on serum biochemical indices and liver hepcidin mRNA expression of newborn piglets. A total of 15 cross-bred (Duroc×Landrace×Large white) neonatal piglets with an average body weight of (1.22±0.13) kg were randomly divided into 3 groups (iron-deficiency group, regular group and iron-overload group) with 5 replicates per group and 1 piglet per replicate. At 3 and 7 days of age, the piglets in the 3 groups were injected 1 mL physiological saline, 1 mL dextriferron (450 mg iron) and 3 mL dextriferron (450 mg iron), respectively. At 7 days of age, all piglets were killed, and blood, liver and spleen were collected to measure iron content, serum biochemical indices and liver hepcidin mRNA expression. The results showed as follows: iron contents in liver, spleen and serum were all significantly increased with injected Fe content increasing ($P<0.05$ or $P<0.01$). Compared with the regular group, the contents of hemoglobin, globulin, total protein and malondialdehyde and the activities of glutathione peroxidase and peroxidase in serum were significantly increased and the superoxide dismutase activity in serum was significantly decreased in iron-overload group ($P<0.05$ or $P<0.01$), while the contents of hemoglobin, globulin, total protein and malondialdehyde and the activities of glutathione peroxidase, catalase and peroxidase in serum were significantly decreased and the superoxide dismutase activity in serum was significantly increased in iron-deficiency group ($P<0.05$ or $P<0.01$). Compared with the regular group, liver hepcidin mRNA expression was significantly increased in iron-overload group ($P<0.01$) and significantly decreased in iron-deficiency group ($P<0.01$). In conclusion, iron overload or deficiency can affect the immune function and anti-oxidant function of newborn piglets; iron overload and deficiency can increase and decrease body's iron content and liver hepcidin mRNA expression of newborn pigs, respectively.

Keywords: newborn piglets, iron overload, iron deficiency, serum biochemical indices, hepcidin mRNA expression

Service
把本文推荐给朋友
加入我的书架
加入引用管理器
Email Alert
RSS
作者相关文章
刘庆华
杨建平
刘延贺
朱宽佑
李梦云

收稿日期: 2011-11-12;

基金资助:河南省科技攻关项目(102102110113)

通讯作者 李梦云,副教授,E-mail: limengyun1@163.com

引用本文:

刘庆华, 杨建平, 刘延贺等 . 铁过量或缺乏对新生仔猪血清生化指标及肝脏 hepcidin mRNA表达量的影响 [J]. 动物营养学报, 2012,V(5): 845-851

LIU Qinghua, YANG Jianping, LIU Yanhe etc . Effects of Iron Overload or Deficiency on Serum Biochemical Indices and Liver Hepcidin mRNA Expression of Newborn Piglets[J]. Chinese Journal of Animal Nutrition, 2012,V(5): 845-851.

链接本文:

http://118.145.16.228/Jweb_dwyy/CN/10.3969/j.issn.1006-267x.2012.05.008 或 http://118.145.16.228/Jweb_dwyy/CN/Y2012/V/I5/84

[1] KRAUSE A,NEITZ S,MAGERT H J,et al.LEAP-1,a novel highly disulfide-bonded human peptide,exhibits antimicrobial activity[J].The Journal Rapid Publication of Short Reports in Molecular Biosciences,2000,480(5):147-150.

[2] PIGEON C,ILYIN G,COURSELAUD B,et al.A new mouse liver-specific gene,encoding a protein homologous to human antimicrobial peptide hepcidin,is overexpressed during iron overload[J].The Journal of Biological Chemistry,2001,276(6):7811-7819.

[3] NICOLAS G,CHAUVET C,VIATTE L,et al.The gene encoding the iron regulatory peptide hepcidin is regulated by anemia,hypoxia and inflammation[J].The Journal of Clinical Investigation,2002,110(7):1037-1044.

[4] 魏华英,马刚,张莉,等.SD大鼠缺铁性贫血模型的建立[J].四川动物,2007,26(1):190-191.

[5] 许祯莹,陈代文,玉冰.断奶仔猪缺铁模型的建立及酵母铁对断奶仔猪生长及血液生化指标的影响[J].动物营养学报,2009,21(6):897-902.

[6] ZHANG A S,ANDERSON S A,WANG J H,et al.Suppression of hepatic hepcidin expression in response to acute iron deficiency is correlated an increase of matripatase-2 protein in the liver[J].The Journal of the Federation American Societies Experimental Biology,2011,25(8):14

[7] 朱航,张守华,雷蕾,等.不同剂量铁对小鼠肝脏损伤作用的实验研究[J].热带医学杂志,2007,7(2):129-132.

[8] 龙玥娇,孙长颢,王朝旭.铁负荷对大鼠脂质过氧化作用影响及抗氧化维生素对其抑制作用[J].卫生研究,2003,32(3):209-211.

[9] 谢秀梅,曹霞,陈美芳,等.慢性铁过量对和*OE*基因敲除小鼠动脉粥样硬化病变的影响[J].中南大学学报:医学版,2008,33(1):57-62.

[10] 冷慧敏,骆新民,朱航.小鼠铁过量模型建立及相关指标的观察研究[J].齐鲁医学杂志,2008,23(4):331-334.

[11] WEINSTEIN D A,ROY C N,FLEMING M D,et al.Inappropriate expression of hepcidin is associated with iron refractory anemia:implications fo anemia of chronic disease[J].Blood,2002,100(10):371-376.

[12] HANSEN S L,TRAKOOLJUL N,SPEARS J W,et al.Age and dietary iron affect expression of genes involved in iron acquisition and homestasis young pigs[J].The Journal of Nutrition,2010,140(2):147-150.

[1] 张铁涛, 崔虎, 杨颖, 吴学壮, 高秀华, 杨福合, 邢秀梅.饲粮蛋白质水平对育成期母貂生长性能、营养物质消化代谢及血清生化指标的影响 [J]. 动物营报, 2012,(5): 835-844

[2] 朱宇旌, 吴芸彤, 季文彦, 邵彩梅, 张勇.不同环境下包被酸化剂对肉仔鸡生长性能、 消化道内环境及血清生化指标的影响 [J]. 动物营养学报, 2012,(886-896

[3] 张爱忠, 姜宁, 张婷, 宋金峰.不同家蝇幼虫制品对黄羽肉仔鸡营养物质可利用率、 肠道菌群和血清生化指标的影响 [J]. 动物营养学报, 2012,(5): 9 917

[4] 刘雪兰, 石天虹, 井庆川, 阎佩佩, 魏祥法, 刘瑞亭.共轭亚油酸对蛋鸡生产性能、蛋壳质量和血清生化指标的影响 [J]. 动物营养学报, 2012,(5): 926-

[5] 代腊, 顾林英, 朱巧明, 朱莎, 张爱婷, 邹晓庭, 胡彩虹.饲粮缬氨酸水平对蛋鸡生产性能、蛋品质及血清生化指标的影响[J]. 动物营养学报, 2012,24(4) 654-660

[6] 符运勤, 刁其玉, 屠焰, 王建红, 许先查.不同组合益生菌对0~8周龄犊牛生长性能及血清生化指标的影响[J]. 动物营养学报, 2012,24(4): 753-761