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饲粮蛋白质水平对肥育猪背最长肌嫩度及骨骼肌特异性蛋白-核转录因子κB信号途径的影响

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Dietary Protein Level Affects the Tenderness and P94-NFκB Signaling Pathway of Longissimus Dorsi in Finishing Pigs

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摘要 本试验旨在研究饲粮理想蛋白质水平对背最长肌嫩度及骨骼肌特异性蛋白-核转录因子κB（P94-NFκB）信号途径相关蛋白和钙蛋白酶抑制蛋白（CAST）mRNA表达量的影响。选择初始重约50 kg的杜洛克×长白×大白三元杂交猪90头，随机分配到3个处理，每个处理3个重复，每个重复10头，公母各占1/2。3个处理分别采用12%、16%、20%理想蛋白质水平的饲粮，饲粮能量水平相同。正试期58 d，结束后屠宰取样，测定肌肉剪切力并利用实时定量PCR法测定猪背最长肌P94、NFκB、核转录因子抑制物（IκB）和CAST mRNA表达量。结果表明：1）饲粮蛋白质水平对背最长肌剪切力、P94、NFκB、IκB和CAST mRNA表达量有显著影响（P<0.05）；随饲粮蛋白质水平升高，背最长肌剪切力、IκB和CAST mRNA表达量升高、P94和NFκB mRNA表达量降低。2）背最长肌剪切力与IκB（相关系数为0.513，P<0.05)、CAST mRNA表达量（相关系数为0.816，P<0.01）呈正相关。3）CAST与P94 mRNA表达量呈负相关（相关系数为－0.496，P<0.05），与IκB mRNA表达量呈正相关（相关系数为0.710，P<0.01)。4）P94与NFκB mRNA表达量呈正相关（相关系数为0.550，P<0.05），与IκB mRNA表达量呈负相关（相关系数为－0.518，P<0.05）；IκB与NFκB mRNA表达量呈负相关（相关系数为－0.539，P<0.05）。结果提示：饲粮高蛋白质水平提高了猪背最长肌剪切力、CAST和IκB mRNA表达量，降低了肌肉嫩度和P94 mRNA表达量；猪背最长肌P94-NFκB信号途径在肌肉嫩度调控过程中发挥一定作用，但不是主要途径。

关键词： 蛋白质水平 钙蛋白酶抑制蛋白 骨骼肌特异性蛋白 核转录因子&kappa B 肌肉嫩度

Abstract: The study was conducted to investigate the effect of dietary ideal protein level on tenderness and mRNA expression levels of P94-NFκB signaling pathway related to proteins and CAST of longissimus dorsi in finishing pigs. Ninety crossbred pigs (Duroc × Landrace × Large white, about 50 kg BW) were randomly allocated into 3 treatments with 3 replicates per treatment and 10 heads per replicate. Pigs in the three treatments were fed diets with the same energy level and ideal protein levels at 12%, 16% and 20%, respectively. All pigs were slaughtered after 58 days experiment and then muscle samples were collected for the analysis of shear force, meanwhile, mRNA expression levels of P94, NFκB, IκB and CAST of longissimus dorsi in pigs were determined by real-time PCR. The results showed as follows: 1) there were significant effects of dietary protein level on shear force and the mRNA expression levels of P94, NFκB, IκB and CAST of longissimus dorsi (P<0.05); with the increasing of dietary protein level, the shear force and mRNA expression level of IκB and CAST were increased, but that of P94 and NFκB were decreased. 2) the shear force was positively correlated with the mRNA expression levels of IκB (coefficient correlation=0.513, P<0.05) and CAST (coefficient correlation=0.816, P<0.01). 3) The mRNA expression level of CAST was negatively correlated with that of P94 (coefficient correlation=－0.496, P<0.05), but positively correlated with that of IκB (coefficient correlation=0.710, P<0.01). 4) The mRNA expression level of P94 was positively correlated with that of NFκB (coefficient correlation=0.550, P<0.05), but negatively correlated with that of IκB (coefficient correlation=－0.518, P<0.05); the mRNA expression levels of IκB and NFκB were negatively correlated (coefficient correlation=－0.539, P<0.05) to each other. The results indicate that high dietary protein level can increase the shear force and the mRNA expression levels of CAST and IκB, but decrease the tenderness and the mRNA expression level of P94; P94-NFκB signaling pathway plays a role in the process of regulating muscle tenderness, but it is not the main pathway. [Chinese Journal of Animal Nutrition, 2011, 23（8）: 1342 -1350]

Keywords: protein level, CAST, P94, NFκB, muscle tenderness

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