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谷氨酰胺对肉仔鸡肠道黏膜淋巴细胞增殖活性、氧化应激和免疫应激的调控作用

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Mo utamine in Proliferative Activity, Oxidative and Immune Stress of Int ocytes of Broilers

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摘要
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摘要 本试验旨在通过体外细胞培养技术培养肉仔鸡肠道淋巴细胞，建立体外脂多糖（LPS）和双氧水（H2O2）应激模型，研究不同浓度的谷氨酰胺（Gln）对肉仔鸡淋巴细胞增殖活性和抗氧化的调控作用，为Gln营养改善肠道健康状态提供理论依据。从肉仔鸡空肠分离出淋巴细胞，制得细胞悬液，在Gln终浓度分别为0、10、50、100、200 μg/mL的200 μL培养体系中培养24 h，然后加入LPS刺激，用四甲基偶氮唑盐（MTT）法测定淋巴细胞增殖情况。用0.3 mmol/L的H2O2刺激肠道黏膜模拟氧化应激环境，收集培养的细胞上清液，测定氧化应激和免疫应激指标。结果表明：当添加Gln浓度为100 μg/mL时，其对淋巴细胞增殖活性的抑制效果最为明显。当Gln浓度为50和100 μg/mL时，显著提高了肉仔鸡肠道淋巴细胞中过氧化氢酶（CAT）和超氧化物歧化酶（SOD）活性（P<0.05）；随着Gln浓度继续升高，当其为200 μg/mL时，CAT和SOD活性呈下降趋势（P>0.05）；未添加Gln组肠道淋巴细胞丙二醛含量显著高于添加组（P<0.05），各添加组间无显著差异（P>0.05）。100 μg/mL Gln组肉仔鸡肠道淋巴细胞中免疫球蛋白A（IgA）含量显著高于其他各组（P<0.05）。由此可知，当Gln浓度为100 μg/mL时,其对肉仔鸡肠道淋巴细胞增殖活性的抑制效果最为明显，并提高了IgA合成量，有利于维持免疫系统的平衡状态；当Gln浓度为50和100 μg/mL时，显著提高了CAT和SOD活性，有利于维护肉鸡肠道的抗氧化功能。

关键词： **谷氨酰胺;肉仔鸡;肠道淋巴细胞;氧化应激;免疫应激**

Abstract： This experiment was conducted to culture broiler intestinal lymphocytes by the technology of in vitro cell culture, establish in vitro stress model of lipopolysaccharides (LPS) and H2O2, study the modulation of different levels of glutamine (Gln) on proliferative activity and antioxidation of broiler lymphocytes, and finally provide a theoretical basis for the improvement of intestinal health by Gln. Separate lymphocytes from broiler jejunum and make them into cell suspension. Culture the cells for 24 h in 200 μL solutions with 0, 10, 50, 100, 200 μg/mL Gln, respectively. Add LPS into the solutions and test cell proliferation by MTT method. Imitate the condition of oxidative stress by stimulating intestinal mucous membrane with 0.3 mmol/L H2O2. Collect the supernatant and test the oxidative and immune stress parameters. The results showed as follows: 1) the 100 μg/mL level of Gln had the most obvious inhibiting effect on lymphocyte proliferative activity. 2) The 50 and 100 μg/mL levels of Gln could significantly increase the activities of catalase (CAT) and superoxide dismutase (SOD) in intestinal lymphocytes of broilers (P<0.05), while the activities of CAT and SOD began to decrease when the Gln level was 200 μg/mL; the malondialdehyde (MDA) content in 0 μg/mL Gln group was significantly higher than that in the other groups (P<0.05), and there were no significant differences among Gln groups (P>0.05). 3) The immunoglobulin A (IgA) content in intestinal lymphocytes of broilers in 100 μg/mL Gln group was significantly higher than that in the other groups (P<0.05). In conclusion, the 100 μg/mL level of Gln has the most obvious effect on suppressing proliferative activity of intestinal lymphocytes of broilers, and it increases IgA content, which is good for the maintenance of immune system balance; 50 and 100 μg/mL level of Gln can significantly increase the activities of CAT and SOD, which is good for the maintenance of antioxidant function of broiler intestine. [Chinese Journal of Animal Nutrition , 2011 , 23 (2) : 274-279]

Keywords： **glutamine; broiler; intestinal lymphocytes; oxidative stress; immune stress**

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