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丙氨酰-谷氨酰胺二肽对仔猪小肠上皮细胞间紧密连接蛋白occludin定位与表达的影响

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Effects of Alanyl-Glutamine Dipeptide on Localization and Expression of Tight Junction Protein Occludin in Small Intestinal Epithelial Cells from Piglets

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摘要 本试验以分离自仔猪空肠上皮的IPEC-1细胞为模型, 探讨丙氨酰-谷氨酰胺二肽(Ala-Gln)对仔猪小肠上皮细胞间紧密连接蛋白occludin定位与表达的影响。试验选取同代IPEC-1细胞接种至6块6孔细胞培养板上, 分别用含0(对照组)、0.25、0.50、1.00、2.00、4.00 mmol/L Ala-Gln的DMEM高糖培养基进行培养, 待细胞生长融合达70%以上时, 对occludin进行免疫荧光定位和蛋白质印迹(Western Blot)检测。结果表明: 1) 对照组细胞可见其胞质内存在团状的阳性荧光染色, 而细胞间连接处阳性荧光染色不明显; 随着Ala-Gln浓度的升高, 细胞间连接处荧光信号逐渐增强, 细胞轮廓更加清晰, 而胞质内荧光信号逐渐减弱。2) 各添加组IPEC-1细胞间occludin的相对表达量均极显著高于对照组($P<0.01$)。随着Ala-Gln浓度的升高, occludin的相对表达量呈先增后减的趋势, 添加量为2.00 mmol/L时达到峰值, 且极显著高于其他添加量($P<0.01$)。由此可知, Ala-Gln可以上调仔猪小肠上皮细胞间紧密连接蛋白occludin的表达, 促进细胞间紧密连接结构的形成, 进而增强仔猪小肠黏膜的屏障功能。

关键词: 仔猪 小肠上皮细胞 紧密连接 occludin 丙氨酰-谷氨酰胺二肽

Abstract: This experiment was conducted to evaluate the effects of alanyl-glutamine dipeptide (Ala-Gln) on localization and expression of tight junction protein occludin in small intestinal epithelial cells from piglets using IPEC-1 cells isolated from jejunal epithelium as the model. The IPEC-1 cells of the same generation were planted into 6-six-well cell culture plates and were incubated with DMEM high-glucose medium containing 0 (control group), 0.25, 0.50, 1.00, 2.00, 4.00 mmol/L Ala-Gln, respectively. When the cell fusion had reached more than 70%, the immunofluorescence localization and Western Blot of occludin were detected. The results showed as follows: 1) the positive fluorescence staining clouds in cytoplasm of cells were observed in the control group, but that was not obvious among the junction of cells. The fluorescence signals among the junction of cells appeared to be strengthen gradually and the cell outline appeared clearer with the increase of Ala-Gln concentration. Contrarily, the fluorescence signals in cytoplasm of cells were weakened gradually. 2) Compared with the control group, the relative expression level of occludin in IPEC-1 cells in supplemental groups was significantly increased ($P<0.01$) and a trend from increase to decrease was observed with the increase of Ala-Gln concentration. The relative expression level of occludin in 2.00 mmol/L group was significantly higher than that in other supplemental groups ($P<0.01$). Therefore, Ala-Gln can up-regulate the expression of tight junction protein occludin in small intestinal epithelial cells from piglets, and promote the formation of intercellular tight junction structure, and then strengthen the barrier function of intestinal mucosa in piglets.

Keywords: piglet, intestinal epithelial cell, tight junction, occludin, Ala-Gln

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- [1] 刘海萍, 胡彩虹, 徐勇. 早期断奶对仔猪肠通透性和肠上皮紧密连接蛋白Occludin mRNA表达的影响[J]. 动物营养学报, 2008, 20(4):442-446.
- [2] 马永贤, 蒋朱明, 白满喜, 等. 创伤后肠黏膜屏障改变分子生物学机制的研究[J]. 中华外科杂志, 1995, 33(6):371-373.
- [3] 袁雪波, 马黎, 陈克麟, 等. 丙氨酸谷氨酰胺二肽对哺乳仔猪生长性能、小肠形态学和血清生化指标的影响[J]. 动物营养学报, 2011, 23(1):94-101.
- [4] 刘铁民, 吴衍忠. 谷氨酰胺对过度运动大鼠肠黏膜屏障功能变化的干预机制[J]. 四川体育科学, 2007(4):55-58.
- [5] TSUKITA S, FURUSE M. Occludin and claudins in tight-junction strands: leading or supporting players[J]. Trends in Cell Biology, 1999, 9(7):268-273. 
- [6] 高志光, 秦环龙. 肠上皮细胞紧密连接的生物学功能及在肠屏障中的作用[J]. 肠外与肠内营养, 2005, 11(2):299-302.
- [7] KUBOTA K, FURUSE M, SASAKI H, et al. Ca²⁺-independent cell-adhesion activity of claudins, a family of integral membrane proteins localized at tight junctions[J]. Current Biology, 1999, 9(18):1035-1038. 
- [8] BJARNASON I, MACPHERSON A, HOLLANDER D. Intestinal permeability: an overview[J]. Gastroenterology, 1995, 108(5):1566-1581. 
- [9] 蒋建文, 黎介寿, 李幼生, 等. 甘氨酸谷氨酰胺二肽对猪自体移植小肠的营养作用[J]. 中华外科杂志, 1999, 37(11):677-679.
- [10] SHIMIZU M, SON D O. Food-derived peptides and intestinal functions[J]. Current Pharmaceutical Design, 2007, 13(19):885-895.
- [11] WU X Q, SHU L H, SUN M, et al. Effect of glutamine on apoptosis of the small intestine in young rats with endotoxemia and its mechanism [J]. Chinese Journal of Contemporary Pediatrics, 2006, 8(6):496-498.
- [12] BOELEN S P G, HOUDIJK A P, HAARMAN H J, et al. Glutamine-enriched enteral nutrition decreases infectious complications in trauma patients [J]. American Journal of Clinical Nutrition, 2002, 76(1):253-254.
- [13] KARINCH A M, PAN M, LIN C M, et al. Glutamine metabolism in sepsis and infection[J]. Journal of Nutrition, 2001, 131(9):2535S-2538S, 2550S-2551S.
- [14] 崔巍, 闻颖, 董亚珺, 等. 谷氨酰胺对体外培养肠上皮细胞屏障通透性的影响[J]. 世界华人消化杂志, 2008, 16(33):3729-3733.
- [15] 潘璠, 刘成霞. 谷氨酰胺对体外肠上皮细胞缺血再灌注损伤后occludin蛋白表达的影响[J]. 中华临床医师杂志, 2012, 6(10):2624-2627.
- [16] 张宇飞, 嵇武, 黎介寿. Occludin蛋白调控机制及临床意义的研究进展[J]. 肠外与肠内营养, 2010, 17(3):175-178.

- [1] 易孟霞, 易学武, 贺喜, 张石蕊. 仔猪缬氨酸需要量的研究进展[J]. 动物营养学报, 2014,26(3): 578-584
- [2] 任曼, 霍应峰, 杨凤娟, 刘灵, 罗艳红, 谯仕彦. 仔猪断奶前后肠道形态和相关免疫蛋白基因表达的变化[J]. 动物营养学报, 2014,26(3): 614-619
- [3] 马燕芬, 杜瑞平, 高民. 热应激对奶山羊瘤胃黏膜紧密连接蛋白表达的影响[J]. 动物营养学报, 2014,26(3): 768-775
- [4] 周盟, 张乃锋, 董晓丽, 王黎文, 屠焰, 纪守坤, 张立霞, 崔祥, 楼灿, 刁其玉. 益生菌对断奶仔猪生长性能、免疫器官指数及胃肠道pH的影响[J]. 动物营养学报, 2014,26(2): 445-452
- [5] 李留安, 王凤云, 杨晶晶, 王转丁, 刘念, 闫艳玲. 断奶日龄对仔猪脾脏、胸腺和胰腺抗氧化功能的影响[J]. 动物营养学报, 2014,26(1): 74-80
- [6] 李俊良, 史彬林, 闫素梅, 金鹿, 徐元庆, 李侗宇, 郭玮玮, 郭晓宇. 不同壳聚糖浓度培养液对断奶仔猪外周血淋巴细胞中花生四烯酸代谢的影响[J]. 动物营养学报, 2014,26(1): 184-189
- [7] 余长松, 贾刚, 邓秋红, 陈小玲, 王康宁. Ras同源蛋白A-Ras同源蛋白激酶信号转导途径对上皮细胞紧密连接的调节作用[J]. 动物营养学报, 2013,25(9): 1929-1935
- [8] 高佩, 汪海峰, 章文明, 刘建新. 益生菌调节肠道上皮屏障功能及作用机制[J]. 动物营养学报, 2013,25(9): 1936-1945
- [9] 贺淼, 周安国, 王之盛, 陈中平, 张海波, 邹华围, 申俊华. 复合酵母的营养价值评定[J]. 动物营养学报, 2013,25(8): 1904-1910
- [10] 吴苗苗, 肖昊, 印遇龙, 李丽立, 李铁军. 谷氨酸对脱氧雪腐镰刀菌烯醇刺激下的断奶仔猪生长性能、血常规及血清生化指标变化的干预作用[J]. 动物营养学报, 2013,25(7): 1587-1594
- [11] 聂昌林, 姜建阳, 韩先杰, 宋春阳. 杜洛克与鲁烟白杂交断奶仔猪对可消化赖氨酸的需要量[J]. 动物营养学报, 2013,25(7): 1617-1623
- [12] 石秋锋, 桑静超, 辛小召, 杨富宇, 李振田. 不同蛋白质源组合饲料对断奶仔猪生长性能和血清生化指标的影响[J]. 动物营养学报, 2013,25(6): 1199-1206
- [13] 董晓丽, 张乃锋, 周盟, 屠焰, 刁其玉. 复合菌制剂对断奶仔猪生长性能、粪便微生物和血清指标的影响[J]. 动物营养学报, 2013,25(6): 1285-1292
- [14] 宋志学, 杜天玺, 孙红国, 张蔓, 华永丽, 纪鹏, 魏彦明. 红芪粗多糖对免疫应激断奶仔猪生长性能、血清生化指标和抗氧化能力的影响[J]. 动物营养学报, 2013,25(5): 1062-1068
- [15] 王永, 杨维仁, 张桂国. 饲料中添加屎肠球菌对断奶仔猪生长性能、肠道菌群和免疫功能的影响[J]. 动物营养学报, 2013,25(5): 1069-1076