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十二指肠灌注亮氨酸对奶牛胰腺淀粉酶分泌的影响

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Duodenal Infusion of Leucine: Effects on Pancreatic Amylase Secretion of Dairy Cows

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摘要 本试验旨在研究十二指肠灌注亮氨酸对奶牛胰腺淀粉酶分泌的影响。以4头周岁荷斯坦母牛[(215±7) kg]为试验动物,手术安装十二指肠胰液收集袋、灌注管和回流管以及颈静脉插管,采用4×4拉丁方试验设计,进行十二指肠亮氨酸灌注试验。结果表明,随亮氨酸灌注水平升高,血浆胰岛素和胆囊收缩素浓度升高($P<0.05$),胰腺 α -淀粉酶合成速率(U/h)呈先升高后降低趋势($P<0.01$),在29.5 $\mu\text{mol}/(\text{kg}\cdot\text{h})$ 灌注水平时最大。十二指肠灌注亮氨酸也极显著影响了胰腺 α -淀粉酶分泌浓度(U/L, $P<0.01$; U/g prot, $P<0.01$)。结果表明,亮氨酸可通过刺激胰岛素和胆囊收缩素释放,调控青年奶牛胰腺淀粉酶分泌功能,二者存在剂量效应。

关键词: 亮氨酸 十二指肠灌注 淀粉酶 胰岛素 胆囊收缩素

Abstract: This experiment was conducted to evaluate the effects of duodenal leucine infusion on pancreatic α -amylase secretion of dairy cows. Four intravenously cannulated yearling Holstein cows [(215±7) kg] with pancreatic pouch-duodenal reentrant cannulas, duodenal catheters and jugular catheters were used in a 4×4 Latin square with duodenal leucine infusions [0, 29.5, 59.1 and 88.6 $\mu\text{mol}/(\text{kg}\cdot\text{h})$]. The results showed as follows: plasma insulin and cholecystokinin concentrations were increased with leucine infusion level increasing ($P<0.05$), and pancreatic α -amylase production rate (U/h) was increased first and then decreased with leucine infusion level increasing ($P<0.01$), in which the greatest value was observed at 29.5 $\mu\text{mol}/(\text{kg}\cdot\text{h})$. Duodenal leucine infusion could also affect α -amylase concentration (U/L, $P<0.01$; U/g prot, $P<0.01$). These data indicate that leucine can regulate pancreatic α -amylase secretion by stimulating the release of insulin and cholecystokinin of young dairy cows, and there is a dose-effect relationship between them.

Keywords: leucine, duodenal infusion, amylase, insulin, cholecystokinin

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 - [2] HARMON D L,MCLEOD K R.Glucose uptake and regulation by intestinal tissues:implications and whole-body energetics[J].Journal of Animal Science,2001,79:E59-E72.
 - [3] NOCEK J E,TAMMINGA S.Site of digestion of starch in the gastrointestinal tract of dairy cows and its effect on milk yield and composition[J].Journal of Dairy Science,1991,74(10):3598-3629. [crossref](#)
 - [4] ESCOBAR J,FRANK J W,SURYAWAN A,et al.Physiological rise in plasma leucine stimulates muscle protein synthesis in neonatal pigs by enhancing translation initiation factor activation[J].American Journal of Physiology:Endocrinology and Metabolism,2005,288(5):914-921.
 - [5] 王洪荣,季昀.氨基酸的生物活性及其营养调控功能的研究进展[J].动物营养学报,2013,25(3):447-457.
 - [6] RICHTER M,SVOBODOV J,KAOV L,et al.Effect of duodenal infusions of leucine on milk yield and plasma amino acids in dairy cows[J].Czech Journal of Animal Science,2010,55(9):351-358.
 - [7] 于红霞,于志鹏,刘凯,等.十二指肠灌注亮氨酸对山羊胰腺外分泌功能的影响[J].动物营养学报,2011,23(9):1513-1518.
 - [8] HUNTINGTON G B,HARMON D L,RICHARDS C J.Sites,rates,and limits of starch digestion and glucose metabolism in growing cattle[J].Journal of Animal Science,2006,84(13):E14-E24.
 - [9] ST-JEAN G,HARMON D L,PETERS J P,et al.Collection of pancreatic exocrine secretions by formation of a duodenal pouch in cattle[J].American Journal of Veterinary Research,1992,53(12):2377-2380.
 - [10] SWANSON K C,RICHARDS C J,HARMON D L.Influence of abomasal infusion of glucose or partially hydrolyzed starch on pancreatic exocrine secretion in beef steers[J].Journal of Animal Science,2002,80(4):1112-1116.
 - [11] SWANSON K C,BENSON J A,MATTHEWS J C,et al.Pancreatic exocrine secretion and plasma concentration of some gastrointestinal hormone response to abomasal infusion of starch hydrolyzate and/or casein[J].Journal of Animal Science,2004,82(6):1781-1787.
 - [12] RICHARDS C J,SWANSON K C,PATON S J,et al.Pancreatic exocrine secretion in steers infused posturally with casein and cornstarch[J].Journal of Animal Science,2003,81(4):1051-1056.
 - [13] MCGUIRE M A,GRIINARI J M,DWYER D A,et al.Role of insulin in the regulation of mammary synthesis of fat and protein[J].Journal of Dairy Science,1995,78(4):816-824. [crossref](#)
 - [14] 田青,季昀,庞学燕,等.胰岛素对奶牛乳腺上皮细胞酪蛋白合成调节机理的研究[J].动物营养学报,2013,25(3):550-560.
 - [15] YU Z P,XU M,LIU K,et al.Leucine markedly regulates pancreatic exocrine secretion in goats. Journal of Animal Physiology and Animal Nutrition.doi: 10.1111/jpn.12069.
 - [16] WANG B J,CUI Z J.How does cholecystokinin stimulate exocrine pancreatic secretion?From birds,rodents,to humans[J].American Journal of Physiology:Regulatory,Integrative and Comparative Physiology,2007,292(2):R666-R678.
 - [17] YU Z P,XU M,YAO J H,et al.Regulation of pancreatic exocrine secretion in goats:differential effects of short-and long-term duodenal phenylalanine treatment. Journal of Animal Physiology and Animal Nutrition.doi: 10.1111/j.1439-0396.2012.01276.x.
 - [18] SWANSON K C,MATTHEWS J C,WOODS C A,et al.Influence of substrate and/or neurohormonal mimic on *in vitro* pancreatic enzyme release from calves posturally infused with partially hydrolyzed starch and/or casein[J].Journal of Animal Science,2003,81(5):1323-1331.
 - [19] SHIMOMURA Y,MURAKAMI T,NAKAI N,et al.Exercise promotes BCAA catabolism:effects of BCAA supplementation on skeletal muscle during exercise[J].The Journal of Nutrition,2004,134(6):1583S-1587S.
 - [20] 冯仰廉.奶牛小肠蛋白质体系的局限性与氨基酸平衡[J].动物营养学报,2006,18(2):63-68.
 - [21] 王洪荣.反刍动物氨基酸营养平衡理论及其应用[J].动物营养学报,2013,25(4):669-676.
-
- [1] 孙敏敏,刘含亮,王红卫,孟晓,王纪亭,万文菊.酵母铬对尼罗罗非鱼生长和糖代谢的影响[J].动物营养学报,2013,25(9):2143-2149
 - [2] 刘南南,姚军虎.营养素和激素对乳蛋白合成过程中哺乳动物雷帕霉素靶蛋白信号通路调节作用的研究进展[J].动物营养学报,2013,25(6):1158-1164
 - [3] 田青,季昀,庞学燕,王洪荣.胰岛素对奶牛乳腺上皮细胞酪蛋白合成调节机理的研究[J].动物营养学报,2013,25(3):550-560
 - [4] 朱宇旌,丁兰,张勇,王艳,张宝生.胰岛素对促性腺激素释放激素分泌及活性的调控[J].动物营养学报,2013,25(1):1-7
 - [5] 田青,季昀,庞学燕,王洪荣.胰岛素对奶牛乳腺上皮细胞生长及κ-酪蛋白和胰岛素受体基因表达的影响[J].动物营养学报,2013,25(1):77-87