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亚急性瘤胃酸中毒对瘤胃和瓣胃上皮细胞增殖与凋亡的影响

邬宇航[1,2], 殷兆丽[3], 刘大程[1,2], 胡红莲[4], 高民[4], 刘国娟[1,2]

1. 内蒙古农业大学, 呼和浩特 010018;
2. 农业部动物疾病临床诊疗技术重点实验室, 呼和浩特 010018;
3. 内蒙古医科大学, 呼和浩特 010110;
4. 内蒙古农牧业科学院动物营养研究所, 呼和浩特 010031

Effects of Subacute Rumen Acidosis on Proliferation and Apoptosis of Rumen and Omasum Epithelial Cells

WU Yuhang[1,2], YING Zhaoli[3], LIU Dacheng[1,2], HU Honglian[4], GAO Min[4], LIU Guojuan[1,2]

1. Inner Mongolian Agriculture University, Hohhot 010018, China;
2. Key Laboratory of Clinical Diagnosis and Treatment Technology in Animal Disease, Ministry of Agriculture, Hohhot 010018, China;
3. Inner Mongolian Medical University, Hohhot 010110, China;
4. Animal Nutrition Institute, Inner Mongolian Academy of Agriculture and Animal Sciences, Hohhot 010031, China

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摘要 本试验旨在研究亚急性瘤胃酸中毒(SARA)对瘤胃和瓣胃上皮细胞增殖与凋亡的影响。选取8只健康的处于泌乳期关中奶山羊,按体重、泌乳量相近原则随机分为3组,对照组(n=2)饲喂基础饲粮,SARA组(n=3)饲喂非纤维性碳水化合物与中性洗涤纤维比分别为1.02、1.24、1.63、2.58的试验饲粮,诱导发生SARA;恢复组(n=3)奶山羊发生SARA后自由采食青干草4周。取瘤胃、瓣胃黏膜组织,通过检测瘤胃、瓣胃黏膜蛋白质、DNA及RNA含量来研究SARA对瘤胃、瓣胃黏膜生长的影响;通过检测增殖细胞核抗原、原位末端标记阳性细胞数,研究瘤胃、瓣胃上皮细胞增殖与凋亡的变化;并在透射电镜下观察细胞凋亡情况。结果表明:SARA显著降低了瘤胃黏膜蛋白质、DNA及RNA含量(P<0.05),对瓣胃上皮细胞蛋白质、DNA和RNA含量影响不显著(P>0.05)。SARA组上皮细胞微绒毛排列不整齐,线粒体肿胀、核固缩、染色质边集化,有较多的凋亡小体形成。SARA组瘤胃及瓣胃上皮细胞增殖指数较对照组显著降低(P<0.05),细胞凋亡指数较对照组显著提高(P<0.05)。综上,SARA对瘤胃及瓣胃上皮细胞增殖活性有抑制作用,对上皮细胞凋亡有促进作用。

关键词: SARA 黏膜屏障 增殖细胞核抗原 细胞凋亡

Abstract: The aim of this study was to investigate the effects of subacute rumen acidosis (SARA) on proliferation and apoptosis of rumen and omasum epithelial cells. Eight healthy lactating *Guanzhong* dairy goats were randomly allocated to three groups by body weight and milk yield. Dariy goats in control group (n=2) were fed a basal diet; those in SARA group (n=3) were fed the diets with different nonfiber carbohydrate/neutral detergent fiber ratios (NFC/NDF) (1.02, 1.24, 1.63 and 2.58, respectively), which gradually induced SARA; those in recovery group (n=3) were fed hay for 4 weeks after SARA. The mucosa of rumen and omasum were collected. The contents of protein, DNA and RNA of mucosa of rumen and omasum were detected to investigate the effects of SARA on the growth of mucosa of rumen and omasum; the positive cell number of PCNA and TUNEL was detected to investigate the changes of apoptosis and proliferation; meanwhile, and apoptosis was observed by transmission electron microscopy. The results showed as follows: SARA significantly reduced the contents of protein, DNA and RNA of rumen mucosa (P<0.05), but had no significant effects on those indices of omasum mucosa. In SARA group, microvilli on the epithelial cells surface were untidily, and the characteristics of cells were mitochondrial swelling, karyopyknosis, chromatin margination, and apoptotic body presentation. The proliferation index of rumen and omasum epithelial cells in the SARA group was significantly lower than that in control group (P<0.05), while the apoptosis index was significantly higher than that in control group (P<0.05). In conclusion, SARA can inhibit proliferation, but promote the apoptosis of rumen and omasum epithelial cells.

Keywords: SARA, mucosa barrier, PCNA, apoptosis

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通讯作者 刘大程,教授,硕士生导师,E-mail:nmgldc@163.com Email: nmgldc@163.com

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