



小肽转运载体2在奶牛乳腺小肽摄取中的作用研究

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Role of Oligopeptide Transporter 2 in Bovine Mammary Gland Phenylalanine Dipeptide Uptake

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摘要 本试验旨在研究2型小肽转运载体 (oligopeptide transporter 2, PepT 2) 在奶牛乳腺组织吸收利用小肽合成乳蛋白过程中的作用。在体外培养的奶牛乳腺组织培养液中分别添加不同浓度的苯丙氨酸二肽 (Phe-Phe) (0和11.7 μg/mL) 和/或焦碳酸二乙酯 (DEPC) (0、0.01、0.1、0.5和1.0 mmol/L) 进行培养, 试验结束后收集乳腺组织和培养液分别用于基因表达和乳蛋白合成的检测。结果表明, Phe-Phe促进了PepT 2和 α s1-酪蛋白基因表达及乳蛋白合成 ($P<0.05$); 随DEPC添加浓度的升高, α s1-酪蛋白基因表达 ($P<0.01$) 和乳蛋白合成 ($P<0.05$) 显著降低; 0.5 mmol/L DEPC显著降低了Phe-Phe组 α s1-酪蛋白的基因表达 ($P<0.05$) 和乳蛋白合成 ($P<0.01$) 以及不添加小肽组乳蛋白合成 ($P<0.05$), 但不影响不添加小肽组 α s1-酪蛋白基因表达 ($P>0.05$)。结果提示, 奶牛乳腺能摄取Phe-Phe用于乳蛋白的合成, PepT 2可能在乳腺小肽摄取过程中发挥重要作用。

关键词: 二肽 PepT 2 酪蛋白 DEPC 奶牛乳腺组织

Abstract: This experiment was conducted to study the role of oligopeptide transporter 2 in small peptides uptake and milk protein synthesis in bovine mammary gland. Different doses of Phe dipeptide (0 and 11.7 μg/mL) and DEPC (0, 0.01, 0.1, 0.5 and 1 mmol/L) were added to the culture medium of bovine mammary gland tissues. After incubated in the experimental medium, mammary tissues and medium were collected and used for gene expression and milk protein determination, respectively. The results showed that 1) Phe dipeptide increased oligopeptide transporter 2 and α s1-casein gene expression and milk protein quantity in the medium ($P<0.05$); 2) with increasing of DEPC dose, α s1-casein gene mRNA level ($P<0.01$) and synthesis of milk protein ($P<0.05$) were decreased; 3) treatment with 0.5 mmol/L DEPC significantly decreased α s1-casein gene expression ($P<0.05$) and synthesis of milk protein ($P<0.01$) in Phe dipeptide group, and synthesis of milk protein ($P<0.05$) in free Phe group, but had no effect on α s1-casein gene mRNA level ($P>0.05$) in free Phe group. These results indicate that Phe dipeptide can be used for synthesis of milk protein by bovine mammary gland while PepT2 may play an important role in small peptides uptake by bovine mammary gland. [Chinese Journal of Animal Nutrition, 2011, 23 (8) : 1303 -1308]

Keywords: dipeptides, PepT2, casein, DEPC, bovine mammary gland tissues

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