



# 动物营养学报

CHINESE JOURNAL OF ANIMAL NUTRITION

首页 期刊介绍 编委会 编辑部 投稿须知 期刊订阅 广告服务 联系我们 留言与回复

动物营养学报 2012, Vol. 24 Issue (10) :1847-1853 DOI: 10.3969/j.issn.1006-267x.2012.10.001

综述 Review

最新目录 | 下期目录 | 过刊浏览 | 高级检索 << | Next Articles >>

## 小肽转运载体1的生物学特性及其功能

朱宇旌<sup>1</sup>, 王秉玉<sup>1</sup>, 张勇<sup>1</sup>, 李欣蔚<sup>1</sup>, 邵彩梅<sup>2</sup>

1. 沈阳农业大学畜牧兽医学院, 沈阳 110866;

2. 辽宁禾丰牧业有限公司, 沈阳 110164

## Peptide Transporter 1: Biological Characteristics and Functions

ZHU Yujing<sup>1</sup>, WANG Bingyu<sup>1</sup>, ZHANG Yong<sup>1</sup>, LI Xinwei<sup>1</sup>, SHAO Caimei<sup>2</sup>

1. School of Animal Science and Veterinary, Shenyang Agricultural University, Shenyang 110866, China;

2. Liaoning Well Hope Agri-Tech Co., Ltd., Shenyang 110164, China

- 摘要
- 参考文献
- 相关文章

Download: PDF (829KB) HTML (1KB) Export: BibTeX or EndNote (RIS) Supporting Info

**摘要** 小肽转运载体1(PepT1)是H<sup>+</sup>/肽偶联的转运载体。该载体通过利用肠腔到肠细胞的质子梯度来转运二肽和三肽。PepT1对游离氨基酸、多肽在动物肠道内的转运调控具有重要作用。本文综述了PepT1的分类、生物学特征及功能,并探讨了影响PepT1活性调控的因素。

**关键词:** 小肽转运载体1 生物学特性 功能

**Abstract:** Intestinal peptide transporter 1 (PepT1) is a transporter of H<sup>+</sup>/peptide coupling, which has a function to transport dipeptide and tripeptide by proton gradient from the intestinal cavity to the intestinal cells. PepT1 plays an important role in the regulation of free amino acids and polypeptide transportation in the intestine of animals. This paper reviewed the classification, biological characteristics and functions of PepT1, and the factors that regulate its activity.

**Keywords:** PepT1, biological characteristics, function

收稿日期: 2012-04-05;

基金资助:

国家自然科学基金(31101253)

引用本文:

朱宇旌, 王秉玉, 张勇等. 小肽转运载体1的生物学特性及其功能[J]. 动物营养学报, 2012,V24(10): 1847-1853

ZHU Yujing, WANG Bingyu, ZHANG Yong etc. Peptide Transporter 1: Biological Characteristics and Functions[J]. Chinese Journal of Animal Nutrition, 2012,V24(10): 1847-1853.

链接本文:

http://118.145.16.228/Jweb\_dwyy/CN/10.3969/j.issn.1006-267x.2012.10.001 或

http://118.145.16.228/Jweb\_dwyy/CN/Y2012/V24/I10/1847

- [1] HINDLET P, BUYSE M. Regulation of PepT1 by leptin and physiological implications[J]. Genes & Nutrition, 2010, 5(1): 15-17.
- [2] INGERSOLL S A, AYYADURAI S, CHARANIA M A, et al. The role and pathophysiological relevance of membrane transporter PepT1 in intestinal inflammation and inflammatory bowel disease[J]. American Journal of Physiology, Gastrointestinal and Liver Physiology, 2012, 302(5): G484-G492.
- [3] AGU R, COWLEY E, SHAO D, et al. Proton-coupled oligopeptide transporter (POT) family expression in human nasal epithelium and their drug transport potential[J]. Molecular Pharmaceutics, 2011, 8(3): 664-672.
- [4] ZUCHELLI M, TORKVIST L, BRESSO F, et al. PepT1 oligopeptide transporter (SLC15A1) gene polymorphism in inflammatory bowel disease [J]. Inflammatory Bowel Diseases, 2009, 15(10): 1562-1569.

### Service

- ▶ 把本文推荐给朋友
- ▶ 加入我的书架
- ▶ 加入引用管理器
- ▶ Email Alert
- ▶ RSS

### 作者相关文章

- ▶ 朱宇旌
- ▶ 王秉玉
- ▶ 张勇
- ▶ 李欣蔚
- ▶ 邵彩梅

- [5] GUO X J, MENG Q, LIU Q, et al. Construction, identification and application of HeLa cells stably transfected with human PepT1 and PepT2 [J]. *Peptides*, 2012, 34(2): 395-403.
- [6] DANIEL H, KOTTRA G. The proton oligopeptide cotransporter family SLC15 in physiology and pharmacology [J]. *Biomedical and Life Sciences*, 2004, 447(5): 610-618.
- [7] DANIEL H. Molecular and integrative physiology of intestinal peptide transport [J]. *Annual Review of Physiology*, 2004, 66: 361-384.
- [8] TEROVA G, CORA S, VERRI T, et al. Impact of feed availability on *PepT1* mRNA expression levels in sea bass (*Dicentrarchus labrax*) [J]. *Aquaculture* 2009, 294: 288-299.
- [9] VAN L, PAN Y X, BLOOMQUIST J R, et al. Developmental regulation of a turkey intestinal peptide transporter (PepT1) [J]. *Poultry Science*, 2005, 84: 75-82.
- [10] WANG W, SHI C, ZHANG J, et al. Molecular cloning, distribution and ontogenetic expression of the oligopeptide transporter *PepT1* mRNA in Tibetan sucking piglets [J]. *Amino Acids*, 2009, 37(4): 593-601.
- [11] GILBERT E R, WONG E A, WEBB K E. Peptide absorption and utilization: implication for animal nutrition and health [J]. *Journal of Animal Science*, 2008, 86: 2135-2155.
- [12] SHIMAKURA J, TERADA T, SHIMADA Y, et al. The transcription factor Cdx2 regulates the intestine specific expression of human peptide transporter 1 through functional interaction with Sp1 [J]. *Biochemical Pharmacology*, 2006, 71: 1581-1588.
- [13] SHIMAKURA J, TERADA T, KATSURA T, et al. Characterization of the human peptide transporter *PepT1* promoter: Sp1 functions as a basal transcriptional regulator of human *PepT1* [J]. *American Journal of Physiology, Gastrointestinal and Liver Physiology*, 2005, 289: 471-477.
- [14] BAKKE S, JORDAL A E, GOMEZ-REQUENI P, et al. Dietary protein hydrolysates and ferr amino acids affect the spatial expression of peptide transporter *PepT1* in the digestive tract of Atlantic cod (*Gadus morhua*) [J]. *Comparative Biochemistry and Physiology*, 2010, 156: 48-55.
- [15] CHEN H, PAN Y X, WONG E A, et al. Molecular cloning and functional characterization of a chicken intestinal peptide transporter (cPepT1) in *Xenopus* oocytes and Chinese hamster ovary cells [J]. *The Journal of Nutrition*, 2002, 132: 387-393.
- [16] AMBERG J J, MYR C, KAMISAKA Y, et al. Expression of the oligopeptide transporter, *PepT1*, in larval Atlantic cod (*Gadus morhua*) [J]. *Comparative Biochemistry and Physiology*, 2008, 150: 177-182.
- [17] HOWARD A, GOODLAD R, WALTERS J, et al. Increased expression of specific intestinal amino acid and peptide transporter mRNA in rats fed by TPN is reversed by GLP-2 [J]. *The Journal of Nutrition*, 2004, 134: 2957-2964.
- [18] HUSSAIN I, KELLETT G, AFFLECK J, et al. Expression and cellular distribution during development of the peptide transporter (*PepT1*) in the small intestinal epithelium of the rat [J]. *Cell Tissue Research*, 2002, 307: 139-142.
- [19] OSTASZEWSKA T, KAMASZWSKI M, GROCHOWSKI P, et al. The effect of peptide absorption on *PepT1* gene expression and digestive system hormones in rainbow trout (*Oncorhynchus mykiss*) [J]. *Comparative Biochemistry and Physiology*, 2010, 155: 107-114.
- [20] SUN B W, ZHAO X C, WANG G L, et al. Changes of biological functions of dipeptide transporter (*PepT1*) and hormonal regulation in severe scald rats [J]. *World Journal Gastroenterol*, 2003, 9(12): 2782-2785.
- [21] HINDLET P, BADO A, FARINOTTI R, et al. Long-term effect of leptin on H<sup>+</sup>-coupled peptide cotransporter 1 activity and expression *in vivo*: evidence in leptin-deficient mice [J]. *The Journal of Pharmacology and Experimental Therapeutics*, 2007, 323: 192-201.
- [22] BUCKING C, SCHULTE P M. Environmental and nutritional regulation of expression and function of two peptide transporter (*PepT1*) isoforms in a euryhaline teleost [J]. *Comparative Biochemistry and Physiology*, 2012(161): 379-387.
- [23] GILBERT E R, LI H, EMMERSON D A, et al. Dietary protein quality and feed restriction influence abundance of nutrient transporter messenger RNA in the small intestine of broiler chicks [J]. *The Journal of Nutrition*, 2008, 138: 262-271.
- [24] MA K, HU Y, SMITH D E, et al. Influence of fed-fasted state on intestinal *PepT1* expression and *in vivo* pharmacokinetics of glycylsarcosine in wild-type and *PepT1* knockout mice [J]. *Pharmaceutical Research*, 2012, 29(2): 535-545.
- [25] MADSEN S L, WONG E A. Expression of the chicken peptide transporter 1 and the peroxisome proliferator-activated receptor  $\alpha$  following feed restriction and subsequent refeeding [J]. *Poultry Science*, 2011, 90(10): 2295-300.
- [26] KODERA T, HARA H, NISHIMORI Y, et al. Amino acid absorption in portal blood after duodenal infusions of a soy protein hydrolysate prepared by a novel soybean protease D3 [J]. *Journal of Food Science*, 2006, 71: 517-525.
- [27] LIU Z H, WANG C Y, LIU Q, et al. Uptake, transport and regulation of JBP485 by PEPT1 *in vitro* and *in vivo* [J]. *Peptides*, 2011, 32: 747-754.
- [28] CHEN H, PAN Y X, ERIC A W, et al. Dietary protein level and stage of development affect expression of an intestinal peptide transporter (ePepT1) in chickens [J]. *The Journal of Nutrition*, 2005, 135(2): 193-198.
- [29] PAN X, TERADA T, OKUDA M, et al. The diurnal rhythm of the intestinal transporters SGLT1 and PEPT1 is regulated by the feeding conditions in the rat [J]. *The Journal of Nutrition*, 2004, 134: 2211-2215.

- [1] 苏斌朝, 王连生, 王红, 石宝明, 单安山. 玉米干酒糟及其可溶物饲料中添加共轭亚油酸或甜菜碱对肥育猪生长性能、血清生化指标及抗氧化功能的影响 [J]. *动物营养学报*, 2012, 24(9): 1737-1744
- [2] 李永明, 徐子伟, 刘杰, 冯尚连. 母猪饲料添加  $\beta$ -羟基- $\beta$ -甲基丁酸对母猪繁殖性能及仔猪生长性能和免疫功能的影响 [J]. *动物营养学报*, 2012, 24(9): 1745-1753
- [3] 郭志强, 杨奉珠, 雷岷, 宋代军, 谢晓红. 抗菌肽对肉兔小肠黏膜形态、盲肠菌群和免疫功能的影响 [J]. *动物营养学报*, 2012, 24(9): 1778-1784
- [4] 解俊美, 王安. 饲料维生素D添加水平对蛋雏鸭免疫及抗氧化功能的影响 [J]. *动物营养学报*, 2012, 24(9): 1819-1824

- [5] 徐鹏,董晓芳,佟建明.微生物饲料添加剂的主要功能及其研究进展[J]. 动物营养学报, 2012,24(8): 1397-1403
- [6] 刘立恒, 闵力, 瞿明仁, 戈婷婷, 钟志勇.甘露寡糖、果寡糖和大豆寡糖组合对锦江黄牛瘤胃液细菌多样性的影响[J]. 动物营养学报, 2012,24(8): 1583-1588
- [7] 田金可, Ahmad Hussain, 李伟, 高尚, 王恬.不同硒源及水平对肉鸡组织硒含量及抗氧化功能的影响[J]. 动物营养学报, 2012,24(6): 1030-1037
- [8] 苏莉娜, 王安.饲料锌水平对笼养蛋雏鸭生长性能、抗氧化功能及免疫器官发育的影响 [J]. 动物营养学报, 2012,(5): 815-821
- [9] 王明, 孙志刚, 刘文奇, 杨柳, 方洛云, 蒋树林.大豆异黄酮对奶牛脾脏和肠系淋巴结淋巴细胞干扰素 $\gamma$ 、白介素2和白介素4浓度以及雌激素受体 $\beta$  mRNA表达的影响 [J]. 动物营养学报, 2012,(5): 859-869
- [10] 郭小权, 黄克和, 曹华斌, 胡国良, 李浩棠, 张彩英.高钙饲料对青年蛋鸡血清一氧化氮浓度和抗氧化功能的影响 [J]. 动物营养学报, 2012,(5): 933-938
- [11] 唐胜球, 梁桂桃, 董小英.银杏叶提取物生物学功能及其在家禽养殖中的应用[J]. 动物营养学报, 2012,24(4): 606-611
- [12] 蒋守群, 周桂莲, 蒋宗勇, 陈芳, 洪平.饲料维生素E水平对43~63日龄黄羽肉鸡肉品质和抗氧化功能的影响[J]. 动物营养学报, 2012,24(4): 646-653
- [13] 刘含亮, 孙敏敏, 王红卫, 万文菊, 王纪亭.壳寡糖对虹鳟生长性能、血清生化指标及非特异性免疫功能的影响[J]. 动物营养学报, 2012,24(3): 479-486
- [14] 李杏, 陈小连, 朱丽慧, 吴红梅, 王雅芬, 许丛丛, 谷娟, 徐建雄.硫辛酸对黄羽肉鸡生长性能、抗氧化能力和免疫功能的影响[J]. 动物营养学报, 2012,24(3): 515-521
- [15] 吴琛, 刘俊锋, 孔祥峰, 杨焕胜, 印遇龙, 杨家晃.饲料精氨酸与丙氨酸对环江香猪肉质、氨基酸组成及抗氧化功能的影响[J]. 动物营养学报, 2012,24(3): 528-533