



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

动物营养学报 2013, Vol. 25 Issue (2) :242-247 DOI: 10.3969/j.issn.1006-267x.2013.02.002

综述 Review

最新目录 | 下期目录 | 过刊浏览 | 高级检索

<< Previous Articles | Next Article >>

精氨酸与动物摄食生理调节因子的关系

汪超^{1,2}, 黄苇¹, 谢明¹, 喻俊英¹, 侯水生¹

1. 中国农业科学院北京畜牧兽医研究所, 北京 100193;

2. 重庆市畜牧科学院, 重庆 402460

Interaction of Arginine and Ingesting Regulatory Factors in Animal

WANG Chao^{1,2}, HUANG Wei¹, XIE Ming¹, YU Junying¹, HOU Shuisheng¹

1. Beijing Institute of Animal Sciences, Chinese Academy of Agricultural Sciences, Beijing 100193, China;

2. Chongqing Academy of Animal Sciences, Chongqing 402460, China

- 摘要
- 参考文献
- 相关文章

Download: PDF (1145KB) HTML (1KB) Export: BibTeX or EndNote (RIS) Supporting Info

摘要 精氨酸是幼龄哺乳动物和鸟类等的必需氨基酸,成年哺乳动物的条件性必需氨基酸,饲料中精氨酸含量过高或不足均显著抑制动物摄食。研究表明,精氨酸可在一氧化氮合酶作用下生成一氧化氮(NO),NO通过作为动物主要增食和厌食生理调节因子的下游信号分子参与动物的摄食调控。精氨酸可在精氨酸脱羧酶作用下生成胍丁胺,胍丁胺通过与肾上腺素能受体作用刺激动物摄食。本文主要对精氨酸代谢、精氨酸对动物摄食的影响、精氨酸代谢产物与主要摄食生理调节因子的关系进行了综述。

关键词: 精氨酸 一氧化氮 胍丁胺 摄食因子

Abstract: Arginine is an essential amino acid for birds and young mammalian animals, and conditioned-essential amino acid for adult mammals. Arginine deficiency or overdoes in a diet would significantly decreased ingesting behavior. Research showed that arginine could be converted to nitric oxide by nitric oxide synthase (NOS) in an animal body, and the latter has been discovered to regulate feed intake as downstream signal molecular of anorexic and orexigenic hormones. In addition, agmatine, produced from arginine decarboxylation, can stimulate feeding behavior via activating adrenergic receptors. The metabolism of arginine, the effect of arginine on animal ingesting, and the interaction of arginine and the main ingesting regulatory factors were reviewed in this paper.

Keywords: arginine, nitric oxide, agmatine, ingesting regulatory factor

收稿日期: 2012-08-28;

基金资助:

现代水禽产业技术体系建设专项资金项目(CARS-43)

通讯作者 侯水生,研究员,博士生导师,E-mail:houss@263.net

引用本文:

汪超,黄苇,谢明等. 精氨酸与动物摄食生理调节因子的关系[J]. 动物营养学报, 2013,V25(2): 242-247

WANG Chao, HUANG Wei, XIE Ming etc. Interaction of Arginine and Ingesting Regulatory Factors in Animal[J]. Chinese Journal of Animal Nutrition 2013,V25(2): 242-247.

链接本文:

http://118.145.16.228/Jweb_dwyy/CN/10.3969/j.issn.1006-267x.2013.02.002 或 http://118.145.16.228/Jweb_dwyy/CN/Y2013/V25/I2/

[1] JOBGEN W S, FRIED S K, FU W J, et al. Regulatory role for the arginine-nitricoxide pathway in metabolism of energy substrates[J]. The Journal of Nutritional Biochemistry, 2006, 17: 571-588.

[2] BAUCHART-THEVRET C, CUI L, WU G, et al. Arginine-induced stimulation of protein synthesis and survival in IPEC-J2 cells is mediated by mTOR not nitric oxide[J]. American Journal of Physiology-Endocrinology and Metabolism, 2010, 299(6): E899-E909.

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

- ▶ 汪超
- ▶ 黄苇
- ▶ 谢明
- ▶ 喻俊英
- ▶ 侯水生

- [3] YAO K, YIN Y, CHU W, et al. Dietary arginine supplementation increases mTOR signaling activity in skeletal muscle of neonatal pigs[J]. *The Journal of Nutrition*, 2008, 138(5): 867-872.
- [4] MUNIR K, MUNEER M A, MASAOUD E, et al. Dietary arginine stimulates humoral and cell-mediated immunity in chickens vaccinated and challenged against hydropericardium syndrome virus[J]. *Poultry Science*, 2009, 88(8): 1629-1638.
- [5] ALIMON A R, EMADI M, JAHANSHIRI F, et al. Nutrition and immunity: the effects of the combination of arginine and tryptophan on growth performance, serum parameters and immune response in broiler chickens challenged with infectious bursal disease vaccine[J]. *Avian Pathology*, 2011, 40(1): 63-72.
- [6] MORLEY J E, FLOOD J F. Evidence that nitric oxide modulates food intake in mice[J]. *Life Science*, 1991, 49(10): 707-711.
- [7] CHOI Y H, FURUSE M, OKUMURA J, et al. Nitric oxide controls feeding behavior in the chicken[J]. *Brain Research*, 1994, 654(1): 163-166.
- [8] KHAN M, TACHIBANAA T, HASEBE Y, et al. Peripheral or central administration of nitric oxide synthase inhibitor affects feeding behavior in chick[J]. *Comparative Biochemistry and Physiology-Part A: Molecular & Integrative Physiology*, 2007, 148(2): 458-462.
- [9] PRASAD A, PRASAD C. Agmatine enhances caloric intake and dietary carbohydrate preference in satiated rats[J]. *Physiology & Behavior*, 1994, 53(4): 1187-1189.
- [10] TAKSANDE B, KOTAGALE N, NAKHATE K, et al. Agmatine in the hypothalamic paraventricular nucleus stimulates feeding in rats: involvement of neurokinin B[J]. *British Journal of Pharmacology*, 2011, 164: 704-718.
- [11] GRILLO M, LANZA A, COLOMBATTO S. Transport of amino acids through the placenta and their role[J]. *Amino Acids*, 2008, 34: 517-523.
- [12] KWAK H, AUSTIC R E, DIETERT R R. Influence of dietary Arg concentration on lymphoid organ growth in chickens[J]. *Poultry Science*, 1999, 78: 1536-1541.
- [13] LABADAN M C, HSU K N, AUSTIC R E. Lysine and arginine requirements of broiler chickens at two- to three-week intervals to eight weeks of age[J]. *Poultry Science*, 2001, 80(5): 599-606.
- [14] CHOI Y H, OHNO N, DENBOW D M, et al. Effect of inhibition of nitric oxide synthase on food intake of chicks fed diets differing in arginine concentration[J]. *Japanese Poultry Science*, 1997, 34: 292-298.
- [15] WEBEL D M, JOHNSON R W, BAKER D H. Lipopolysaccharide-induced reductions in body weight gain and feed intake do not reduce the efficiency of arginine utilization for whole-body protein accretion in the chick[J]. *Poultry Science*, 1998, 77(12): 1893-1898.
- [16] 方勇军. 精氨酸对肉鸭生长性能、免疫机能、胴体品质和血液脂质的影响. 硕士学位论文. 武汉: 武汉工业学院, 2009: 13-21.
- [17] 张再明. 饲料赖氨酸与精氨酸交互对北京鸭生长发育的影响. 硕士学位论文. 广州: 华南农业大学, 2011: 5-13.
- [18] CAREW L B, EVARTS K G, ALSTER F A. Growth, feed intake, and plasma thyroid hormone levels in chicks fed dietary excesses of essential amino acids[J]. *Poultry Science*, 1998, 77(2): 295-298.
- [19] HARA T. Feeding behaviour in some teleosts is triggered by single amino acids primarily through olfaction[J]. *Journal of Fish Biology*, 2006, 68: 810-825.
- [20] 杨小萍. 补充精氨酸对21日龄仔猪生长的影响. 硕士学位论文. 雅安: 四川农业大学, 2008: 16-23.
- [21] 姚康, 褚武英, 邓敦, 等. 不同精氨酸添加水平对哺乳仔猪生长性能的影响[J]. *天然产物研究与开发*, 2008, 20(1): 121-124.
- [22] TAN B, YIN Y, LIU Z, et al. Dietary L-arginine supplementation increases muscle gain and reduces body fat mass in growing-finishing pigs[J]. *Amino Acids*, 2009, 37(1): 169-175.
- [23] 麻名文. 日粮精氨酸对生长肉兔生长性能、免疫、血液生化指标、激素水平及IGF- I mRNA表达量的影响. 硕士学位论文. 泰安: 山东农业大学, 2009: 12-29.
- [24] VOZZO R, WITTEGGER G A, HOROWITZ M, et al. Effect of nitric oxide synthase inhibitors on short-term appetite and food intake in humans[J]. *American Journal of Physiology-Regulatory Integrative and Comparative Physiology*, 1999, 276(6): R1562-R1568.
- [25] MORLEY J E, ALSHAHER M M, FARRS S A, et al. Leptin and neuropeptide Y (NPY) modulate nitric oxide synthase: further evidence for a role of nitric oxide in feeding[J]. *Peptides*, 1999, 20(5): 595-600.
- [26] CHENG C W, LIN P Y, CHEN M D. Zinc and nitric oxide synthase inhibitor L-NAME attenuate NPY-induced feeding in mice[J]. *Biological Trace Element Research*, 2000, 75(1/2/3): 21-27.
- [27] MORLEY J E, FARR S A, SELL R L, et al. Nitric oxide is a central component in neuropeptide regulation of appetite[J]. *Peptides*, 2011, 32(4): 777-780.
- [28] GASKIN F S, FARR S A, BANKS W A, et al. Ghrelin-induced feeding is independent on nitric oxide[J]. *Peptides*, 2003, 24(6): 913-918.
- [29] FARR S A, BANKS W A, KUMAR V B, et al. Orexin-A-induced feeding is dependent on nitric oxide[J]. *Peptides*, 2005, 26: 759-765.
- [30] RIGAMONTI A E, CELLA S G, CAVALLERA G M, et al. Contrasting effects of nitric oxide on food intake and GH secretion stimulated by a GH-releasing peptide[J]. *European Journal of Endocrinology*, 2001, 144(2): 155-162.
- [31] RAIMONDI L, ALFARANO C, PACINI A, et al. Methylamine-dependent release of nitric oxide and dopamine in the CNS modulates food intake in fasted rats[J]. *British Journal of Pharmacology*, 2007, 150: 1003-1010.
- [32] MORLEY J E, FARR S A, SUAREZ M D, et al. Nitric oxide synthase inhibition and food intake effects on motivation to eat and in female mice[J]. *Pharmacology Biochemistry and Behavior*, 1995, 50(3): 369-373.
- [33] CALAPAI G, CORICA F, ALLEGRA A, et al. Effects of intracerebroventricular leptin administration on food intake, body weight gain and diurnal nitric oxide synthase activity in the mouse[J]. *British Journal of Pharmacology*, 1998, 125(4): 798-802.

- [34] YANG S J,DENBOW D M.Interaction of leptin and nitric oxide on food intake in broilers and Leghorns[J].Physiology & Behavior,2007,92(4): 657.
- [35] STINGL H,RAFFESBERG W,NOWOTNY P,et al.Reduction of plasma leptin concentrations by arginine but not lipid infusion in humans [J].Obesity,2002,10(11):1111-1119.
- [36] SQUADRITO F,CALAPAI G,ALTAVILLA D,et al.Food deprivation increases brain nitric oxide synthase and depresses brain serotonin levels in [J].Neuropharmacology,1994,33(1):83-86.
- [37] CALAPAI G,CORICA F,CORSONELLO A,et al.Leptin increases serotonin turnover by inhibition of brain nitric oxide synthesis[J].Journal of Clinical Investigation,1999,104: 975-982.
- [38] WELLMAN P J,DAVIES B T,MORIEN A,et al.Modulation of feeding by hypothalamic paraventricular nucleus α 1- and α 2-adrenergic receptor [J].Life Sciences,1993,53(9):669-679.
- [39] JACKSON H C,GRIFFIN I,NUTT D.The effects of idazoxan and other α 2-adrenoceptor antagonists on food and water intake in the rat[J].British Journal of Pharmacology,2012,104(1):258-262.
- [40] PRASAD A.Agmatine (A),an endogenous alpha-2-noradrenergic agonist,augments feeding in satiated rats[J].Journal of Investigative Medicine,1994(Suppl.1):55A.
- [41] COTA D,PROULX K,SMITH K A,et al.Hypothalamic mTOR signaling regulates food intake[J].Science,2006,312(5775): 927-930.
- [1] 李金霞,孙海洲,赵存发,桑丹,张春华,凌树礼,珊丹,任晓萍.过瘤胃保护性精氨酸和大豆油对细毛羊肌内脂肪和脂肪酸组成的影响 [J].动物营养学报 2012,(5): 828-834
- [2] 徐柏林,王梦芝,张兴夫,哈斯,王春艳,敖长金,王洪荣.精氨酸水平对奶牛乳腺上皮细胞体外生长及 κ -酪蛋白基因表达的影响 [J].动物营养学报, 2012,(5): 852-858