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综述 Review

中枢神经系统整合外周信号调节采食量的分子机制

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Molecular Mechanisms of Feed Intake Regulation through Integration of Various Peripheral Signals by Central Nervous System

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摘要 采食量是动物生产性能充分发挥的基石,其受多种因素的共同调节。胃肠调节肽、肥胖信号分子(瘦素和胰岛素)及营养物质等外周调节因子在采食量的调节中发挥重要的作用。中枢神经系统是采食量调节的关键。近年来对中枢神经系统调控采食量的分子机制认识越来越深入,已鉴定出一些关键信号转导通路及转录因子,其中哺乳动物下丘脑雷帕霉素靶蛋白(mTOR)通路、一般性调控阻遏蛋白激酶2(GCN2)介导的一般性氨基酸应答通路及叉头转录因子1(FoxO1)和信号转导与转录激活因子3(STAT3)在中枢的采食量调节中起着重要作用。本文在简要回顾采食量调节生理机制的基础上,主要对外周信号在中枢神经系统调节采食量分子机制的研究进展进行综述。

关键词: 采食量 调节机制 中枢神经系统 信号通路 mTOR GCN2

Abstract: Feed intake is the cornerstone of assuring adequate production performance of animals and a variety of environmental stimuli influences the feed intake. Numerous peripheral stimuli involved gastrointestinal peptides, adiposity signaling molecules (insulin and leptin), and nutrients signal to central nervous system (CNS) have an important physiological role in regulating feed intake. CNS plays the central role in feed intake regulation, while the molecular pathway and mechanism has been increasingly recognized for the past few years. In mammals, it has already identified some key CNS intracellular signal transduction pathways and transcription factors as sensors/integrators in regulating feed intake, such as some highly conserved key pathways—the hypothalamic mammalian target of rapamycin (mTOR) and general control nonderepressible-2 kinase (GCN2)-mediated general amino acid control (GAAC) pathway, and transcription factors involved forkhead transcription factor 1 (FoxO1) and signal transducer and activator of transcription 3 (STAT3). This review provided an overview of the research progress of physiological and CNS molecular mechanisms in the overall control of feed intake.

Keywords: feed intake, regulation mechanisms, central nervous system, signal pathway, mTOR, GCN2

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