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Cristal M. Hill, Hans-Rudolf Berthoud, Heike Münzberg, Christopher D. Morrison

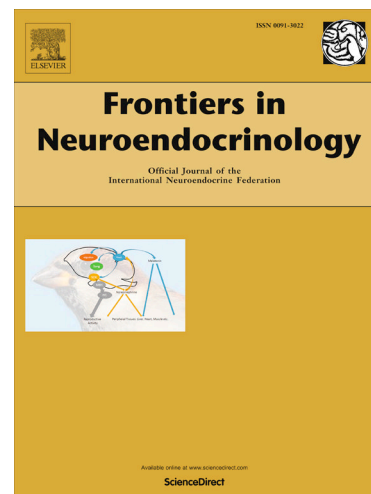
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Homeostatic sensing of dietary protein restriction: A case for FGF21

Cristal M. Hill, Hans-Rudolf Berthoud, Heike Münzberg, Christopher D. Morrison*

Pennington Biomedical Research Center, Baton Rouge, LA, 70808

***Corresponding Author**

Christopher D. Morrison
Pennington Biomedical Research Center
Baton Rouge, LA 70808
Christopher.Morrison@pbrc.edu

Abstract

Restriction of dietary protein intake increases food intake and energy expenditure, reduces growth, and alters amino acid, lipid, and glucose metabolism. While these responses suggest that animals 'sense' insufficient consumption of amino acids, the basic physiological mechanism mediating the adaptive response to protein restriction has been largely undescribed. In this review we make the case that the liver-derived metabolic hormone FGF21 is the key signal which communicates and coordinates the homeostatic response to dietary protein restriction. Support for this model centers on the evidence that FGF21 is induced by settings of insufficient dietary protein or amino acid intake and is required for adaptive changes in metabolism and behavior. FGF21 occupies a unique endocrine niche, being induced when energy intake is adequate but protein and carbohydrate are imbalanced. Collectively, the evidence thus suggests that FGF21 is the first known endocrine signal of dietary protein restriction.

Keywords: macronutrient, FGF21, dietary protein, nutrition

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