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Inadequate nutrition during development produces long-term adverse effects: Can these effects be modulated?

Nutrition is essential for the survival of individuals, but it is also of utmost importance that the quality and quantity of food intake remain within the adequate limits, so that the systems that regulate energy homeostasis develop properly. The neural networks that control food intake develop mainly during the early stages of life and, for this reason, a suitable diet during these developmental stages can determine the correct functioning of these circuits when the organisms are adults. Numerous studies have shown that in rodents both under- and over-nutrition during the pre- and early postnatal periods produce short, medium, and long-term adverse effects on the animal's metabolic physiology, including the brain's regulation of eating. This, suggests that in some cases malfunctioning of the intake system in adults has its origin in an inadequate nutrition during development. It has also been shown that estradiol during the first two weeks of life may have long-term modulatory effects on the alterations produced by a lack or excess of food. Recent reports have shown that in the programming of the hypothalamic circuits that regulate food intake, some metabolic hormones exert a very relevant function. Mainly leptin, but also ghrelin are involved in the development of hypothalamic circuits that regulate metabolism and brain metabolic circuits and it has been demonstrated that leptin act on hypothalamic neurones through the transcription factor STAT3 pathway. In light of these results and taking into account that estradiol shares this same pathway to exert its inhibitory effects on food intake, it would be of great importance to verify the possible involvement of estradiol in the programming of the circuits that regulate energy metabolism.

Biography

Paloma Collado is a professor of psychobiology at the National University of Distance Education (UNED) in Spain. She obtained her PhD in psychobiology in 1990. Her research has been focused since the beginning of her career in the field of physiological psychology, and for the last fifteen years, on the mechanisms involved in the development of the cerebral circuits that control food intake in rodents. Particularly, this research has focused on the vulnerability of brain circuits that regulate energy homeostasis to under- and over-nutrition, and also on the factors that could modulate the adverse effects that an inadequate nutrition produces during development. She has developed this research as principal Investigator of different grants in collaboration with researchers from the University of Cambridge, the University of Turin and the Department of Endocrinology at the University Hospital Niño Jesus. Her research has been published in international peer-reviewed journals.

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