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Defense of increased body weight against caloric restriction in diet-induced obesity: The role of relaxin-3

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Obesity is a multi-factorial disorder that generally develops on the polygenetic basis in an obesogenic environment. An animal model related to human obesity is diet-induced obesity in rats. The rats placed on a high-energy diet show wide distribution in body weight with a subset of animals developing diet-induced obesity (DIO) and the remaining animals showing a diet-resistant (DR) phenotype. Once obesity is established, DIO rats strongly defend their increased body weight against caloric restriction. The neuronal mechanisms involved in the defence of increased body weight in the DIO rats are not yet completely understood. Our results suggest that an orexigenic neuropeptide relaxin-3 may be involved in the mechanisms of defence of elevated body weight against caloric restriction in DIO rats. Expression of relaxin-3 and its specific receptor RXFP3 mRNAs were assessed by in situ hybridization in ad libitum, food-deprived and refeed DIO and DR rats. The brain levels of expression of relaxin-3 were higher in the DIO rats compared to the DR rats in the ad libitum-fed state. The stronger expression of relaxin-3 in the ad libitum-fed state in the DIO rats was accompanied by low expression of the RXFP3 receptor. However, refeeding significantly increased expression of RXFP3 in the DIO rats. These results provide evidence that DIO rats show a constitutive increase in relaxin-3 brain expression and that refeeding after food deprivation may enhance the orexigenic effects of relaxin-3 in DIO rats by rapid upregulation of the expression of RXFP3 in the brain regions involved in food intake regulation.

Biography

Elena Timofeeva is a professor in the Department of Psychiatry and Neuroscience at the Laval University (Quebec, Canada). After receiving a bachelor's degree from the Odessa State University (Ukraine) she has completed her master's (1997) and PhD (2001) degrees in the Department of Physiology at the Laval University (Quebec, Canada). Dr. Timofeeva performed her post-doctoral studies (2001-2005) at the Mental Health University Institute (Quebec, Canada). Dr. Timofeeva has published 4 book chapters and 38 research papers. She is director of the Laboratory of Stress and Feeding (www.timofeeva-stress-feeding-lab.ca). Her laboratory studies the neuronal mechanisms of food intake in eating disorders and obesity.

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