Peripheral RVD-hemopressin(α) administration inhibits food intake, in rats

1)Ferrante C. 2)Orlando G. 3)Recinella L. 4)Leone S. 5)Chiavaroli A. 6)Di nisio C. 7)Martinotti S. 8)Mollica A. 9)Macedonio G. 10)Stefanucci A. 11)Vacca M. 12)Brunetti L.

Department of Pharmacy, "G. d'Annunzio" University

Hemopressin, VD-hemopressin(α) and RVD-hemopressin(α) are hemoglobin α chain derived-peptides which have been found in mouse brain, where they modulate cannabinoid (CB) receptor function (Heimann et., 2007; Gomes et al., 2009; Han et al., 2014). The nonapeptide hemopressin has been reported to inhibit feeding after both central and peripheral administration, possibly playing a role of antagonist/inverse agonist of CB1 receptors, and consequently blocking the orexigenic effects of endogenous cannabinoids (Dodd et al., 2010). VD-hemopressin(α) and RVD-hemopressin(α) are N-terminal extended forms of hemopressin. VD-hemopressin(α) has CB1 agonist activity, and as such it has been shown to stimulate feeding. RVD-hemopressin(α) is reported to play a negative allosteric modulatory function on CB1 receptors, but there are no data on its possible effects on feeding and metabolic control.

We have studied, in rats, the effects of 14 daily intraperitoneal (ip) injections of RVD-hemopressin(α) (10 nmol). We found that RVD-hemopressin(α) treatment inhibited food intake while total body weight was not affected. The null effect on body weight despite diminished feeding could be related to decreased uncoupling protein 1 (UCP-1) gene expression in brown adipose tissue (BAT). We also investigated the underlying neuromodulatory effects of RVD-hemopressin(α) and found it to down regulate proopiomelanocortin (POMC) gene expression, together with norepinephrine (NE) levels, in the hypothalamus. In conclusion, RVD-hemopressin(α) administration has an anorectic effect, possibly related to inhibition of POMC and NE levels in the hypothalamus. Despite decreased food intake, body weight is not affected by RVD-hemopressin(α) treatment, possibly due to inhibition of UCP-1 gene expression in BAT.

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