

Vagus Nerve Stimulation and Emotional Responses to Food among Depressed Patients

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Abstract

Background:

Approved for treatment of treatment-resistant depression and for epilepsy, vagus nerve stimulation (VNS) therapy involves stimulation of the vagus nerve, affecting both mood and appetite regulating systems. VNS is associated with changes in food intake and weight loss in animals. Studies of its impact on food intake and weight with humans are limited. It is not known whether or how VNS influences emotional response to food, but vagus afferents project to regions in the insula involving satiety and taste.

Method:

Thirty-three participants were recruited for three groups: depressed patients undergoing VNS therapy, depressed patients not undergoing VNS therapy, and healthy controls. All participants viewed images of foods twice in random order. When applicable, VNS devices were turned on for one viewing and off for the other. Participants were instructed to rate immediately after the viewings how each picture made them feel on a visual analog on three dimensions (unhappy to happy, calm to aroused, and small/submissive to big/domineering).

Results:

Controlling for time since last meal, a significant main effect was found for arousal ratings in response to sweet food images. Post-hoc analyses indicated that the VNS group demonstrated significant changes in arousal ratings between paired food image viewings compared to controls. Sixty-four percent of VNS participants demonstrated increases and 36% demonstrated decreases in arousal. Higher body mass indexes and greater levels of self-reported sweet cravings were associated with increased arousal during VNS activation.

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Abbreviations: (ANOVA) univariate analysis of variance, (BDI-II) Beck Depression Inventory II, (BMI) body mass index, (CVAS) computerized visual analog scale, (EES) Emotional Eating Scale, (IAPS) International Affective Picture System, (MANCOVA) multivariate analysis of covariance, (TRD) treatment-resistant depression, (VNS) vagus nerve stimulation

Keywords: appraisal, brain stimulation, depression, emotions, food, obesity, vagus nerve, vagus nerve stimulation

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Abstract cont.**Conclusions:**

This study was the first to examine the effects of acute left cervical VNS on emotional ratings of food in adults with major depression. Results suggest that VNS device activation may be associated with acute alteration in arousal response to sweet foods among depressed patients. Future research is needed to replicate these findings and to assess how activation of the vagus nerve affects eating and weight.

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