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Olfactory stimulatory with grapefruit and lavender oils change autonomic nerve activity and physiological function

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Abstract

This review summarizes the effects of olfactory stimulation with grapefruit and lavender oils on autonomic nerve activity and physiological function. Olfactory stimulation with the scent of grapefruit oil (GFO) increases the activity of sympathetic nerves that innervate white and brown adipose tissues, the adrenal glands, and the kidneys, decreases the activity of the gastric vagal nerve in rats and mice. This results in an increase in lipolysis, thermogenesis, and blood pressure, and a decrease in food intake. Olfactory stimulation with the scent of lavender oil (LVO) elicits the opposite changes in nerve activity and physiological variables. Olfactory stimulation with scent of limonene, a component of GFO, and linalool, a component of LVO, has similar effects to stimulation with GFO and LVO, respectively. The histamine H1-receptor antagonist, diphenhydramine, abolishes all GFO-induced changes in nerve activity and physiological variables, and the histamine H3-receptor antagonist, thioperamide, eliminates all LVO-induced changes. Lesions to the hypothalamic suprachiasmatic nucleus and anosmic treatment with ZnSO₄ also abolish all GFO- and LVO-induced changes. These findings indicate that limonene and linalool might be the active substances in GFO and LVO, and suggest that the suprachiasmatic nucleus and histamine are involved in mediating the GFO- and LVO-induced changes in nerve activity and physiological variables.

Keywords: Adrenal glands; Appetite; Aromatherapy; Autonomic neurotransmission; Blood pressure; Body temperature; Brown adipose tissue; Circadian clock; Histamine; Kidney; Limonene; Linalool; Lipolysis; Mice; Parasympathetic; Rat; Stomach; Suprachiasmatic nucleus; Sympathetic; Thermogenesis; White adipose tissue.

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