Binge-like consumption of caloric and non-caloric palatable substances in ad libitum-fed C57BL/6J mice: Pharmacological and molecular evidence of orexin involvement

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The orexin (OX) system has been implicated in food-reinforced behavior, food-seeking and food overconsumption. Recent evidence suggests that OX signaling might influence consumption of palatable foods with high reinforcing value depending upon the caloric status of the animal. The present study evaluates from a pharmacological and a molecular approach the contribution of OX to excessive binge-like consumption of highly preferred palatable substances (sucrose and saccharin) in ad libitum-fed C57BL/6J mice. The main findings of this study are: (1) intraperitoneal (ip) injection of SB-334867 (10, 20 or 30. mg/kg), a selective OXR1 antagonist, significantly decreased binge-like consumption of sucrose (10%, w/v) and saccharin (0.15%, w/v) during the test day in a Drinking in the Dark procedure in ad libitum-fed animals, without evidence of any significant alteration of locomotor activity. (2) Four repetitive, 2-h daily episodes of sucrose and saccharin (but not water) binge-like drinking significantly dampened OX mRNA expression in the LH. Present findings show for the first time a role for OXR1 signaling in binge-like consumption of palatable substances in animals under no caloric needs. Targeting OXR1 could represent a novel pharmacological approach to treat binge-eating episodes.

Binge-like consumption

Drinking in the Dark (DID)

Orexins

Palatable substances

1 (2 methyl 6 benzoxazolyl) 3 (1,5 naphthyridin 4 yl)urea

messenger RNA

orexin

orexin 1 receptor

saccharin

sucrose

1-(2-methylbenzoxazol-6-yl)-3-(1,5)naphthyridin-4-yl urea

agents interacting with transmitter, hormone or drug receptors

benzoxazole derivative

drinking water

messenger RNA

mitochondrial protein

neuropeptide

nuclear protein

orexins

Oxr1 protein, mouse

saccharin

signal peptide

sugar intake

urea

adult

animal experiment

animal model

animal tissue

article

binge eating disorder

controlled study

dose response

drinking behavior

drug dose comparison

drug effect

gene expression

lateral hypothalamus

locomotion

male

mouse

nonhuman

priority journal

signal transduction

administration and dosage

analogs and derivatives

animal

antagonists and inhibitors

bulimia

C57BL mouse

caloric intake

drug effects

metabolism

motor activity

physiology

sugar intake

Animals

Benzoxazoles

Bulimia

Dietary Sucrose

Dose-Response Relationship, Drug

Drinking Behavior

Drinking Water

Energy Intake

Hypothalamic Area, Lateral

Intracellular Signaling Peptides and Proteins

Male

Mice, Inbred C57BL

Mitochondrial Proteins

Motor Activity

Neuropeptides

Neurotransmitter Agents

Nuclear Proteins

RNA, Messenger

Saccharin

Urea