



## Central interaction between physostigmine and histamine during yawning in rats

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### Abstract:

In this study, the effects of intraperitoneal (*ip*) injection of physostigmine, subcutaneous (*sc*) injection of atropine, and intracerebroventricular (*icv*) injections of histamine, chlorpheniramine ( $H_1$ -receptor antagonist), and ranitidine ( $H_2$ -receptor antagonist) in separate and combined treatments were investigated during yawning in rats. Physostigmine at a dose of 0.25 mg/kg produced the highest number of yawns. Atropine, used alone, was without effect, but physostigmine (0.25 mg/kg, *ip*)-induced yawning was blocked by pretreatment with atropine (1 mg/kg, *sc*). Histamine at the doses of 10, 20 and 40  $\mu$ g produced yawning. Chlorpheniramine and ranitidine, used alone, had no effect, whereas pretreatments with chlorpheniramine and ranitidine at the same dose of 80  $\mu$ g prevented histamine (40  $\mu$ g, *icv*)-induced yawning. The suppressive effect of chlorpheniramine was more than that of ranitidine. Histamine (10 and 40  $\mu$ g, *icv*) enhanced, whereas chlorpheniramine and ranitidine at the same dose of 80  $\mu$ g suppressed, physostigmine (0.25 mg/kg, *ip*)-induced yawning. Atropine (1 mg/kg, *sc*) not only suppressed histamine-induced yawning, but also enhanced the inhibitory effect of chlorpheniramine, but not of ranitidine on yawning induced by histamine. These results indicate that muscarinic receptors mediate yawning induced by physostigmine. Histamine central  $H_1$ , and to a lesser extent  $H_2$  receptors, may be involved in histamine-induced yawning. Cholinergic muscarinic receptors, as well as histaminergic  $H_1$  and to a lesser extent  $H_2$  receptors, may also be involved in the interaction between brain acetylcholine and histamine.

### Key words:

physostigmine, atropine, histamine, chlorpheniramine, ranitidine, yawning, rats

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