

## ATP increases ciliary beat frequency in mouse airway cilia through P2Y<sub>1</sub> receptor

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Mucociliary transport, which is a host-defense mechanism of the airway, consists of the mucous layer and the beating cilia lining on the airway surface. Although beating of cilia is the most important in this system, the regulation of beating is not fully understood. Among a few pharmacological stimuli which has been known to increase the ciliary beating, ATP is one of the most effective. However, ATP is not useful expectorant, because of its wide-spread pharmacological activity. In the present study, therefore, we have examined the purinergic receptor, which is involved in the increase in ciliary beating by ATP, in isolated mouse airway cilia. ATP significantly increased both ciliary beat frequency (CBF) and ciliary bend angle (CBA), whereas ADP increased only CBF. In contrast, adenosine and UTP did not increase CBF and CBA. Interestingly, increase in CBF by ATP was abolished by BAPTA-AM, but CBA was not affected, suggesting that ATP differently regulates CBF and CBA. Finally, increase in CBF by ATP was completely inhibited by MRS2179, a P2Y<sub>1</sub> receptor antagonist. Therefore, we may propose P2Y<sub>1</sub> receptor agonist as a new airway clearance stimulator, which increases ciliary beating.