Materials & Methods

Sensitization of mice and preparation of septal mucosa

1. Development of AR animal model (Group A=13, B=11 and C=12)

2. Symptom score recording
Sneezing and nasal rubbing were counted immediately after provocation for 5 minutes.

3. Preparation of nasal septal mucosa
Mice were sacrificed and both nasal septal mucosae were harvested. Harvested nasal septal mucosae were kept at 37°C in DMEM during all the procedure.

Measurement of CBF
Ciliary movement was observed using an immersion microscope at a magnification of X 400. A digital charge-coupled device camera (XC-HR50, Sony Co, Japan) transferred images to a computer equipped with a frame grabber. Ciliary movement was analyzed using software based on fast-Fourier transform.

Design of experiment

1. Measurement of CBF in acute phase of AR and control
2. The effect of histamine on CBF
3. The CBF responses after treatment with fexofenadine or DMEM solution

Statistical analyses

1. Mann-Whitney U test and Wilcoxon signed rank test generated by SPSS version 12.0 (SPSS Inc, Chicago, IL) were applied to determine the presence of statistical differences (P<.05). Data were expressed as mean±SEM.

Introduction

• There have been many studies on relationship between sinusitis and ciliary beat frequency (CBF). However, a few studies on CBF in allergic rhinitis (AR) were reported and their results were controversial.

• AR was known to lower CBF. Of mediators which are secreted in acute phase of allergic rhinitis, histamine is known to play a crucial role in many aspects.

• Some studies reported the stimulatory effects of histamine on CBF, whereas other studies showed no effects on CBF. Moreover, it is difficult to compare these results because of the difference in materials and methods.

Aim of study
The aim of this study was to investigate CBF in acute phase of allergic rhinitis (AR) and the role of histamine on CBF.

Results

AR symptom scores (rubbing) between 3 groups

CBF after nasal provocation with time

Changes of CBF after the application of 10^-5, 10^-3 and 10^-1 M histamine

Changes of CBF after the application of 100 μM fexofenadine or DMEM solution in histamine-induced ciliostasis

Conclusions

• CBF increases in acute phase of AR mouse model.

• High concentration of histamine show a ciliostatic effect on CBF, which is reversible by antihistamine or washing.

• Histamine is not responsible for the increment of CBF in acute phase of AR.