CALIFORNIA STATE SCIENCE FAIR
2016 PROJECT SUMMARY

Name(s)

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Project Number

36028

Project Title

Cold vs. Allergy: The Use of Nasal Cytology to Determine if High School Students Can Predict Their Own Diagnosis

Abstract

Objectives/Goals

To determine if high school students can predict if their nasal symptoms represent a cold or nasal allergies, by using nasal cytology to confirm their diagnosis.

Methods/Materials

High school student volunteers were recruited with active nasal symptoms (nasal mucus production). Informed consent was obtained from subject or subject's parent (if under 18). Participants were assigned through alphanumeric code. Subjects were asked to blow their nose into a tissue-sized piece of plastic wrap. All subjects filled out a questionnaire based on their symptoms, which included nasal and non-nasal symptoms, were asked qualifying and disqualifying questions, and asked if they thought they had a cold or allergy. Nasal mucus samples obtained from subjects were smeared onto a glass microscope slide using a cotton swab and allowed to air dry. The slide was stained with Hansel stain and rinsed with distilled water. Excess stain was removed with 75% ethyl alcohol. The slide was then read to determine most predominant cell type. A predominance of eosinophils suggests a diagnosis of allergy, while a predominance of neutrophils suggests a cold/infection. The prevalence of allergies were calculated by dividing the number of people who have predominant amount of eosinophils by the total amount of subjects tested (times 100). This same prevalence calculation also done for colds with a neutrophil predominance. People who predicted correctly that they had a cold or allergy divided by the total number of subjects gave the percentage of correctly predicted. Subjects who predicted incorrectly that they had a cold or allergy divided by the total number of subjects gave the percentage of who predicted incorrectly.

Results

A total of 74 subjects completed the study. Predominance of eosinophils was found in 50%, 36%, 60% of subjects for fall, winter, spring, respectively (p=NS). Predominance of neutrophils were found in 41%, 55%, 40% of subjects for fall, winter, spring, respectively (p=NS). Fifty-three percent of subjects correctly predicted their diagnosis over all time periods (p=NS).

Conclusions/Discussion

Eosinophils were the predominant cell type during fall and spring, likely due to mold and tree pollen allergy seasons. Neutrophils were the predominant cell type during winter, corresponding to the peak of cold season. Subjects were unable to accurately predict if they had a cold or allergy.

Summary Statement

Through the microscopic examination of nasal cytology, I was able to determine how accurately students could predict if they had a cold or nasal allergy, as well as the prevalence of colds verses nasal allergies during different seasons.

Help Received

Daniel More, MD, Asst. Clinical Professor, UCSF School of Medicine, Kacee Fujinami, BS, Biology Teacher Salinas High School, Jennifer Kato, MS, Lecturer, CSUMB