398 Stabilizing Fel d1 Levels in a Cat Allergen Exposure Chamber

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RATIONALE: Naturalistic exposure to cat allergen in a controlled environment is optimal for assessing patient responses. However, maintaining control of Feld1 levels remain problematic as reported values can vary significantly within and between chambers. This study aims to assess new and previous methods to aerosolize Feld1 in our Natural Exposure Chamber. The best method for maintaining dander levels will be utilized for future cat allergen exposure studies.

METHODS: The chamber, volume 14.7 m^3 was designed and built to accommodate two neutered cats and 1-2 subjects. Samples were obtained at 3 locations in the chamber using portable air samplers (Gillian 5000) with glass fiber filters (Millipore), flow rate 4 L/min. Feld1 was quantified using ELISA (Indoor Biotechnologies). Over 20 weeks, 30-minute air samples and floor and wall swabs were collected to measure Feld1. Fans and blanket shaking were evaluated as means to aerosolize dander.

RESULTS: With no disturbance, air Feld1 levels were mostly below the limit of detection in the 20 weeks following the cats' introduction to the room. Over the same time, wall (1.7 to 19.2 ng/m^2) and floor Feld1 (15.1 to 138.2 ng/m^2) increased. Fans placed 1.5 and 7 feet above the floor aerosolized Feld1 (12.6 $\pm$ 19.8 and 9.17 $\pm$ 6.1 ng/m^3, respectively). Shaking the cats' blankets generated 45.9 $\pm$ 60.1 ng/m^3 in the air and shaking every 15 minutes 111.7 $\pm$ 46.3 ng/m^3.

CONCLUSIONS: Feld1 increased on walls and floor over 20 weeks of cat residence but required intervention for aerosolization. Blanket shaking generated higher levels of Feld1 in the air.

399 Pollen and air quality control in the Environmental Exposure Unit (EEU): A review of 20 years data for refinements, improvements, and distinction in indoor air quality assurance

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RATIONALE: A variety of contaminants present in indoor and outdoor air can affect the clinical allergic response to airborne pollen. These include fine particles(PM2.5) and ground level ozone, fibres, volatile organic compounds(VOCs), mould and endotoxin. CO2concentrations above 1000 ppm are associated with significant negative cognitive effects. For the last 20 years, a systematic effort has been made to understand and limit the presence of contaminants and confounders of symptom perception in the EEU known to affect clinical responses to inhaled pollen during controlled allergen challenge.

METHODS: We have extensively analyzed the biotic and abiotic contaminants evaluated from inlet air, pollens, volatiles introduced by the building and participants in EEU studies over the past 20yrs of operations. We qualitatively analyzed changes and improvements over the EEU's lifespan.

RESULTS: Data from the early 1990s revealed the original HVAC system and cleaning products used introduced undesirable abiotic contaminants. Third party analysis of commercially obtained pollen showed contamination with a variety of fungi and gram-negative bacteria depending on conditions of their production. Refinements to the EEU and feedback to pollen suppliers(and exclusion of batches not meeting standards) has led to remarkable improvement in all aspects of EEU quality control, with current analyses showing very low levels of fine particles, VOCs, moulds and endotoxin.

CONCLUSIONS: A sustained effort is needed to ensure that the exposure for any participant in a study using a Controlled Allergen Challenge facility is limited to only the relevant pollen allergen. The EEU has shown a high degree of success in maintaining this standard.

400 Detection of dust mite allergens in homes throughout the US

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RATIONALE: *Dermatophagoides* dust mites are known to vary across North America depending on location with factors like elevation and humidity influencing their presence. These studies have included microspopic identification of mites, DNA analysis and allergen protein measurements. In order to develope a current mapping of allergen protein prevalence, we have studied dust from homes in 16 regions around the US for major dust mite allergens. In order to explore variability within a region, multiple homes from the same region were studied.

METHODS: Dust from vacuum cleaner bags from 24 homes was used to make 1:10w/v extracts using a 1% albumin, 0.9%saline phenol extraction fluid. The extracts were filtered using a 0.2micron filter then analysed for species specific Der p/f 1 using direct binding monoclonal ELISAs (ALK, Madrid).

RESULTS: Nineteen of the homes had detectable mite allergens ranging from below 1 microgram/gram of dust to more than 20micrograms/gram. 12 of these homes showed *D. farinae* only, 1 in Southern California showed *D. pteronyssinus* only, and 6 homes contained both mites. The *D. pteronyssinus* containing homes were not confined to coastal areas. The homes in Spokane, Reno, Denver, and Sonoma showed no mites. Out of 9 homes in Texas that contained mite allergens,one had no detectable dust mites.

CONCLUSIONS: This study confirmed widespread presence of dust mite allergens in homes across the US but are low in drier rocky mountain states. Many homes contain both species in New England and Southern regions.

401 Reduction of asthma and allergic rhinitis by minimizing the animal dander and particle count in indoor air on using the AHPCO and Plasma Nanotechnology

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RATIONALE: There is a gradual rise of allergy and asthma cases all over the world. Particulate matter of size 2.5 microns are a major health concern in the present decade since, when inhaled they can reach deep into the lungs and tissues via the bloodstreams. These are generally composed of the combustion particles, organic compounds, metals. We analyzed the particle count in two fiber glass chambers to assess and evaluate the efficiency of the hybrid AHPCO or Advanced Hydrated Photocatalytic Oxidation and Plasma Nanotechnology in reducing the particle counts in the chambers.

METHODS: We evaluated the rate of the decay of aerosol particles on using the AHPCO and plasma nanotechnology. Through an inlet, the aerosols were injected and dispersed in the chamber in a controlled way and particle count was recorded using the DustTrack connected to the outlet. The DustTrack 8520 spectrometer counted the aerosols in the chamber on injecting 12 mg/m^3 of NX solution into the chamber; we turn on the DustTrack and let the aerosols settle to the lowest concentration. We used the illite NX powder as aerosols since it has a similar mineralogical composition to atmospheric mineral dust. We also used a Dylos Air Quality Monitor to detect and compare the animal dander counts on running the air purifier for 24-120 hours of exposures in the animal vivarium.

RESULTS: A gradual reduction of the indoor particulate matters and animal dander was recorded with the progressive time intervals.

CONCLUSIONS: AHPCO and Plasma efficiently reduced the indoor particles and dander.

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