SUNDAY

532 Climate Change and Shifting Ragweed Trends in the New York Metropolitan Area

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RATIONALE: Ragweed (*Ambrosia*) is a clinically significant aeroallergen in the New York City metropolitan area (NYCMA); we examined how changes in local climate may account for altered production of ragweed pollen over an 18 year period.

METHODS: Pollen was collected using a volumetric sampling device according to the National Allergy Bureau standard from 1990 through 2007. Meteorological data was accumulated via review of National Oceanic and Atmospheric Administration records from the same time period.

RESULTS: Total aeroallergen (pollen and mold spore) counts from summer to fall are predominated by ambrosia species (66%). On average, ragweed appears on day 210 (July 29th), lasts 93 days, and achieves its peak measurement on day 246 (September 3rd). A trend toward lower peak and monthly average ragweed count was observed between 1990 and 2007 ($R^2 = 0.98$ for both), although an increased trend in duration of season occurred from 90 to 105 days. The total amount of ragweed counted each year has significantly declined ($p = 0.01$). During the same period, the trend of average monthly precipitation has increased ($R^2 = 0.90$). While overall average monthly temperature appears to be increasing, average daily July temperature appears to be decreasing over the same period. Significant ragweed pollen release was correlated to higher temperatures ($R^2 = 0.81$). A significant positive correlation between average monthly rainfall and duration of ragweed season was found ($R^2 = 0.92$).

CONCLUSIONS: Ragweed is a highly potent aeroallergen that appears to have seasonal and daily counts decreasing with increasing duration of "ragweed days" in the NYCMA, which may, in part, be attributable to climate change.

533 Peak Tree Pollen Levels in New York City

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RATIONALE: Both precipitation and temperature may affect tree pollen counts. In April of 2008, there was a significantly greater peak in tree pollen compared to the previous three years. To examine this trend, we compared peak tree pollen counts with temperature and precipitation levels.

METHODS: Tree pollen counts were measured at the Long Island College Hospital counting station in Brooklyn, NY from March 14, 2005 through August 30, 2008 and were compared to precipitation and temperature data obtained from Accuweather.com.

RESULTS: Total tree pollen increased 277% (from 2360/m^3 to 6550/m^3) from 2007 to 2008. The increase was due to a 13 day period of high pollen counts with a peak count of 1533/m^3 in late April of 2008. This was preceded by a 13 day period of dry weather. Peak tree pollen levels were always noted after periods of dry weather (average of 10.5 days), with the highest peak numbers in 2005 and 2008 after 14 days and 13 days, respectively, of dry weather. The lowest peak tree pollen was measured in 2007 (333/m^3) after only 5 days of dry weather. There was no significant difference in average temperature during this time.

CONCLUSIONS: It is known that precipitation during allergen season influences tree pollen levels but the relationship is not well defined. Given normal temperature during pollen season, our research suggests that long periods of dry weather lead to high peak tree pollen counts.

534 Pollen-grain-induced Oxidative Stress Activates Dendritic Cells

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RATIONALE: It has recently been demonstrated that pollen grains contain NADPH oxidases that induce oxidative stress in the airways and this signal boosts allergic inflammation in sensitized mice. We investigated whether pollen-generated reactive oxygen species (ROS) have a role in the sensitization phase of allergic reactions.

METHODS: Human monocyte-derived dendritic cells (DCs) were treated with ragweed pollen grains and the changes in the oxidative stress levels after exposure were determined by using a redox-sensitive probe. The chemokine and cytokine release from DCs were measured by means of ELISA. Phenotypic maturation of DCs was analyzed by flow cytometry. T cell priming and polarizing capacity of pollen-treated DCs were examined in co-cultures with naïve $CD4^+$ T cells.

RESULTS: Pollen exposure induced oxidative stress in DCs and the elevated levels of ROS triggered the production of IL-8, TNF-alpha and IL-6. Treatment with pollen grains initiated the maturation of DCs, consequently up-regulated the expression of CD40, CD80, CD86 and CD83 on DCs. The pollen-treated DCs exhibited a strong capacity to induce T cell proliferation and were able to polarize naïve T cells to T helper1, T helper2 or regulatory T cell direction, respectively. Antioxidants inhibited both the phenotypic and functional changes of DCs induced by pollen administration underlining the importance of ROS in these processes.

CONCLUSIONS: Pollen-derived ROS may contribute to local innate immunity by triggering proinflammatory cytokine production of DCs. Moreover, pollen-produced ROS affect the maturation program of DCs, hence they participate in the initiation of allergen-dependent adaptive immune responses.

535 Basophil Activation Test in Patients with Immediate Allergic Reactions to NSAIDs.

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RATIONALE: Non steroidal antiinflammatory drugs (NSAIDs) are one of the drugs that most frequently induce allergic reactions. Two main mechanisms are involved: IgE-mediated and cross-intolerance. Although the mechanism involved in cross-intolerance reactions is still poorly understood Basophil Activation Test (BAT) have been proposed as a diagnostic tool. The aim of this study was to evaluate the potential value of BAT using flow cytometric methods in the diagnosis of patients with cross-intolerance to NSAIDs.

METHODS: Sixty-eight patients diagnosed of cross-intolerance (by clinical history and drug provocation test) to NSAIDs and 68 tolerant controls were studied. BAT was performed by flow cytometry with aspirin, paracetamol, diclofenac, dipirone, naproxen and ibuprofen at two different concentrations. Results, expressed as stimulation index (SI), were considered positive when $SI > 2$.

RESULTS: The mean time interval between the reaction and the study was 3 months. The sensitivity of BAT for the different drugs ranged from 15.6% for metamizol to 36.4% for naproxen and the specificity ranged from 69% for diclofenac to 77% for ibuprofen. The sensitivity decreased dramatically when more restricted criteria were used from 57.6% in patients with BAT positive at least to one drug to 15.2% in patients positive to at least three drugs. According to the symptom severity, BAT sensitivity varied from 75% in mild to 42.9% in severe reactions.

CONCLUSIONS: Basophil Activation Test does not seem to be a useful tool for the diagnosis of patients with cross-intolerance to NSAIDs due to its low sensitivity and specificity, specially in severe reactions.