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AllergyAllergies, also known as allergic diseases are a number of situations cause by hypersensitivity of the immune system to something in the environment that usually causes little or no problem in majority of the people.

These diseases include hay fever, food allergies, atopic dermatitis, allergic asthma and anaphylaxis. Common allergens include Ø Certain food(nuts, fruits, cow's milk, hen eggs, wheat, seafood, soya, gluten)Ø PollenØ MetalsØ Insect stingsØ MedicationsHistory: The perception of allergy was introduced in 1906 by the Viennese pediatrician Clemens von Pirquet, after he realize that some of his patients were oversensitive to normally harmless entities such as dust, pollen, or certain foods. Pirquet called this incident " allergy" from the Ancient Greek words allos meaning " other" and ergon meaning " work" All forms of hypersensitivity used to be classify as allergies, and all were considered to be caused by an inappropriate activation of the immune system. Later, it became clear that several different disease mechanisms were implicated, with the common link to a disordered activation of the immune system. In 1963, a new classification method was given by Philip Gell and Robin Coombs that described four types of hypersensitivity reactions, known as Type I to Type IV hypersensitivity. With this new categorization, the word " allergy" was limited to type I hypersensitivities (also called immediate hypersensitivity), which are categorized as rapidly developing reactions. A major advancement in understanding the mechanisms of allergy was the discovery of the antibody class labeled immunoglobulin E (IgE). IgE was simultaneously discovered in 1966–67 by two independent groups: Ishizaka's team at the

Children’s Asthma Research Institute and Hospital in Denver, Colorado, and by Gunnar Johansson and Hans Bennich in Uppsala, Sweden.

Their joint paper was published in April 1969. Usually children develop seasonal allergies after 5-6 years of age. Before that the most common sign of allergy is asthma, which begins most frequently between the ages of 1-3 years. Symptoms: The symptoms of seasonal allergies can be divided into three main groups: Ø Nasal: runny or stuffy nose, itchy nose, itchy palate, frequent sneezing. Ø Eye symptoms: redness, itchy or runny eyes.

Sometimes these symptoms make a child very uneasy. Ø Asthma: symptom include wheezing, cough and/or difficulty breathing. Symptoms of food allergy comprise abdominal pain, bloating, vomiting, diarrhea, itchy skin and swelling of the skin during hives. Food allergies rarely be the reason of respiratory (asthmatic) reactions, or rhinitis. Insects sting, food, antibiotics and certain medicines may create a systemic allergic response that is also called anaphylaxis. Multiple organ systems can be affected, including digestive system, the respiratory system and the circulatory system.

Depending upon the rate of severity, it can cause a skin reaction, bronchoconstriction, swelling, low blood pressure, coma and death. This type of reaction can be initiated suddenly, or the onset can be delayed. The nature of anaphylaxis is such that the reaction can be seem to be subsiding, but may happen again throughout a period of time. Risk factors: Risk factors for allergy can be located in two general categories. 1.

Host factors 2. Environmental factors Host factors includeØ HeredityØ Sex-men are found to be more prone to allergies than women. The cause of

this is unknownØ RaceØ AgeHeredity factor is most significant. However there have been recent increases in the incidence of allergic reactions that cannot be explained by genetic factors alone. Major environmental factors are: Ø Alteration in exposure to infectious diseases during early childhoodØ Smoking – children who belong to families where parents or family members smoke are at greater risk of allergiesØ Children who belong to smaller families with just one or two children or who are overweight or obese are at a greater riskØ Frequency of antibiotics – children who have frequent courses of antibiotics are at a greater risk of developing allergies.

Ø Environmental pollutionØ Allergens levels Ø Dietary changesCauses of seasonal allergies: The causes of seasonal allergies are following: Ø Trees pollens (APRIL-JUNE): maple, ash, oak, elm, birch and cedar. When they pollinate depends on the area in which one live. Ø Grasses (JUNE-JULY): Kentucky Blue grass, rye, orchard and timothy. These type of allergies are worsened when the grass (lawn) is mowed.

Ø Ragweed (MID-AUGUST-OCTOBER): Ragweed pollen is such an important cause of seasonal allergies. Pathophysiology: Acute responseIn the early stages of allergy, a type 1 hypersensitivity reaction against an allergen encounter for the first time and presented by a professional antigen-presenting cell causes a response in a type of immune cell called a TH2 lymphocyte, which belongs to a subset of T cells that produce a cytokine called interleukin-4 (IL-4). These TH2 cells interact with other lymphocytes called B cells, whose role is making of antibodies. Together with signals provided by IL-4, these interactions excite the B cell to start the production of a large amount of a particular type of antibody known as IgE.

The IgE circulates in the blood and attaches to an IgE-specific receptor (a kind of Fc receptor called FC? RI) on the exterior of other kinds of immune cells called mast cells and basophils, which are both concerned in the acute inflammatory response. The IgE-coated cells, at this stage, are sensitized to the allergen. The diagram explains how energy develops If later exposure to the same allergen occur, the allergen can bind to the IgE molecules held on the surface of the mast cells or basophils. Cross-linking of the IgE and Fc receptors occurs when more than one IgE-receptor complex interact with the same allergenic molecule, and activate the sensitized cell. Activated mast cells and basophils go through a process called degranulation, during which they release histamine and other inflammatory chemical mediators (cytokines, interleukins, leukotrienes, and prostaglandins) as of their granules into the surrounding tissue cause several systemic effects, such as vasodilation, mucous secretion, nervestimulation, and smooth muscle contraction. This results in rhinorrhea, itchiness, dyspnea, and anaphylaxis. Depending on the person, allergen, and mode of introduction, the symptoms can be system-wide or localized to particular body systems. Asthma is localized to the respiratory system and eczema is localized to the dermis.

Late phaseThese responses can often occur after the chemical mediators of the acute response subside, because other leukocytes such as neutrophils, lymphocytes, eosinophils and macrophages migrate to the first site. It occurs 2-24 hours after the original reaction. The role in the persistence of long-term effect may be played by cytokines from mast cells.

Environmental factors that affect the production and dispersal of pollen and pollutants: Climate changeEffects of climate changes on start and length of season, on pollen production and future scenarios. Current studies showed the potential impact of climate change on aeroallergens and, as a consequence, on allergic diseases. These comprise impacts on pollen amount, pollen allergenicity, pollen season, plant and pollen distribution, and other plant attributes.

Recent studies shown that spring events, such as flowering, have advanced by 6 days, and that autumn events have been delayed by 4. 8 days, compared with the early 1960s. On average, the length of the growing season in Europe increased by 10–11 days during the last 30 years. Trends in pollen amount over the latter decades of the 1900s increased according to local rises in temperature. Considerable increases in pollen production resulted from exposure to increased CO2 concentration, in experimental conditions and in city vs. rural areas; the latter study provides a dependable model for evaluating the effects of global warming. Some other attributes of allergenic plants are also responsive to CO2 concentration and temperature increases.

The duration of the pollen season is also extended, especially in summer and in the late flowering species. There is some evidence of significantly stronger allergenicity in pollen from trees grown at increased temperatures. An earlier start and peak of the pollen season is more pronounced in species that start flowering earlier in the year. Due to the earlier onset of pollen seasons, the seasons are more often disturbed by adverse weather conditions in late winter or early spring. Anyway, the association between changes in

temperature is likely to vary across plant species (annual, more than perennial species and insect pollinators advancing more than wind pollinators). Changes in climate show to have change the spatial dispersal of pollens. New patterns of atmospheric circulation over Europe might take part to episodes of long distance transport of allergenic pollen, increasing the risk of new sensitizations among the allergic population. There is growing fact to show that climate change might also help the geographical spread of particular plant species to new areas, which become climatically suitable.

However, the effect of the expected rate of warming could be less pronounced than effects of land use change the sociocultural changes as well as international transport. WeatherThunderstorm-associated asthma was known over 15 years ago, and, since then, other asthma outbreaks during thunderstorms were described in UK, Australia and Italy. A comprehensive review on thunderstorm-associated asthma was recently published by D'Amato. The hypotheses underlying the epidemiological observations are: 1. Outflow of colder air occurring during thunderstorms sweeps up pollen grains and particles and concentrates them at the ground level.

Sensitized subjects who are uncovered will inhale a high concentration of allergenic substance capable of inducing asthmatic reactions which can also be severe. 2. It is also found by some researchers that under wet conditions or during the period of thunderstorms, pollen grains may, after break by osmotic shock, discharge part of their content, including respirable, allergen-carrying starch granules (0. 5–2. 5 lm) into the atmosphere. 3.

There is a hypothesis which shows that an increase in fungal spores during a thunderstorm could contribute to asthma epidemics.

In the light of the above, subjects affected by pollen allergy should be attentive to the danger of being outdoors during a thunderstorm in the pollen season, since such events may be an important cause of strict exacerbations of asthma. Long-distance transportThe studies of the dispersal distance of the anemophilous pollen have focused on the deposition of pollen within relatively short distances. But, there are numerous examples of pollen undoubtedly traveling long distances to arrive at a site and studied by using air concentration samples or meso-scale dispersion process models. Suspended particles are usually transported by the wind, and dispersed by the existing turbulence within the lowest atmospheric layer (boundary layer) where deep convection can bring up particles to free atmosphere and be suspended in an air mass moved by synoptic systems. Depending on the altitude reached, they could be transported and deposited at great distances. Upcoming evidences showed that long distance transport might represent a cause of sensitization and of symptoms among the allergic population, in areas far from the source of pollen. Ragweed seems to be frequently involved in the transboundary transport in Europe.

Numerous episodes of finding of ragweed pollen appeared to be connected to air mass coming from the Balkans (possibly Hungary) and pollen count often reached the clinical threshold suggesting a possible increase in the sensitization rate and clinical impact on allergic population, in central Italy. The study was supported by a preliminary observation of the increasing trend of ragweed allergy in a neighbouring region where plants are not

present, as well. In addition, there is convincing evidence to prove that the long-range transport of pollen from distant regions can significantly modify pollinating seasons (i. e.

the start time and duration of high atmospheric pollen concentrations) in many European areas. This is particularly important for northern Europe, where flowering takes place later in the spring. In Finland, birch pollen is shown to approach from Baltic States, Russia, Germany, Poland and Sweden, depending on the particular meteorological situation.

While the pollen count can reach high levels during these episodes, large-scale forecasting might be useful for the allergic population. Genetics and allergies: GWAS (Genome wide association studies) help us to understand the genes in the development of allergic conditions. Specific gene variations that alter the encoding of epithelial cell-derived cytokines such as interleukin-33 and thymic stromal lymphopoietin may be involved in the pathogenesis of allergies. Additionally, variations in the ORMDL3 and GSDML genes have been linked to an increased risk of early-onset asthma. These finding help to identify children with the highest susceptibility to allergies, which can be useful in targeting preventative techniques or being aware of allergies symptoms that require treatment. However, there is still a lot to be discovered in the research field of allergies and genetics.

Further studies are necessary to go on increase the understanding of the genetic development mechanisms of allergic conditions, and initiate to implement techniques to reduce the impact of allergies on the modern population. Other factors that have been linked to allergies include the

surrounding environment and lifestyle habits including: Exposure to smoke Exposure to farm animals and products Domestic cats and dogs Daycare attendance Viral infections Vaccinations Medications Air pollution DietIt is likely that each of these factors may play in the pathogenesis of allergies, particularly for individuals that have a genetic susceptibility to the condition. Diagnosis of allergiesDiagnosis of an exact cause of allergy is important.

This is made by a skin prick test using multiple potential allergens to check for the exact cause of allergy. Approaching seasonal allergies: Take actions against your indoor and outdoor allergens. Nasal allergies can be bothersome at times. It is nearly impossible to eliminate every allergen from home. However, one can take steps to make it a friendlier environment, even during allergy season. Ø Monitor pollen and mold counts.

Newspapers, radio and television often include this information during allergy seasons. Ø During the summer months, pollens level fluctuate from day to day, but seem to be higher during hot humid days. Ø Stay inside midday and during the afternoon, when pollen counts are highest. Ø Keeping all doors and windows closed as much as possible during the pollen season will prevent the pollen from entering the home. Ø Wear a NIOSH-rated 95 filter mask when mowing the lawn or doing other chores outdoors, and take appropriate medication beforehand. Ø Take a shower, wash hair and change clothes after been working or playing outdoors. Ø Air conditioners help this as they can filter out the pollen.

The windows should be closed during air conditioner use. Ø Exclusive breast feeding for the first four months of life. Ø Living with parents who do not

smoke. Ø Exposure to good probiotic bacteria in the infant diet. Ø Inclusion of vitamins C and E, and omega-3 polyunsaturated oils in diet. Treating Seasonal Allergies:• Parents should be aware that these treat the symptoms and not the cause of the allergy in their children, when using allergy medications.

The best approach is to recognize and then avoid what a child is specifically allergic to. • Antihistamine medications given by mouth as needed can help certain children with allergic symptoms. While the older antihistamines caused sleepiness, the newer ones tend not to. It is a good idea to avoid antihistamines that make a child drowsy or sleepy during the day.

• Specific anti-allergic eye drops containing anti-histamines can help reduce eye symptoms. • The pumps (Inhaled nasal preparations) containing steroids are considered to be safe and effective in children who suffer from nasal allergies. This type of medications are useful if used on a regular basis for a period of time.

Using inhaled nasal steroids on and off irregularly is not very effective. • Nasal decongestant sprays are generally not recommended in children. In fact prolonged use of these medications may actually make matters worse. • The symptoms of asthma brought on by seasonal pollens are treated with the correct asthma medications because they will not react with the antihistamine (anti-allergic) medications. Newer therapies to prevent allergies: Newer therapies in prevention of allergies includeØ development of DNA vaccinesØ Anti-IgE antibodies that bind to the Immunoglobulin E and inactivate it (e.

g. Omalizumab) Ø modification of the binding sites of the IgE