Gesundheit! Yes, It's Allergy Season Again

Whether caused by pet danger, pollen, dust or food, allergies affect millions of people each year. If you have ever wondered why or how allergies occur, this is the article for you.

PRACTICAL SCIENCE WITH PHIL FREDA

If you are among the 50 million unfortunate people in the United States that suffer allergy symptoms each year, like me, then this article may help you better understand how and why allergic reactions work.

As long as I can remember, I have dreaded the onset of autumn because I knew that, shortly, my eyes would be burning, my nose would be running, and my sinuses would start to inflame.

And even as I write this, I am battling sinus pressure and headache.

I am not looking for sympathy because I know that many of you suffer the same fate. I am simply providing allergy suffers an informative resource of the anatomical causes of allergies, no matter what the allergen may be.

What can cause an allergic reaction?
There a literally thousands of things that can cause an allergic reaction, but each fall in a certain category, according to Allergy and Family Medicine.

- **Pollens:** Pollen is a "powder" that is most likely to be found as a yellowish film on your car. The interesting thing about pollen is that each singular grain of pollen is actually what produces the male gamete (sperm cell) in seed plants. Pollen is the most ubiquitous and most common allergen.

- **Dust:** Second to pollen is dust. Dust is actually a collection of very small particles found around the home. This can include skin cells, hairs, clothing fibers, paper fibers and even pollen.

- **Molds:** Molds are actually a colony of fungi that grow on everything from food to your walls. All mold requires to grow is some organic material and moisture.

- **Animal Dander:** Dander is usually believed to be the hair of a certain animal, but it is actually dead skin cells of the animal. What one is allergic to is not the hair or the skin of the animal, but rather proteins that are found on the skin, urine or saliva.

- **Drugs:** It is also possible for us to be allergic to certain chemicals that are in medications.

- **Insect Venoms:** I'm sure everyone knows someone that is allergic to bees. To some extent, we all exhibit soreness and/or inflammation at the site of an insect sting, but some people are so allergic that the reaction can affect the entire body and even be fatal.

- **Foods:** To the dismay of many, certain foods can trigger an allergic reaction. The most common I have seen is an adverse reaction to certain shellfish, such as shrimp.

What happens during an allergic reaction?

What is interesting about allergic reactions is that our body is actually trying to fight off whatever the allergen may be.

Your body thinks that the pollen grain or dust particle that entered into your nasal cavity is some mean bacteria or virus.

The allergic response cascade is a sequence of steps that your body goes through when it encounters an invader.

Here is a look at the cascade step by step with help from Medicine Net.

- First Antigen Protecting Cells, or APCs, which reside inside of your body, engulf the allergen particle and break it down into smaller pieces.

- After the APC's "digest" the allergen, they attach special proteins to it called human leukocyte antigens or HLAs.

- Next, the APC moves the allergen with the connected HLA to the surface of the cell in plain sight of a special white blood cell called the lymphocyte. There are two types of lymphocytes: T and B lymphocytes. T-lymphocytes, commonly called T-cells, are involved in cell-mediated immunity, meaning that they attack foreign substances. B-lymphocytes, on the other hand, create antibodies, which "flag" foreign substances so they can more easily be located.

- Once the T-lymphocytes notice the APC with the allergen attached to it, they release chemicals, called cytokines, which activate the B-lymphocytes.

- This activation causes the B-lymphocytes to produce a special antibody, called IgE, that bind to the allergen.

- Now that the level of IgE has both increased and are "linked" to a specific allergen, whenever the body comes in contact with that allergen again, IgE will automatically recognize it.
- During the next exposure to the antigen, there are cells in the body called mast cells and basophiles. Mast cells are found in body tissue and basophiles are found in the blood. Both of them have over 100,000 receptors for the IgE antibody. The binding of the antibody to these cells is akin to lighting a fuse on a bomb.

- In response to IgE and the presence of the antigen, the mast cell, or basophile, exports many different chemicals and among them is something called histamine. I'm sure you have heard of histamine in the phrase "antihistamine blocker."

- Once histamine is released into the body, it binds to histamine receptors on the surface of most of the cells in the body. The binding of histamine results in swelling, sneezing and itching of the nose, throat and roof of the mouth.

Sometimes, this allergic response can be so profound, like if a bee stings someone who is allergic, the result can be life threatening. If exposed to an allergen they are severely allergic to, they may go into anaphylactic shock.

Hopefully, this article has somewhat shed some light on why allergies happen and perhaps even on how to limit your exposure to problem sources.
If you can limit your exposure to some antigens, you may feel a bit better than you did before.

Think about it!

About this column: An educational, science-minded column