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News

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*****Researcher in allergic diseases
investigating how allergic re-
actions can be avoided.

DALLAS--Although children may outgrow allergies such as asthma or hayfever, says allergist Timothy Sullivan of Southwestern Medical School, some people acquire allergies as adults.

Allergic diseases will develop in approximately one-third of all Americans at some point in their lives, he says.

A researcher whose field of expertise involves allergic reactions and how they can be avoided, Sullivan describes an allergy as a deficiency in a person's immune system. Hayfever is a body defense mechanism gone awry.

Our systems are constantly being bombarded by pollen, dust, mold spores or animal danders and normally our immune systems will not react. But those people prone to allergies begin to manufacture antibodies to fight off these foreign substances as if they were disease bacteria or parasites. The result is an allergic reaction--inflammation of the eyes, nose or lungs--and this is what Sullivan calls a "misdirected protective reaction."

Non-allergic people appear to start making these protective antibodies (called IgE) but somehow manage to suppress them. But the immune system of the allergy-prone individual does not suppress this response and it's here that the problem lies.

New to the medical school faculty from Washington University School of Medicine in St. Louis, Dr. Sullivan is head of a recently established allergy section of Southwestern's Internal Medicine Department.

One of his current projects involves participation in a team of scientists who are investigating how mountain cedar produces wide-spread allergic reactions in the Dallas area. Sullivan describes the mountaincedar problem as being unique to the Southwestern portion of the country. "We now know that there is a single protein in the pollen which provokes the reaction. We are looking toward a standardized diagnosis for this allergy along with a standardized conventional treatment."

It's the release of histamine by body cells that causes the inflammation. As long as the body is exposed to the pollen, dust, dander, food, drug or other allergens the immune system persists in its faulty behavior. Our bodies are forgetful, however. Take the allergen away for a sufficient length of time and the immune system will often forget about the allergy and return to normal--that is, to stop making IgE antibodies.

For those allergic to the drug penicillin, for example, after six months to a year most people still have their allergy. After five years only one-half are still allergic. Yet after ten years, fewer than one out of five are allergic.

People allergic to pollen such as ragweed are at a disadvantage, however, since each year there's enough ragweed to keep the immune system tuned up, says Sullivan.

first add allergy

Seeing his role as partly one of collaborator with scientists in other disciplines who are studying and treating immune diseases, Sullivan says the allergy and clinical immunology specialty belongs to the emerging "new medicine" taught in medical schools. It has only been within the last ten years that isolated bits of knowledge about allergic reactions have fallen into place. Before that it was largely guesswork on what was causing the wheezing, sneezing, itching and burning of allergic reaction. Now he says the allergist can offer immune system information to doctors dealing with diseases of the heart, or kidneys or other organs and together they are able to find more solutions than either could separately.

Allergies are now among the best defined illnesses known, Sullivan says. Among the common allergies--those produced by pollen, dust, animal dander, food and drugs--scientists are able to precisely measure numbers of molecules involved in allergic reactions.

Approximately four to five percent of the adults in this country have common allergies which cause them to seek medical help, he says. This is only a small percentage of the total adult population suffering from some forms of allergies, however.

Sullivan cites three commonly used approaches to allergy treatment. The allergy sufferer can avoid the allergen or use simple medicine such as antihistamines to suppress symptoms. Or for more severe cases, the allergic reaction can be modified by giving a series of shots. But these shots are cumbersome in that treatment is often prolonged and therefore somewhat costly, he says.

Other alternatives for treatment demand research, says the allergist. "One is to turn off antibody production and another is to stop the allergic reaction by stopping the release of histamine." Both are receiving the attention of science.

The process behind the common allergic reaction involves mast cells, the doctor explains, cells which make and release histamine in body tissue. Occasionally the release of histamine by mast cells can be explosive enough to be fatal, as in the case of a penicillin allergy. New knowledge of allergic reactions has enabled scientists to develop ways to give penicillin with relative safety even when one is extremely allergic to the drug, he says.

In other allergies, such as when dust, pollen or animal dander is inhaled or when a food allergen is ingested, the release of histamine is usually more gradual, more localized, and the reaction is not as intense.

Binding to the surface of the mast cells are the IgE antibodies which signal the cells to fire off their histamine. These antibodies resemble lobsters, with long bodies that sit on the surface of mast cells, each with two claw-like arms that grab onto particles the antibodies perceive as invading the system. When more than one antibody recognizes this foreign object and grabs onto it, this multiple attachment to the object (called clumping) signals the mast cell to release histamine. Essential to the release of histamine is that two or more antibodies close to each other hold onto the same foreign object.

Scientists have learned that if the foreign object (the allergen) is fragmented into minute pieces, clumping can be avoided since the individual antibodies could not hold onto the same foreign object. It's this fragmentation of the allergen that might eventually be used in allergy shots. The broken-up allergen would occupy the antibodies without causing the release of histamine and therefore the person can be temporarily free of allergy symptoms.

"If we know what the antibodies recognize, we can flood the system with fragments and therefore avoid clumping," says Sullivan.

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