Giving mast cells their proper respect

Although identified more than 150 years ago, mast cells still don't get much respect. And what little reputation these immune cells have is bad.

Through the release of chemicals such as histamine in response to pollen and other harmless substances, for example, mast cells trigger the miseries of allergies. The cells can overreact so strongly, as in cases of bee stings or peanut allergies, that they kill a person.

Yet, scientists trust that the immune system has a reason for keeping the cells around. "Mast cells are in the body to do good. Their role in allergies is an accident," says Soman N. Abraham of Duke University Medical Center in Durham, N.C.

To prove that point, Abraham and his colleagues have investigated how mast cells may help the body defend against bacteria. In their latest work, they've found that the cells sport a surface protein that recognizes potentially dangerous germs.

Mast cells abound below the skin and in the linings of the respiratory and urinary tracts, areas vulnerable to infectious organisms. There, the cells can secrete chemicals, such as tumor necrosis factor-alpha, that draw microbe-killing blood cells called neutrophils.

"They seem ideally placed and equipped to play a critical role in immune surveillance," says Abraham. "We view them as sentries with rifles. They're at the perimeter keeping an eye out. When they see an enemy, they send signals to bring in reinforcements and at the same time attack the enemy with the rifles."

Over the past several years, Abraham's group and other research teams have shown that rodents lacking mast cells become more vulnerable to certain bacterial infections. Abraham and his colleagues also found that mast cells directly bind to FimH, a protein on hairlike extensions that cover some disease-causing bacteria. In the July 6 PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES, the researchers identify CD48, which adorns the surface of mast cells, as the protein that performs that binding.

Over the decades, scientists have suggested many roles for mast cells, from wound healing to warding off parasites, remarks Dean Metcalfe of the National Institute of Allergy and Infectious Diseases in Bethesda, Md. It now seems clear that mast cells can directly recognize bacteria, he says, but it remains unproven that such a talent is critical to a person's health.

Proving that hypothesis may be tough, since physicians have never found a person naturally lacking mast cells. To fans of the immune cell, that supports the notion that the mast cell is essential for life, notes Metcalfe.

Abraham's team plans to examine whether artificially stimulating CD48 can arouse mast cells. Such an ability might help people with AIDS, for example. "It's conceivable that in people who have sluggish immune systems, we may be able to activate mast cells at times of infection," he says. *—J. Travis*

Memory may go to pieces in schizophrenia

Most people take for granted their ability to maintain cohesive and distinctive memories of what they have done or observed. For schizophrenia sufferers, however, personal recollections bob to the surface of awareness in isolated fragments that can't keep clear thinking afloat, according to a new study.

People diagnosed with schizophrenia often err when trying to recognize pairs of objects that they saw a short time earlier, report psychiatrist Jean-Marie Danion of the University Hospitals of Strasbourg in France and her colleagues. Some patients had difficulty even recalling whether they had paired objects themselves or watched someone else do it, the researchers say.

The memory of who paired objects survives, however, in those patients who experience a sense of familiarity upon encountering a pair of items again, although they can't explicitly remember having previously seen the duo.

Fragmentation of memory, resulting in confusion and bizarre behavior, has long been noted in clinical descriptions of schizophrenia. However, investigators have had difficulty devising tests of this phenomenon.

"Our findings support the proposal . . . that schizophrenia is predominantly an abnormality of conscious awareness," Danion's group concludes in the July ARCHIVES OF GENERAL PSYCHIATRY.

The researchers recruited 25 patients undergoing treatment for schizophrenia and a control group of 25 healthy adults. Each volunteer saw 72 common objects placed on a table and then arranged half of them in pairs according to written directions. They watched an experimenter form pairs out of the remaining items. After completing unrelated tasks for 45 minutes, participants tried to identify from a written list of object pairs which ones they had seen.

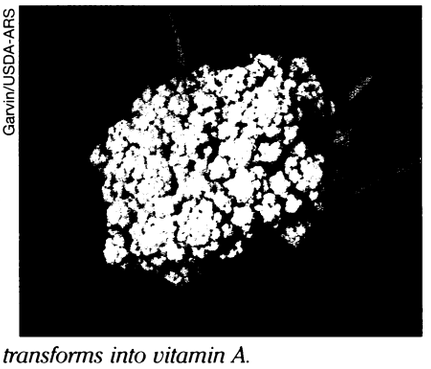
Patients displayed marked memory difficulties, particularly for object pairs that they didn't assemble themselves. In contrast, healthy individuals combined the separate lines of information into coherent memories. They usually remembered pairs that they had seen, regardless of who manipulated them. Explicit recall of object pairs tended to go along with accurate memories of having watched or performed object pairings.

Reasons for memory fragmentation in schizophrenia are unclear, the researchers say. They may include a disruption of the ability to tie together related lines of information, they theorize.

The new results are "interesting and potentially important," remarks psychiatrist Allen Y. Tien of Medical Decision Logic in Baltimore in a comment accompanying the new report. Researchers should examine whether patients do better on tests that present fewer object pairs or when shown pictures instead of words on recall lists, Tien holds.

It's not known if such memory problems occur frequently in severe psychiatric disorders other than schizophrenia, he adds. *—B. Bower*

The color of vitamin A



Garvin/USDA-ARS

The cauliflower pictured here is indeed orange—due to a mutation that increased its beta-carotene content at least 100-fold. This mutant line, which first appeared spontaneously in a Canadian field 30 years ago, is only now undergoing a major molecular probing.

At the U.S. Department of Agriculture's Plant, Soil, and Nutrition Laboratory in Ithaca, N.Y., David F. Garvin is investigating why changes in a single gene ratchet up production of this pigment, which the body transforms into vitamin A.

"Our goal is not to make orange cauliflower," he notes, but to explore whether plant staples that are virtually devoid of beta-carotene—such as rice or wheat—might be engineered to make plenty. Such cultivars could improve health in areas of the world where vitamin A deficiency is rampant. —J.R.