ance in elderly people. Now, scientists have discovered a mechanism by which this spice, called turmeric, could help the body clear plaque deposits associated with Alzheimer's disease.

Those deposits consist of a protein called amyloid-beta. Healthy people's bodies make the protein, but immune system cells called macrophages regularly identify, engulf, and remove it. In the new study, a team led by Milan Fiala of the Greater Los Angeles Veteran's Affairs Medical Center found that macrophages in blood samples from people with Alzheimer's couldn't destroy amyloid-beta.

Fiala's team then compared the gene activity of these impaired macrophages with that of macrophages from healthy people. The researchers identified several genes that were less active in the impaired cells.

When they exposed these dysfunctional macrophages to a chemical in turmeric, the subdued genes switched on, restoring the ability of some of the cells to destroy amyloid-beta.

"These genes are critical for the function of macrophages, so if these genes aren't being expressed, then macrophages wouldn't function properly," says Fiala.

Many of the genes identified as vulnerable belong to a family that makes cell parts called toll-like receptors, which enable immune cells to recognize foreign microbes and other disease-causing agents.

The gene apparently most impaired by Alzheimer's was *MGAT3*, which was more than 300 times as active in the healthy macrophages as in those from Alzheimer's patients.

In separate experiments, the researchers blocked the function of *MGAT3* in lab-cultured monocytes, immune cells that are similar to macrophages. The procedure prevented the cells from engulfing amyloid-beta, a critical step in clearing the plaque-forming protein.

Exposure to the turmeric chemical increased activity of *MGAT3* and the receptor genes in blood samples from all 73 Alzheimer's patients. However, only about half the samples showed a full recovery of gene activity, the team reports online and in an upcoming *Proceedings of the National Academy of Sciences*. Differences in the causes of the disease among patients could account for the variation in response, Fiala says.

MEDICINAL SPICE? A chemical in turmeric, a common ingredient of curry powder, could help the immune system fight Alzheimer's disease.

"I think [the study] is very fascinating," says Bharat Aggarwal of the M.D. Anderson Cancer Center in Houston, who has also done research on chemicals in turmeric. "There is definitely something interesting going on here."

Whether the chemical in turmeric will affect macrophages in Alzheimer's patients remains to be seen. The researchers didn't test whether the compound might influence the patients' immune systems or clear any amyloid-beta plaques from their brains. Fiala notes that the experiments involved higher doses of the compound than a person would get by eating foods prepared with turmeric.

Further studies would be needed to investigate why the macrophages of people with Alzheimer's become impaired in the first place. —P. BARRY

Chemical Conversation

Red blood cells send a signal that makes platelets less sticky

Primarily known for their work hauling oxygen to tissues throughout the body, red blood cells may also play a part in regulating activities of another blood component. The cells can release a chemical that signals blood-clotting platelets to become less sticky and therefore less likely to clog a narrow vessel, chemists report.

Red blood cells change shape as they maneuver through the curves and narrows of the body's circulatory system. As they flex, the cells release small amounts of adenosine triphosphate (ATP), an energy-storing molecule, into the bloodstream. Earlier research had established that ATP can stimulate cells lining the walls of blood vessels to produce nitric oxide (NO), which causes the walls to relax, allowing blood to flow more easily.

Researchers also knew that platelets respond to ATP in the bloodstream by producing NO, which reduces their tendency to clump. Using a technique that mimics the natural flow of blood cells, Dana Spence and his colleagues at Wayne State University in Detroit have now shown that platelets respond specifically to ATP released by red blood cells in a way that promotes blood flow.

"It's possible that red cells and platelets are communicating and working together," comments Randy Sprague of Saint Louis University in Missouri.

Spence and his collaborators pumped red blood cells and platelets through tubing 50 micrometers in diameter. They used a standard method to track ATP release within the tube, adding chemicals that react with ATP to produce a fluorescent signal. To track NO, they used a different fluorescent molecule that they trapped within the platelets. "We made all these measurements in the blood," Spence says. "We had platelets in there, red blood cells in there; they were flowing."

To establish the connection between ATP from red blood cells and NO production in platelets, the researchers conducted a variety of tests in which they modified either ATP production by red blood cells or the platelets' response to ATP. Two drugs, iloprost and pentoxyfilline, increased ATP production by red blood cells and NO production by platelets, the researchers report in the July 15 *Analytical Chemistry*. Researchers had known that these drugs increase blood flow, but the new study establishes a mechanism for how they do so, Spence says.

The results may help researchers understand circulatory problems in diabetes patients. Studies have shown that red blood cells in people with diabetes have limited flexibility and a reduced capacity to release ATP.

Spence and other researchers have gathered "strong evidence that there's something wrong with this pathway in diabetic patients," says pathologist Rakesh Patel of the University of Alabama at Birmingham. If red blood cells play a role in controlling both platelets and blood vessels, they represent a new target for drugs that could fight diabetes symptoms, he adds.

"Even 2 or 3 years ago, no one in diabetes or in red cell biology would have thought there was a connection," Patel says. "These studies open up a new avenue of thinking." —S. WEBB

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