

Neural teamwork may compensate for aging

The news about aging's effects on the brain is not unremittingly grim. New research suggests that people automatically compensate for age-related declines by recruiting brain areas that previously hadn't participated in a given task.

With few exceptions, human skills degrade with age during adulthood. Memory for names and events is one of the first abilities to go, accompanied by reasoning skills and speedy perception. Wisdom, however, continues to blossom. People's knowledge of facts, as well as their vocabularies, remain strong until about age 65.

In young adults, verbal and spatial learning occur in specialized regions of the brain. In older adults, extra regions contribute to these abilities, Patricia A. Reuter-Lorenz of the University of Michigan in Ann Arbor reported this week in Washington, D.C., at the Cognitive Neuroscience Society's annual meeting.

Reuter-Lorenz and her colleagues

used positron emission tomography (PET) to compare the brain activity of college students and people 62 to 73 years old. The participants memorized and then recalled either sets of letters presented on a computer screen or the locations of points on the screen. In young adults, as expected, the letter task activated the left hemisphere and the location task activated the right hemisphere. However, in the older subjects—who performed just as well as the students—both the right and left frontal lobes were active for both types of memory.

In a second test, participants matched shapes on a computer screen in tasks that engaged either one brain hemisphere or both. Older people responded faster when they had to use both sides of the brain rather than just one, a pattern that younger people didn't always share.

"In older adults, when you present information in a way that promotes the use

of both hemispheres, people can take advantage of that and use it to benefit their performance," said Reuter-Lorenz.

Widespread neural activation may help seniors when they focus on one task but could cause interference when they take on many activities at once, says Ulman Lindenberger of the Max Planck Institute for Human Development in Berlin.

Lindenberger and his colleagues have tested hundreds of people ages 75 to 103 and also younger adults. Shortly after reading a list of words that they were told to memorize, young and old participants took directed walks through the lab. If they walked a smooth oval track, both groups learned the list about equally well, the team reports. When participants had to walk a jagged path, however, older people memorized fewer words than the young did.

Still, says Timothy A. Salthouse of the Georgia Institute of Technology in Atlanta, "the evidence that old people may be able to engage more brain regions as a task gets more difficult is very encouraging." —L. Helmuth

Arthritis care: Beyond tea and sympathy

It sounds like a dessert request, but a pot of tea and bowl of cherries may prove a prescription for defusing painful overreactions by the immune system.

Two research teams have stumbled across natural products—green tea and tart cherries—that may be useful in controlling inflammation from injury or diseases such as arthritis. These foods contain antioxidants that inhibit the Cox-2 enzyme, which the body employs to fire up this inflammation.

In one of the new studies, Tariq M. Haqqi and his colleagues at Case Western Reserve University in Cleveland isolated compounds known as polyphenols from green tea and added them to the drinking water given to young mice. Later, the researchers injected some of these animals with a substance that triggers immune reactions mimicking rheumatoid arthritis. They also injected animals that continued to receive unadulterated drinking water.

Within about a month, 94 percent of the mice drinking untreated water developed redness or swelling, usually in at least two paws. The affected paws often proved too painful to walk on. Though 44 percent of the mice drinking treated water also developed symptoms, theirs were far milder, showed up later, and typically affected just one paw, Haqqi's team reports in the April 13 *PROCEEDINGS OF THE NATIONAL ACADEMY OF SCIENCES*.

Probes of the affected joints turned up virtually no cartilage damage in the mice consuming polyphenols but significant damage in the plain-water drinkers. The joints of these control animals also had far higher concentrations of im-

mune-system cells and the inflammation-triggering compounds that they produce, such as Cox-2 and TNF-alpha.

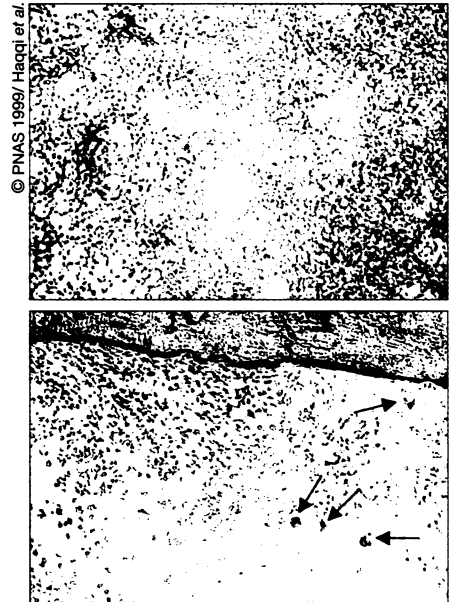
Haqqi was so surprised by these findings that he repeated the experiments twice more to quell his disbelief. Now he's working to identify which of the polyphenols are most protective.

Even though 80 percent of the world's tea drinkers down black tea, Haqqi is focusing on green tea because its composition is simpler. Black tea has the same polyphenols, albeit in smaller quantities, he says.

The other natural compounds recently shown to have anti-inflammatory activity are antioxidant pigments extracted from tart cherries. Chemist Muraleedharan G. Nair and his coworkers at Michigan State University in East Lansing say that eating 20 tart cherries per day might provide a natural alternative to aspirin.

Drugs such as aspirin inhibit the activity of Cox-2 and that of a related Cox-1 enzyme. Nair says his studies, reported in the February *JOURNAL OF NATURAL PRODUCTS*, indicate that the cherry compounds are not only some 10 times as potent as aspirin in inhibiting Cox-2 and Cox-1, "but also remain active longer."

Unfortunately, he adds, tart cherries are much more sour than cranberries. If the cherry pigments prove clinically beneficial, he says, people may want to get them from a pill. "Cooking destroys much of the [inflammation-fighting] stuff in the fruit," he explains, so a slice of pie won't substitute. Nobody has yet investigated whether sweet cherry pigments would have an anti-inflammatory benefit.



Cells producing TNF-alpha, an immune-system compound active in arthritis, are stained red. Five times as many of these cells have infiltrated the joint of a mouse drinking plain water (top) as tissue from a tea-polyphenol drinker (bottom; arrows point to TNF-alpha cells).

Both studies involve "good science," says Brian Butcher, vice president for research at the Atlanta-based Arthritis Foundation. Because the tea study observed an effect in animals, he believes that work—which his organization partially funded—provokes "a degree of excitement." However, he says, people with arthritis should not substitute green tea for the medications that their doctors have recommended. —J. Raloff