

Jogging Your Memory

You can push your aging brain to recall more facts and dates, scientists say, if you use a little muscle.



OLD FRIENDS: Many past events are still stored in your mind, it's just harder to retrieve them

By ANNE UNDERWOOD

BRAD WILLIAMS, A 51-YEAR-OLD radio anchor in La Crosse, Wisconsin, used to joke that, if he ever married, he would never forget his anniversary. You wouldn't either, with a memory like his. Ask him which day of the week Christmas fell on in 1982, and he summons the correct answer in less than two seconds—Saturday. A video that his brother posted on YouTube shows Williams rattling off the answers to such random questions as which day Egyptian President Anwar Sadat was assassinated and which tragic event happened on Nov. 18, 1978. (Oct. 6, 1981, and the Jonestown massacre, respectively.)

There is no magic formula for achieving such a memory, although neuroscientist James McGaugh at the University of California, Irvine, is studying Williams for

clues. Scientists now know that much of the deterioration that comes with age represents a slowing of cognitive function rather than actual memory loss, and they're busy working on interventions. No one should expect miracles soon, if at all. But the deeper scientists peer into the workings of memory, the better they understand what helps to stave off age-related declines—and the closer they come to devising potential drugs to help.

There are many hypotheses about why our powers of recall go awry over time, but it's clear that both committing new information to memory and retrieving it become more difficult. A new memory is fragile. "It has to set, like cement or Jell-O," says McGaugh. A small structure in the brain called the hippocampus binds information from various parts of the brain into a coherent memory, which the prefrontal cortex later pulls up for use. But the pre-

frontal cortex and other brain structures tend to shrink with age as the cells' long projections contract, taking with them some of the crucial synapses that neurons use for communication.

Scientists are devising drugs to enhance memory formation, and some are now advancing to clinical trials. Memory Pharmaceuticals Corp. has devised a compound that selectively tickles nicotine receptors in the brain, which makes it easier to pay attention—a crucial ingredient for forming memories—while avoiding nicotine's side effects. Last month the company announced the results of a small trial in 80 Alzheimer's patients, who performed better on tests of long-term memory, working memory and speed of cognition after taking the pill once a day for eight weeks.

Poorer memory formation is only one frustration of aging brains. Sometimes the crucial neurons that retain a memory are damaged. In a study this year in the journal *Nature*, neuroscientist Li-Huei Tsai at MIT provided evidence that some "lost" memories may be recoverable, even in the presence of neuronal damage. Tsai put mice in a specially wired cage, where they received a mild shock to their feet, which caused the mice to tense up in fear when put back in the wired cage. When Tsai triggered the degeneration of critical neurons, the mice apparently forgot their fear of the cage. Tsai then administered an experimental drug that promotes synapse formation, after which the animals exhibited the fearful behavior again, without receiving any further shocks. Drugs like this one could conceivably enhance periods of lucidity for patients suffering dementia.

Many scientists are more interested in what we can accomplish naturally, without drugs. In the past year, research has shed new light in particular on the benefits of both mental and physical activity. In the Proceedings of the National Academy of Sciences this year, Dr. Scott Small at Columbia University showed that aerobic exercise—an hour a day, four days a week for three months—led to changes on the brain scans of 11 volunteers, which suggested the birth of new neurons in the hippocampus. And last month Peter Penzes at Northwestern University published a study showing that brain activity boosts the function of a protein called kalirin-7, which enlarges and strengthens synapses.

But the truth is, there are limits. Even Brad Williams's memory isn't foolproof. In 1993, acting in an amateur theater production, he blanked on the name of one of the play's characters—also named Williams. It's comforting to know he's human, too. ■