3 Questions: Suzanne Corkin on the world's most famous amnesic

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A photo of H.M., Henry Molaison, the well-known amnesic patient whose condition helped scientists understand memory and memory impairment.

H.M., the well-known amnesic patient whose condition helped scientists understand memory and memory impairment, died a year ago at the age of 82. H.M. (whose full name, Henry Gustav Molaison, was disclosed only after his death) suffered from an unusual condition as a result of brain surgery to treat his epilepsy: He was unable to form new long-term memories.

Before his death, H.M. and his guardian agreed that his brain would be donated to scientists for future study. MIT Professor of Brain and

Cognitive Sciences Suzanne Corkin studied H.M. during his life and is now part of a team that will be analyzing H.M.'s brain starting this week. In this interview, she explains H.M.'s impact on understanding how memory works.

Q. In life, what were the most important contributions H.M. made to understanding human memory and brain function?

A. H.M. illuminated the science of memory. His brain damage was deep in both temporal lobes. Prior to his surgery, the clinical literature contained hints that this area played a role in long-term memory. His case, however, showed definitively that the hippocampus and neighboring cortex are critical for the establishment of long-term declarative memory. He also taught us that memory is compartmentalized in the brain, and thus profound amnesia could exist in an individual with an above-average I.Q. H.M.'s motor skill learning and perceptual learning were preserved, indicating that these kinds of learning rely on networks outside the medial temporal lobe. Further, immediate memory, like remembering a telephone number, was intact in H.M., suggesting that different cognitive and brain processes support immediate memory and long-term memory. His core deficit was an inability to transfer information from short-term memory into long-term memory. The only way he could hang on to new information was to rehearse it over and over again.

Q. Why is it important to examine H.M.'s brain after his death?

A. H.M.'s high-resolution MRI scans preformed before and after his death gave us an approximate idea of the location of his lesion, but these images provided only an indirect view. An autopsy study is the only way to define the true borders of his surgical removal. His brain has been frozen, and on Dec. 2, exactly one year after his death, it will be cut into roughly 2,600 very thin slices from front to back. Each will be

photographed by a specially designed camera, and will be available for anyone in the world to view on a dedicated web site. Some slices will be examined microscopically to count nerve cells, and other slices will be stained to determine, for example, whether he developed Alzheimer's disease in old age. Other scientists outside our group will be able to request tissue to address their own hypotheses about H.M.'s brain. A small number of slices will be displayed as part of a touring exhibition, "Remembering H.M.," which is being planned and created by the MIT Museum.

Q. What was H.M. like as a person and a patient? How well did he understand his condition?

A. Despite his devastating amnesia, H.M. was quiet, polite and congenial, greeting all strangers as friends. He loved to talk about his family and childhood vacations. He had a great sense of humor and would often say, "Knock on wood" while tapping the side of his head with his fist. He was altruistic. When asked how he felt about doing all of our tests and answering questions, he replied, "What they find out about me helps them to help other people." He knew that he had epilepsy, that he had a brain operation, and that he had trouble remembering things. Sometimes when we asked him a question, and he didn't know the answer, he would say, "I'm having an argument with myself." This phrase caught on in my lab, and now, in many parts of the world, former Corkin Lab members have arguments with themselves and remember H.M.

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