Forever new

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"You're beautiful," Clive Wearing said to his wife Deborah. "I adore everything about you." Clive beamed like a happy newlywed. Deborah laughed, delighted. But she knew that if she left the room and returned moments later, Clive would act the same way.

In fact, every time Deborah sees Clive he acts like a newlywed, over and over and over. Her husband is caught in a time warp of memories stored away just before he suffered cataclysmic brain damage.

[ILLUSTRATION OMITTED]

A well-known British music conductor, Wearing became sick and almost died six months after his wedding to Deborah. Doctors determined that a virus had caused damage throughout his brain, and completely destroyed the hippocampus, the brain's memory-making command center. The damage was so severe Clive now suffers from an extreme case of anterograde amnesia, a condition that wipes out a person's capacity for making memories. While most anterograde amnesiacs retain a "working memory," or the ability to keep track of things for a few minutes, Clive lost even that.

[ILLUSTRATION OMITTED]

Dr. Catherine Myers, Co-Director of the Memory Disorders Project at Rutgers University in New Jersey, explains how scientists think the hippocampus works. "A common theory is that as you learn new things they temporarily get stored, probably in the area of the cortex. Over time, the hippocampus helps determine which ones are candidates for long-term storage. As you go through a day, every single thing that happens to you isn't something that you necessarily want to preserve for the rest of your life. What you ate for breakfast, for example. But other things that happen might be worth storing over the long haul and it seems that the hippocampus helps to sort that out in some mysterious way."

With the destruction of his hippocampus, Clive can't remember from one second to the next what goes on around him. His diary shows how he struggles to keep track of his life. "7:46 a.m.--I wake for the first time. 7:47 a.m.--This illness has been like death till NOW. 8:07 a.m.--I AM awake. 8:31 a.m.--Now I am really, completely awake. 9:06 a.m.--Now I am perfectly, overwhelmingly awake. 9:34 a.m.--Now I am superlatively, actually awake." For Clive and other people with anterograde amnesia, life is forever new.

Clive's anterograde amnesia was brought on by viral encephalitis, a swelling of the brain that particularly affects the hippocampus. Another major cause of hippocampus damage is hypoxia, which is the reduction of oxygen to the brain. Experiences like near drowning, carbon monoxide poisoning, or anything else that cuts off a person's air supply can damage the hippocampus.

"The hippocampus is the first and worst affected part of the brain when oxygen gets cut off," says Dr. Myers. "Why this is so is a big, open question. There are theories, but I'm not sure there is a definite

answer. You can look at these folks' brains on an MRI [magnetic resonance image] and people who know how to look can tell straight off that the person is going to have anterograde amnesia because there's a hole where the hippocampus should be."

But what does the hippocampus do to convert a person's everyday experiences into memories? One promising theory involves sleep and dreams.

"During sleep, the hippocampus is very active," says Dr. Myers, describing research being conducted by her colleagues. "Possibly during sleep the hippocampus is helping to literally replay the events of the day, strengthening the memories that deserve to be strengthened and perhaps weakening the ones that don't. While sleeping, the brain is allowed to regroup and sort through some of the recent experiences that have happened. That could be part of what's going on in dreaming ... elements that happened during the day get played back, sifted through, and reassessed. It's very cool."

People with anterograde amnesia aren't intellectually impaired. If they were math whizzes before their brains were damaged, they would still be able to solve math puzzles afterward. But they do have a learning disability in the sense that they can't remember new facts or what has gone on around them, forms of what scientists call "declarative memory."

[ILLUSTRATION OMITTED]

But life can still be good even if lived from moment to moment. Dr. Myers says anterograde amnesiacs tend to be nice people. They always seem happy to help with research that might improve the lives of others with memory loss. Even Deborah Wearing has found happiness in living a moment-to-moment life with her husband. "Even when he was at his worst, he still had that huge overwhelming love for me," she says. "That was what survived when everything else was taken away."

Dan Risch has a daughter who is studying how the mind works and will soon graduate with a degree in psychology, The author hopes "she'll help me figure out how my mind works."

Risch, Dan

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