

For the first time, researchers have mapped what happens in the brain when a patient recovers from depression using cognitive behavioral therapy, a common form of psychological treatment aimed at breaking the bad habits of thought that bring people low.

The changes in the pattern of brain activity are quite different from those observed when patients recover with antidepressant drugs, and in some areas, even opposite, according to findings reported yesterday.

The mapping may provide a first step toward using brain scanning to determine which patients should receive antidepressants and which should receive psychological training, a decision that is now often based on trial and error, said Dr. Helen Mayberg, the study's senior author.

"This experiment lays the groundwork for looking for different markers that will help to optimize the treatment for a given individual; that's the really cool part," said Mayberg, a professor of psychiatry and neurology who conducted the study while at the University of Toronto but recently moved to Emory University in Atlanta.

Researchers also predict that the study could help raise the public standing of cognitive behavioral therapy, a series of lessons that trains patients to recognize their negative thoughts -- "I'm worthless" or "it's hopeless" -- and combat them with facts.

More highly directed and shorter-term than ordinary talk therapy, the psychological practice is already solidly established and is routinely paid for by insurance companies, but it tends to get much less attention than antidepressant drug therapy.

The scanning study's importance is "that you can see such a solid physical finding from a psychological treatment," said Dr. Bruce M. Cohen, president of McLean Hospital in Belmont. He was not involved in the research.

More broadly, Cohen added, the findings represent "one more step toward answering the question: What is happening in the brain when it's depressed? What happens when you change the way you think or take a drug and change the way you feel?"

Mayberg and colleagues used a brain-scanning technique called positron emission tomography to analyze for 15 to 20 sessions the brain metabolism of 14 subjects whose depression lifted considerably after cognitive behavioral therapy.

They found, among other things, that some areas in the cortex -- the outer rind of the brain associated with higher functions, such as thinking -- appeared to become less active, seemingly because patients learned to ruminate and worry less. With antidepressants, those regions became more active.

In essence, Mayberg said, depression stems from a malfunction not in a single spot in the brain, but in a network or circuit of brain connections. The study, published in this month's *Archives of General Psychiatry*, helps to contrast the two main approaches to fighting it.

"The network can reset itself via inputs working from a bottom-up perspective -- that, I think, is how drugs work -- while cognitive therapy works by influencing top-down inputs, turning down rumination and worry areas," said Dr. Zindel Segal, a University of Toronto psychiatry professor who worked on the study.

"Top-down" cognitive therapy begins with the cortex and its higher thinking functions; "bottom-up" drug therapy begins with the deeper, more primitive parts of the brain such as the brain stem and limbic system, which affect emotions and basic bodily functions. Each eventually affects the other through a complex network that remains little understood. An estimated one-fifth of Americans suffer from prolonged depression at some point.

Studies have shown that cognitive therapy is not only at least as effective as antidepressant drugs for some patients, but that many are less susceptible to relapse, said Aldo Pucci, president of the National Association of Cognitive-Behavioral Therapists.

Patients typically attend an average of 16 sessions, replete with homework, and come away with new skills that last much longer.

The therapy works, Segal said, by helping patients become aware of their negative "self-talk" and how it interacts with their mood. For example, he said, if patients have thoughts like "I'm unattractive," they are more likely to accept that thought as fact. Cognitive therapy helps them "develop a capacity to talk back to this depressive propaganda."

There are no national statistics available on how many people perform or undergo cognitive therapy, Pucci said, but his nine year old association already has 5,000 members.

"We maintain that for the overwhelming majority of people who are depressed, it's their thinking that causes their depression, not some biochemical problem," he said. The study, he said, "just supports what we've already been saying." Cognitive behavioral therapy "doesn't need the support, but certainly we'll take it," he said.

In fact, the study does not address the origins of depression, but it did suggest a basic aspect of antidepressant therapy that surprised Mayberg: Drugs and cognitive therapy appear to operate on two different tracks, with no "final common pathway," she said.