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Like Drugs, Talk Therapy Can Change Brain Chemistry

By **RICHARD A. FRIEDMAN, M.D.**

After six years of twice-weekly psychotherapy sessions, Eric had plenty of insight. But his anxiety level had barely changed.

He was still bedeviled by a ceaseless urge to wash his hands and shameful and repetitive violent thoughts. Out of desperation and against the wishes of his therapist, he visited my office to discuss the possibility of medication.

"I thought I could understand my way out of my obsessive compulsive disorder," he recalled recently. "I wanted to be able to do it on my own, without medication."

What he did not remember was his vehement opposition to psychotropic medication on the ground that it was not natural and would change his brain chemistry.

Of course, he was right. Like Eric, many patients and therapists share the view that psychotherapy is preferable to pharmacotherapy because it is more "natural" and because it supposedly gets to the root of the patient's problem. They are convinced that self-understanding will bring relief, whether the problem is anxiety, depression or obsessional thinking.

Insight is a prerequisite of happiness, the theory goes, and well-being achieved without the hard work of psychotherapy is artificial and inauthentic.

But new evidence suggests that the talking cure and psychotropic medication have much more in common than had been thought. In fact, both produce surprisingly similar changes in the brain.

Take Eric's obsessive compulsive disorder. It hobbles patients with unwanted thoughts, often violent or sexual, that play in the mind like a broken record. Owing to the sometimes lurid nature of the thoughts, the treatment mainstay had for years been psychoanalytically oriented therapy to unlock the sexual and aggressive conflicts presumed to underlie the symptoms.

There was just one problem. That form of psychotherapy rarely, if ever, worked for those patients, a point now widely accepted by most psychoanalysts themselves.

But two seemingly different treatments can be highly effective: a form of talk therapy called cognitive-behavior therapy and a class of antidepressants called selective serotonin reuptake inhibitor antidepressants, or S.S.R.I.'s, drugs like Prozac and Zoloft. It is well known that patients with the disorder have altered serotonin function compared with normal controls.

Brain imaging that uses PET scans, or positron emission topography, has shown that the disorder is associated with functional hyperactivity of the caudate nucleus, a structure buried beneath the

cerebral cortex. Some researchers hypothesize that the caudate is part of a subcortical circuit that acts as a kind of filter, sifting out extraneous thoughts and impulses.

In obsessive compulsive disorder, they theorize, the subcortical filter malfunctions, allowing the unwanted thoughts to reach the cortex and then on to consciousness.

In a study by Dr. Lewis Baxter at the U.C.L.A. School of Medicine, patients with the disorder who responded to either a reuptake inhibitor like Prozac or cognitive behavior therapy over 10 weeks showed virtually the same changes in their brains, decreases in the activities of the caudate nuclei and, thus, changes toward normal function.

When patients improved, the changes in their brains, as shown in the PET scans, looked the same regardless of whether they had received antidepressants or psychotherapy.

An S.S.R.I. works, in part, by enhancing the neurotransmitter serotonin, whose activity is often abnormal in people with obsessive compulsive disorder and depression. Cognitive behavior therapy focuses on changing distorted patterns of thinking.

The intriguing finding from the PET scans is not limited to O.C.D. Two studies of patients with depression, reported last year in *The Archives of General Psychiatry*, compared the effects of interpersonal psychotherapy with an antidepressant on brain function, as observed in PET scans. In those studies, the depressed patients received interpersonal therapy, a short-term talk treatment that focuses on the effects of social relationships and major life events on mood.

In one study, a 12-week trial that compared an S.S.R.I., Paxil, to interpersonal psychotherapy, Dr. Arthur Brody, also at U.C.L.A., found that depressed patients who responded to either treatment had nearly identical changes in their brain function, a decrease in the abnormally high activity seen in the prefrontal cortex before treatment.

In the second study, Dr. Stephen D. Martin at the research unit of Cherry Knowle Hospital in Sunderland, England, reported that six weeks of Effexor, an antidepressant that enhances both serotonin and norepinephrine, and interpersonal therapy produced similar effects in those depressed subjects who responded either to medicine or to psychotherapy. Each had shown an increase in the activity of the basal ganglia, a subcortical brain structure.

Although the observed changes with psychotherapy and antidepressant were similar in that study, they were not identical. Subjects with interpersonal therapy but not Effexor also had activation of a brain area called the cingulate gyrus, which responds to serotonin in the brain and has a role in regulating mood.

The studies show that pharmacotherapy and psychotherapy can produce remarkably similar effects on functional brain activity. But does that mean that antidepressants and psychotherapy are really equivalent?

In a word, no. Psychotherapy alone has so far been largely ineffective for diseases like schizophrenia, where there is strong evidence of structural, as well as functional, brain

abnormalities. So it seems that if the brain is severely disordered, then talk therapy cannot alter it.

But it is clear that talk therapy can alter brain function. The reason may come from the elegant work of a Nobel Prize-winning psychiatrist and neurobiologist, Dr. Eric Kandel. Studying the simple and well-mapped nervous system of a sea slug, *Aplysia*, Dr. Kandel showed that learning leads to the production of new proteins and, in turn, to the remodeling of neurons.

Sea slugs exposed to the controlled-learning condition that produced long-term memory ended up with double the number of neuronal connections as the untrained animals. In essence, Dr. Kandel has proved that learning involves the creation of new neuronal connections.

The clear implication for humans is that learning literally changes the structure and function of the brain.

Now it may seem a big leap from a snail to a human. But if psychotherapy is thought of as a form of learning, then when therapists talk to patients, they cause them to learn, perhaps changing their brain function and, perhaps, for the long run.

In the end, Eric chose cognitive behavior therapy and improved drastically. Through exposure to those situations that he feared like messy dirty places, he became desensitized to them and lost his compulsion to wash.

Had he chosen an antidepressant, chances are that he would also have improved.

If psychotherapy produces nearly the same brain changes as pharmacotherapy, then the boundary between mind and brain is purely artificial - even unnatural.

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