



Placebo's power goes beyond the mind

Scientists tap into fake pill's effects to help real pains

By Linda Carroll

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Even though medical researchers told Chuck Park that he might be getting a sugar pill, the 30-year-old software producer was pretty sure he was getting the real thing. Just a few weeks into the clinical trial, Park's depression started to lift. He began to feel less anxious and sad.

So when Park learned he'd been taking a placebo all along, it was a surprise.

"I was fully expecting to receive the real drug even though I knew that the placebo was a possibility," remembers Park of Culver City, Calif. "I guess I wanted it to work — and in a way, it did.

For years, scientists have looked at the placebo effect as just a figment of overactive patient imaginations. Sure, dummy medications seemed to curb epileptic seizures, lower blood pressure, soothe migraines and smooth out jerky movements in Parkinson's — but these people weren't *really* better. Or so scientists thought.

Now, using PET scanners and MRIs to peer into the heads of patients who respond to sugar pills, researchers have discovered that the placebo effect is not "all in patients' heads" but rather, in their brains. New research shows that belief in a dummy treatment leads to changes in brain chemistry.

"There have always been people who have said that we could make ourselves better by positive thinking," says Dr. Michael Selzer, professor of neurology at the University of Pennsylvania School of Medicine. "After pooh-poohing this for years, here are studies that show that our thoughts may actually interact with the brain in a physical way."

New insights into how placebos work may even help scientists figure out how to harness the effect and teach people to train their own brains to help with healing.

Mind over brain matter

Recent reports show that anticipation of relief from a placebo can lead to an actual easing of aches, when the brain makes more of its own pain-dousing opiates. Brain scans of Parkinson's patients show increases in a chemical messenger called dopamine, which leads to an improvement in symptoms when patients think — mistakenly — that they are receiving real therapy.

And studies in depressed patients like Park have found that almost as many are helped by placebo treatments as by actual medications. In fact, as it turns out, a person's response to placebo treatment may offer clues as to whether "real" treatments with antidepressants are likely to work.

Researchers are just starting to appreciate the power that the mind can have over the body, says Tor Wager, an assistant professor of psychology at Columbia University.

"An emerging idea right now is that belief in a placebo taps into processes in your brain that produce physical results that really shape how your body responds to things," he says. "The brain has much more control over the body than we can voluntarily exert."

As an example of this, Wager points to the body's response to perceived threats.

"Say it's late at night and everything is quiet and then suddenly you see someone outside, near a window," he explains. "Your body starts to respond. Your pupils dilate. Your heart rate goes up. You start to sweat."

The belief that something threatening is out there produces a host of physical responses that you have little control over. If you were told to calm down and turn off these sensations, you couldn't, Wager says. "But if the belief changes — say, it turns out that it's just your husband coming home — the physical response changes."

The question, now, is how to tap into these powerful, unconscious responses, Wager says.

Brain waves may hold key

At the University of California at Los Angeles, placebo-treated volunteers were hooked up to an electroencephalograph (EEG), a device that records the brain's electrical activity. After a week of sugar pills, the volunteers were then given either more placebos or an actual antidepressant. They weren't told which type of pill they received.

Eight weeks later, researchers scrutinized the brain waves recorded by the EEG back when all the volunteers were taking placebos. The UCLA scientists discovered something intriguing: The people who got the most benefit from the actual medication had a specific pattern of brain waves when they were being treated with placebos.

Those results were described in a study published this month in the *American Journal of Psychiatry*. Researchers haven't figured out yet what the specific pattern of brain waves mean, but the study does show how patients might be inexpensively screened with an EEG to show doctors who is most likely to respond to antidepressant medications, says the report's lead author Aimee M. Hunter, a research associate at the Semel Institute for Neuroscience and Human Behavior at UCLA.

Teaching patients to soothe themselves

Meanwhile, at Stanford University, scientists figured there must be a way to harness the placebo response to help patients soothe their own pain.

The researchers rigged up an MRI so that people could watch real-time images of their brains, while lying in the scanner. The idea was to use the images to teach study volunteers to consciously pump up activity in parts of the brain activated by the placebo effect, says Dr. Sean Mackey, associate director of Stanford's pain management division and director of its neuroimaging and pain lab.

One of those volunteers, Laura Tibbitts, signed up for the study in hopes that she might be able to find a way to quiet the constant, permanent pain that descended after her right shoulder and arm were smashed in a riding accident eight years earlier.

"Pain is not in the muscles or the arm that may be injured," Mackey says. "The pain is in our brains."

A signal starts out at an injured site and travels up to the brain, Mackey explains. But, until

the brain interprets that electrical signal, you don't actually "feel" pain.

Part of what goes into the brain's interpretation is expectation, Mackey says. "I think of the placebo response, at least in part, as a manipulation of expectancy. And perhaps by changing the expectancy and bumping up the placebo response we might be able to ultimately find a way to provide sustained therapy for chronic pain."

Lying back in the scanner watching images of her brain, Tibbitts was told to conjure up memories of her pain on the day of the accident. Later, she was instructed to think soothing thoughts. "I imagined little people scooping away the pain, trying to rescue me," the 32-year-old San Francisco resident says. "Or I thought about water or snowflakes putting the fire out."

Empowering experiment

Through trial and error, Tibbitts determined which kinds of thoughts fired up and turned down the brain regions that Mackey said were linked to her pain. The mental pictures had an impact.

And the newfound control over pain levels was empowering, Tibbitts says.

"I think the most incredible thing was to see that scan of my brain constantly producing pain," she adds. "And then to actually gain control over the pain, to see that I had that power — even when I was making myself feel worse — was amazing to me."

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