

Brain's reward system helps drive placebo effect

Credit: Reuters/Darren Staples

By Anne Harding

NEW YORK | Wed Aug 4, 2010 4:20pm EDT



NEW YORK (Reuters Health) - Want to maximize the placebo effect? A good way to do this, according to a new study, is to tell someone they have a decent chance of getting the real treatment instead of a fake pill, but keep them guessing.

In the study, Parkinson's disease patients given a placebo after being told they had a 75 percent chance of receiving an active drug produced significant amounts of dopamine, a chemical key to the brain's reward system that is scarce in the brains of patients with this disease.

But no dopamine response occurred in patients given placebo after being told they had a 25 percent, 50 percent, or 100 percent chance of getting real treatment.

The findings show that expectations directly regulate the power of the placebo effect by kicking the brain's reward system into gear, probably not just in Parkinson's patients but in a number of different illnesses, such as chronic pain and depression, according to Dr. A. Jon Stoessl of the Pacific Parkinson's Research Center in Vancouver, British Columbia, and his colleagues.

"The greatest form of reward is really to get better, so expectation of improvement is akin to expectation of reward," Stoessl explained in an interview.

Stoessl and his colleagues first demonstrated a relationship between the placebo effect and dopamine release in Parkinson's patients nine years ago. Given dopamine's role in the reward system, he explained, "perhaps it would be important for the placebo effect in other conditions."

In the current study, the researchers used PET scans to examine whether patients' expectations of getting an active drug would be related to the amount of dopamine released in their brain after they took a placebo.

They randomly assigned 35 patients to be informed that they had a 25 percent chance, 50 percent chance, 75 percent chance, or 100 percent chance of receiving an active drug. But all were given inactive placebo.

"There was a substantial amount of dopamine released, but only when the stated probability was 75 percent," Stoessl explained. "What that means is when you're told that the outcome is certain, that there's a 100 percent chance, you don't activate reward pathways. At lower probabilities, you just don't think there's much chance, so you don't activate the reward system either."

The release of dopamine in response to placebo also was closely correlated to the amount of dopamine released in patients' brains when they were given active medication, meaning that the placebo effect would likely add on to the real drug effect.

Parkinson's patients' reward pathways are abnormal given their loss of dopamine, Stoessl said, so results might be different in patients with normally functioning reward systems; for example, they might release dopamine when told they had a 50 percent likelihood of being given an active treatment.

Researchers could use the new findings in designing future studies, in order to minimize the placebo effect and better gauge the effect of a real drug, according to Stoessl.

Stoessl and his colleagues used something called "authorized deception" in the study, meaning that they told participants beforehand that the experiment would involve deception, without going into specifics. Directly after the test, they gave study participants the details on how they were deceived.

While deception has long been used in neuroscience and psychology research -- it can be tough to do research on the placebo effect without misleading patients -- most of the time, study participants are left in the dark, notes Dr. Franklin G. Miller, a bioethicist at the National Institutes of Health in Bethesda, Maryland. This flies in the face of informed consent, the principle that people should be told exactly what a study will entail and why it's being done so they can choose whether or not to participate in an informed way.

According to Miller, who helped develop the concept of authorized deception, Stoessl and his team were on solid ethical ground. "This approach, by alerting subjects to the use of deception, gives everyone a fair opportunity to decide whether or not they want to participate in research that has deception as part of its design," he said.

And the findings also show, he added, that health care providers can take advantage of the placebo effect while treating their patients, without having to lie to them.

"Normally your response to a drug is a product of the drug itself and the context in which it is given," Miller said, adding that this context is, basically, what the placebo effect is all about. Health care providers can harness the placebo effect for their patients' benefit, he said, by "promoting positive expectations and good doctor-patient relationships."

SOURCE: link.reuters.com/cab43n Archives of General Psychiatry, August 2010.