

## **Pain perception**

### **Mind tricks**

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#### **Suggesting medicine will help does result in physical changes in the brain**

THE placebo effect, long considered nothing more than psychological suggestibility, does now appear to be genuine. Researchers this week demonstrated that when a person is treated with a substance which he or she believes to have the power to relieve pain, the brain can be tricked into setting in motion some of that pain relief.

While the Latin word placebo literally means “I shall please”, in the medical world it has become synonymous with apparent yet false consolation. Placebos—typically sugar pills—have been shown to alleviate all sorts of conditions, including ulcers, herpes and acne. The effect is especially strong in hard-to-pin-down illnesses and conditions such as depression (where up to half of people can get better on a sugar pill) and pain.

It is the latter that Jon-Kar Zubieta and his colleagues at the University of Michigan at Ann Arbor have now examined. They invited 14 men in their 20s into the laboratory to investigate what they claimed was a new medication that was thought to have analgesic effects. In fact, the medication was nothing more than a routine saline drip.

The pain, on the other hand, was authentic. The researchers made their subjects' jaws throb by pumping a solution into a nearby muscle, then asked them to rate the severity of their discomfort. The ratings, required every 15 seconds, were covertly used to keep pain levels constant. This was necessary because the pain was long lasting, and so the researchers needed to have a way of differentiating between what the body was doing naturally to counteract the pain and the contribution made by the false drug.

During the phase of the study where the volunteers were both in pain and receiving their “medication”, they reported suffering less. This was particularly interesting, given that they were receiving ever higher doses of the pain-making solution. (Indeed, in five cases, pain levels could not be maintained, as some volunteers reached the maximum dose they could receive before risking tissue damage.)

The fact that a placebo can lessen subjective measures of pain is not new. But Dr Zubieta also used positron emission tomography scans during the experiment to peer inside the men's brains. He compared the pain-only phase with the pain-plus-placebo phase.

What he found was that when the placebo was being administered—and the subjects were informed when it was—their brains released significantly more endorphins, the brain's natural painkillers. The researchers knew this because they had introduced a radioactive tracer that selectively binds to the same type of receptor in the brain, the mu-opioid variety, as the endorphins. More of the tracer was floating around unbound, suggesting the receptor sites were occupied by the endorphins. The work

was published this week in the *Journal of Neuroscience*.

While the exact mental state that allows the placebo effect to kick in remains a mystery, the belief that something will work seems to be a necessary ingredient. All of the participants were asked in advance how effective they thought the analgesia would be, and all of them believed it would help. The placebo effect could thus be attributed to a lifetime of being conditioned to believe in medicine. Alternatively, it could be tapping into something even bigger to do with belief—or even faith itself.

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