

Interactions between brain and spinal cord mediate value effects in placebo hyperalgesia

A. Tinnermann^{1,*}, S. Geuter^{1,2}, C. Sprenger^{1,3}, J. Finsterbusch¹, C. Büchel¹

+ See all authors and affiliations

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Article

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Price modulates early pain processing

Patients in randomized clinical trials frequently stop taking their drug, complaining of side effects. However, it turns out that some of these subjects are part of the placebo group and thus never received any active medication. This is a case of the placebo effect seriously interfering with medical treatment. Tinnermann *et al.* investigated whether value information such as the price of a medication can further modulate behavioral placebo effects and the underlying neural network dynamics (see the Perspective by Colloca). They used brain imaging to characterize the circuits involved in placebo hyperalgesia within the descending pain pathway from the prefrontal cortex to the spinal cord. Their findings revealed how value information increased the placebo effect.

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Abstract

Value information about a drug, such as the price tag, can strongly affect its therapeutic effect. We discovered that value information influences adverse treatment outcomes in humans even in the absence of an active substance. Labeling an inert treatment as expensive medication led to stronger placebo hyperalgesia than labeling it as cheap medication. This effect was mediated by neural interactions between cortex, brainstem, and spinal cord. In particular, activity in the prefrontal cortex mediated the effect of value on placebo hyperalgesia. Value furthermore modulated coupling between prefrontal areas, brainstem, and spinal cord, which might represent a flexible mechanism through which higher-cognitive representations, such as value, can modulate early pain processing.