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## **BELIEVING IN MIRACLES: A RESTING-STATE FUNCTIONAL CONNECTIVITY STUDY ON PLACEBO EFFECTS**

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**Background:** It has been shown that religious beliefs and practices are associated with resting-state functional connectivity (rsFC) in the default-mode network.

**Aims:** We studied the association between a specific religious belief (miracle cures at Lourdes, a major Catholic pilgrimage site) and rsFC in three large-scale functional brain networks (default-mode, salience, control). The study had a placebo-centered approach.

**Method:** A total of 37 females with the belief that water from the sanctuary in Lourdes has positive effects on their well-being and health participated in a placebo study with a retest design. Before a 15-minute resting-state scan, they drank tap water that was labeled 'Lourdes water' in one condition and 'tap water' in another condition.

**Results:** 'Lourdes water' reduced rsFC in the frontoparietal control network and increased rsFC in the salience network (insular-cerebellar connectivity). This was accompanied by an increased intensity of bodily sensations (e.g. feelings of warmth, tingling) and positive feelings (e.g., gratefulness).

**Conclusions:** These findings provide the first evidence that specific religious beliefs can alter large-scale functional networks.

**Keywords:** Religious belief, Placebo, Functional magnetic resonance imaging, Resting state

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