

[Scientists discover brain area which can be targeted for treatment in patients with schizophrenia who 'hear voices'](#)

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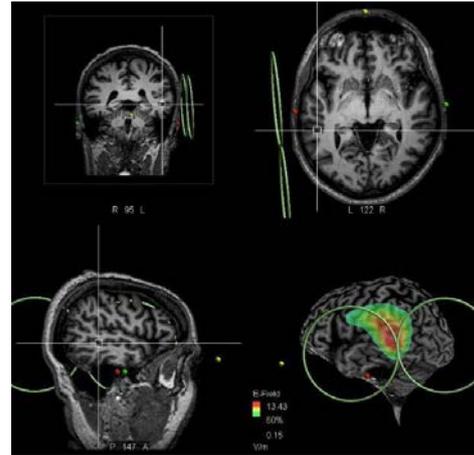
For the first time, scientists have precisely identified and targeted an area of the brain which is involved in "hearing voices", experienced by many patients with schizophrenia. They have been able to show in a controlled trial that targeting this area with magnetic pulses can improve the condition in some patients. This early clinical work is presented at the ECNP conference in Paris on Tuesday 5th September, with later publication in *Schizophrenia Bulletin**

"This is the first controlled trial to precisely determine an anatomically defined brain area where high frequency magnetic pulses can improve the hearing of voices", said lead researcher, Professor Sonia Dollfus (University of Caen, CHU, France).

Schizophrenia is a serious long-term mental health problem. People with schizophrenia experience a range of symptoms, which may include delusions, muddled thoughts and hallucinations. One of the best-known is hearing voices, also known as Auditory Verbal Hallucination (AVH), which around 70% of people with schizophrenia experience at some point. These voices, may be 'heard' as having a variety of different characteristics, for example as internal or external, friendly or threatening, they may be continuously present or present only occasionally, and so on.

Transcranial Magnetic Stimulation (TMS) has been suggested as a possible way of treating the hearing of voices in schizophrenia. TMS uses magnetic pulses to the brain, and has been shown to be effective in several psychiatric conditions. However, there is a lack of controlled trials to show that TMS works effectively with AVH sufferers.

The French research team worked with 26 patients who received active TMS treatment, and 33 as a control group, who received sham (placebo) treatment. The researchers interviewed the patients using a standard protocol – the Auditory Hallucinations Rating Scale – which revealed most of the characteristic features of the voices which they were hearing. The treated patients received a series of 20 Hz high-frequency magnetic pulses over 2 sessions a day for 2 days. Using magnetic resonance imaging (MRI), the pulses were targeted at a specific brain area in the temporal lobe, which is associated with language (the exact area is the crossing of the projection of the ascending branch of the left lateral sulcus and the left superior temporal sulcus).



Magnetic stimulation (blue device on the left photo) applied on localised brain area in real time, with the patient's MRI (right photo). Credit, University of Caen. (High resolution images available from press officer).

After 2 weeks, the patients were re-evaluated. The researchers found that 34.6% of the patients being treated by TMS showed a significant response, whereas only 9.1% of patients in the sham group responded ('significant response' was defined as a more than 30% decrease in the Total Auditory Hallucinations Rating Scale score).

Professor Sonia Dollfus said:

"Auditory Verbal Hallucinations, or "hearing voices" can be a disturbing symptom of schizophrenia, both for patients and for those close to sufferers. This is the first controlled trial to show an improvement in these patients by targeting a specific area of the brain and using high frequency TMS. This means two things; firstly it seems that we now can say with some certainty that we have found a specific anatomical area of the brain associated with auditory verbal hallucinations in schizophrenia. Secondly, we have shown that treatment with high frequency TMS makes a difference to at least some sufferers, although there is a long way to go before we will know if TMS is the best route to treat these patients in the long-term".

Commenting, Professor Andreas Meyer-Lindenberg, Central Institute of Mental Health, Mannheim and member of the ECNP executive board, said: *"This work builds on previous studies that have shown a critical role of excessive activity of subregions of the temporal lobe in the generation of voice hallucinations in schizophrenia. To move this into treatment, controlled trial such as the one by Dollfus and coworkers are important. While response rates were moderate, TMS is a welcome addition to the therapeutic repertoire especially for patients who do not respond to medication."*

*This work has been accepted in the peer-reviewed journal *Schizophrenia Bulletin: The Journal of Psychoses and Related Disorders*. The exact publication date has still to be determined.

Note: Around 220,000 people have been diagnosed as having schizophrenia in England and Wales (<https://www.rcpsych.ac.uk/pdf/NAS%20National%20report%20FINAL.pdf>)

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Notes for Editors

[Please mention the ECNP Conference in any story resulting from this press release](#)

The European College of Neuropsychopharmacology (ECNP)

The ECNP is an independent scientific association dedicated to the science and treatment of disorders of the brain. It is the largest non-institutional supporter of applied and translational neuroscience research and education in Europe. Website: www.ecnp.eu

The 30th annual ECNP Congress takes place from 2nd to 5th September in Paris. It is Europe's premier scientific meeting for disease-oriented brain research, annually attracting between 4,000 and 6,000 neuroscientists, psychiatrists, neurologists and psychologists from around the world. Congress website: <http://2017.ecnp.eu/>

Conference abstract:

P.3.d.044 Efficacy of high-frequency neuronavigated repetitive TMS in auditory verbal hallucinations: a double-blind controlled study in patients with schizophrenia

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Introduction: While low-frequency (1-Hz) repetitive transcranial magnetic stimulation (rTMS) of temporo-parietal targets has been widely tested in the treatment of auditory verbal hallucinations (AVH) in patients with schizophrenia, it is difficult to draw a definitive conclusion regarding its efficacy [1]. Promising results have been reported with either high-frequency [2] or neuronavigated [3] rTMS, but no controlled study was previously based on neuronavigated high-frequency rTMS procedure. This double-blind sham-controlled study assessed the value of high-frequency (20-Hz) rTMS applied, using neuronavigation, over a precise anatomical site in the left temporo-parietal region identified as the best stimulation target [4] and which is easily and reproducibly determined in clinical practice (www.clinicaltrials.gov under number NCT01022489).

Methods: Seventy-four patients with schizophrenia or schizoaffective disorders (DSM-IV R) were included and randomized in an active or a sham group. Fifty-nine patients were treated and fully evaluated over 4 weeks either in the active treatment group (n=26) or in the sham group (n=33). The target was precisely determined from morphological MRI using a neuronavigation system and was located at the crossing between the projection of the ascending branch of the left lateral sulcus and the left superior temporal sulcus. The high-frequency protocol (20-Hz) consisted of 13 trains of 10-s duration with 200 pulses for each train. The intertrain interval was 50 s for a total of 2 600 pulses and a total duration of 13 min. Thus, four rTMS sessions of 13 min, with 2 sessions a day were performed. The resting motor threshold (rMT) was individually measured before each session using electromyography recordings on the first dorsal interosseus muscle. The stimulation intensity was set at 80% of the rMT.

Results: The percentage of responders, defined by a more than 30% decrease in the total score on the Auditory Hallucinations Rating Scale, was significantly higher in the active group (34.6%) than in the sham group at day 14 (34.6 vs. 9.1%, p=0.016). This difference remains significant after adjustment for the other factors in multivariate analysis (neuronavigation system, kind of transcranial magnetic stimulation, university hospital centers). The OR is equal to 5.29 (95% confidence interval = 1.26 - 22.25). The percentage of responders did not differ between the two groups at D 2, D 7, D 21 or D 30. Although there were more adverse events (squeezing, local pain, clenched jaw, or blepharospasm) during the active than the sham procedure, no major side effects were reported in any groups.

Discussion: This is the first controlled study that demonstrates the efficacy of 20-Hz rTMS targeted on an accurate anatomical site and guided by neuronavigation in the treatment of AVH in patients with schizophrenia. This result supports the concept that high-frequency rTMS of the left temporal cortex can modulate cortical activity in the same direction as low-frequency rTMS. Clinical trials are warranted to further develop this innovating therapeutic.

This research was funded by the French Health Ministry (PHRC) and the regional Council (Basse Normandie).

How was this press release reviewed?

There were 1003 abstracts accepted for this conference, this work was amongst the top-scoring 170 abstracts. After initial approval from the ECNP media group, the press release was developed by the press officer and the author, with the final version being approved by the ECNP media review group. We then sought an additional view and comment from someone with expertise in the field – this is the person who comments in the press release. None of the reviewers have been involved in the work.