

'Singing brains' offers epilepsy and schizophrenia clues

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Studying the way a person's brain 'sings' could improve our understanding of conditions such as epilepsy and schizophrenia and help develop better treatments, scientists at Cardiff University have discovered.

Research by a team working in Cardiff University's Brain Research Imaging Centre (CUBRIC) has discovered that a person's brain produces a unique electrical oscillation at a particular frequency when a person looks at a visual pattern.

Importantly, the team found that the frequency of this oscillation appears to be determined by the concentration of a neurotransmitter chemical, GABA, in the visual cortex of each person's brain. The more GABA was present, the higher the frequency or "note" of the oscillation. GABA is a key inhibitory neurotransmitter and is essential for the normal operation of the brain.

The research was primarily carried out by Dr Suresh Muthukumaraswamy and Dr Richard Edden and has just been published in the [Proceedings of the National Academy of Sciences](#), USA.

Professor Krish Singh of Cardiff University's School of Psychology, who led the research, said: "Using sophisticated MEG and [MRI](#) brain imaging equipment, we've found that when a person looks at a visual pattern their brain produces an [electrical signal](#), known as a gamma oscillation, at a set frequency.

"In effect, each person's [brain](#) 'sings' at a different note in the range 40-70 Hz. This is similar to the notes in the lowest octaves of a standard piano keyboard or the lower notes on a bass guitar. Importantly, we also found that this frequency appears to be controlled by how much of an essential neurotransmitter, GABA, is present in a person's [visual cortex](#)."

The researchers believe that their findings will have important implications for future clinical studies, especially in terms of increasing our understanding of conditions such as epilepsy and schizophrenia, where it is known that there may be a problem with GABA.

Professor Singh added: "As a result of our research, we are already looking to share this work with our medical colleagues. In particular, we hope that the study of gamma oscillation frequency will provide a new window into the action of neurotransmitters such as GABA and how their function is compromised in diseases such as epilepsy and schizophrenia."

"We also believe that our findings could have important implications for the development, production and effectiveness of drugs to treat these and other neurological conditions."

More information: Suresh D Muthukumaraswamy, Richard A E Edden, Derek K Jones, Jennifer B Swettenham, Krish D Singh - Resting GABA concentration predicts peak gamma [frequency](#) and fMRI amplitude in response to visual stimulation in humans was published in the Early Edition Section of the *Proceedings of the National Academy of Sciences of the United States (PNAS)*.

Source: Cardiff University ([news](#) : [web](#))

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