

## Discovering a Defective Class of Neurons in the Brains of Individuals with Schizophrenia

- **Functional alterations in the brains of individuals with this condition coincide with the distribution of these neurons in the same brain.**
- **These neurons are responsible for filtering external information reaching the brain. Their functioning is altered in individuals with schizophrenia, which explains the majority of their symptoms.**
- **This discovery is the first time that this alteration can be identified as a possible origin of schizophrenic symptoms, and it opens the door to seeking new targeted treatments with fewer patient side effects.**

**Barcelona, January 10, 2024** – The perception of reality in individuals with schizophrenia is distorted due to the brain's inability to correctly filter external information. **This causes a distorted view of reality**, a fact that leads to the symptoms of this disease. Now, a study published in *European Psychiatry* points to **a defect in a specific line of neurons** as the origin of this dysfunction. The research was carried out by investigators from the Magnetic Resonance Unit, integrated into the Biomedical Diagnosis and Imaging Network (dibi) of the Mental Health Institute of Hospital del Mar and the CIBER of Mental Health (CIBERSAM).

The brain contains two types of neurons based on their function: activating, the most numerous, and inhibitory neurons. Alterations have been observed in the inhibitory neurons, specifically in two subtypes, **which coincide with the areas of the brain affected in individuals with schizophrenia. "Through functional brain imaging studies, we have seen functional alterations in the brain of individuals with schizophrenia that are consistent with a defect in a type of neuron whose function is to inhibit and filter stimuli. This can explain almost the entire constellation of schizophrenia symptoms,"** explains Dr. Jesús Pujol, lead author of the study and research director of the Magnetic Resonance Unit.

The study analyzed functional brain maps generated with magnetic resonance imaging from 87 people with the disorder and compared them with functional maps from 137 controls without the disease. It found that the distribution of areas that do not function correctly in patients with the disease coincides with that of inhibitory neurons throughout the brain. Dr. Pujol explains, **"We have a functional map of the brain, which allows us to see that schizophrenia presents a functional alteration in the brain, with a distribution that coincides with that of inhibitory neurons."**

### Explains Almost All Symptoms of Schizophrenia

Inhibitory neurons, or GABA system neurons, are found in all **sensory inputs of the brain**, including the visual, taste, olfactory, auditory, and tactile systems. They are also present in the emotional system, which manages emotions, and in the area responsible for rational thinking and language. Dysfunction in these neurons causes individuals with schizophrenia to have a distorted perception of reality, an inability to manage it correctly, and the development of symptoms of the disease.

**"The defect in inhibitory neurons causes a distortion of reality in the brains of individuals with schizophrenia and can explain the majority of the symptoms of the disease, both cognitive and emotional,"** confirms Dr. Laura Blanco-Hinojo, lead author of the study. Additionally, despite being two subtypes, these neurons have a common genetic origin during the embryonic development of the individual.

*Nota de prensa*

This investigation is the first time that this defect has been identified as a possible origin of schizophrenia. This discovery opens a new line of research for **developing new treatments** focused on the abnormal behavior of inhibitory neurons. Currently, existing treatments are effective but alter the brain's overall function, affecting the individual's daily life.

For this reason, Dr. Anna Mané, head of the emergency and acute care process at the Mental Health Institute of Hospital del Mar and a co-author of the study, points out that ***"schizophrenia is a very complex disease, with a wide variety of symptoms associated with high disability, and current treatments are primarily effective in some symptoms, such as delusions and hallucinations."*** However, ***"unfortunately, we are not able to address all symptoms, such as negative and cognitive symptoms, which are the ones that most disrupt the individual's daily life. This study opens the door to new treatments that can encompass all symptoms associated with the disease, with a low incidence of side effects."***

Schizophrenia is a severe mental disorder that affects 24 million people across the world. It is estimated that 1% of the population in Catalonia suffers from this illness. It falls under the category of mental disorders known as psychosis and can cause disabilities. Schizophrenia is identified by a range of symptoms, such as hallucinations, delusional ideas, changes in behavior, or movement disorders. In addition, it can lead to social isolation, loss of emotional response, and a decrease in the intensity of expression.

**Reference Article**

Pujol, J., Pujol, N., Mané, A., Martínez-Vilavella, G., Deus, J., Pérez-Sola, V., & Blanco-Hinojo, L. (2023). Mapping alterations in the local synchrony of the cerebral cortex in schizophrenia. *European Psychiatry*, 66(1), E84. [doi:10.1192/j.eurpsy.2023.2463](https://doi.org/10.1192/j.eurpsy.2023.2463)

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