

The brain needs cleaning to stay healthy

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Research led by the Achucarro Basque Center for Neuroscience, the University of the Basque Country (UPV/EHU), and the Ikerbasque Foundation has revealed the mechanisms that keep the brain clean during neurodegenerative diseases.

When neurons die, their debris need to be quickly removed in order for the surrounding [brain tissue](#) to continue to function properly.

Elimination of the neuron corpses, in a process called phagocytosis, is carried out by highly specialized cells in the brain called microglia.

These small cells have many ramifications that are in constant motion and are specially equipped to detect and destroy any foreign element, including dead neurons. Or so it was thought until now.

This study, publishing May 26, 2016 in *PLOS Biology*, investigates, for the first time, the process of neuronal death and microglial phagocytosis in the diseased brain. To this end, scientists collected brain samples from epilepsy patients at University Hospital of Cruces and from epileptic mice.

It is known that during epilepsy-associated seizures, neurons die. However, contrary to what happens in the healthy brain, during epilepsy, microglia seem to be "blind" and unable to find the dead neurons and to destroy them. Their behavior is abnormal. Therefore, dead neurons cannot be eliminated and accumulate, spreading the damage to neighboring neurons and triggering an inflammatory response that worsens the brain injury.

This discovery opens a new avenue to explore therapies that could alleviate the effects of [brain](#) diseases. In fact, the research group that undertook these studies is currently developing drugs, hoping to boost this cleaning process -phagocytosis- and help in the treatment of epilepsy.

More information: Abiega O, Beccari S, Diaz-Aparicio I, Nadjar A, Layé S, Leyrolle Q, et al. (2016) Neuronal Hyperactivity Disturbs ATP Microgradients, Impairs Microglial Motility, and Reduces Phagocytic Receptor Expression Triggering Apoptosis/Microglial Phagocytosis Uncoupling. *PLoS Biol* 14(5): e1002466. [DOI: 10.1371/journal.pbio.1002466](#)

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