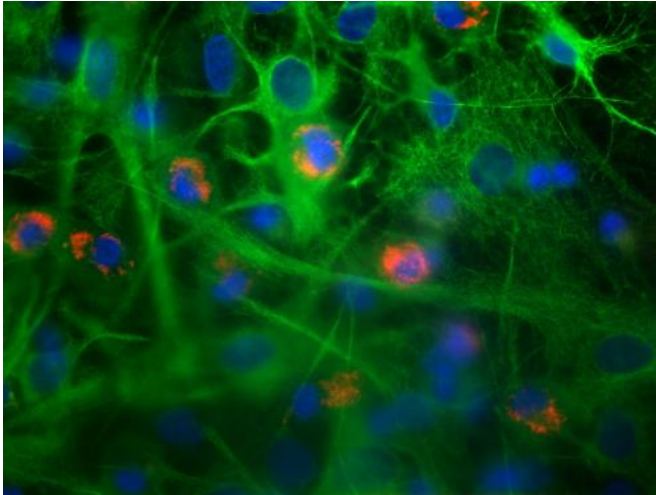


Anti-epilepsy drugs can cause inflammations

19 December 2013, by Dr. Julia Weiler



Two types of glial cells: astroglia are dyed green, microglia red. The nuclei are highlighted blue. Credit: RUB, Bild: Dambach

Physicians at the Ruhr-Universität Bochum (RUB) have been investigating if established anti-epilepsy drugs have anti-inflammatory or pro-inflammatory properties – an effect for which these pharmaceutical agents are not usually tested. One of the substances tested caused stronger inflammations, while another one inhibited them. As inflammatory reactions in the brain may be the underlying cause for epileptic disorders, it is vital to take the trigger for the disorder under consideration when selecting drugs for treatment, as the researchers concluded.

They published their report in the journal *Epilepsia*.

Glial cells play a crucial role in the nervous system

Hannes Dambach from the Department for Neuroanatomy and Molecular Brain Research, together with a team of colleagues, studied how

anti-epilepsy drugs affect the survival of glial [cells](#) in cultures. Glial cells are the largest cell group in the brain; they are crucial for supplying neurons with nutrients and affect immune and inflammatory responses. The question of how glial cells are affected by anti-epilepsy drugs had previously not been studied in depth. The RUB work group Clinical Neuroanatomy, headed by Prof Dr Pedro Faustmann, analysed four substances: [valproic acid](#), gabapentin, phenytoin and carbamazepine.

Four anti-epilepsy drugs affect glial cells in different ways

Glial cells treated by the researchers with valproic acid and gabapentin had better survival chances than those treated with phenytoin and carbamazepine. However, carbamazepine had a positive effect, too: it reduced inflammatory responses. Valproic acid, on the other hand, turned out to be pro-inflammatory. In how far the anti-epilepsy drugs affected inflammations was also determined by the applied dose. Consequently, different drugs affected [glial cells](#) – and hence indirectly the neurons – in different ways.

Inflammatory responses should be taken under consideration in clinical studies

"Clinical studies should focus not only on the question in how far anti-epilepsy drugs affect the severity and frequency of epileptic seizures," says Pedro Faustmann. "It is also necessary to test them with regard to the role they play in [inflammatory responses](#) in the central nervous system." Thus, doctors could take the underlying inflammatory condition under consideration when selecting the right anti-epilepsy drug.

Epilepsy may have different causes

In Germany, between 0.5 and 1 percent of the population suffer from epilepsy that requires drug treatment. The disease may have many causes:

genetic predisposition, disorders of the central nervous system after meningitis, traumatic brain injury and stroke. Inflammatory responses may also be caused by damage to the [brain](#).

More information: H. Dambach, D. Hinkerohe, N. Prochnow, M.N. Stienen, Z. Moinfar, C.G. Haase, A. Hufnagel, P.M. Faustmann (2013): Glia and epilepsy: Experimental investigation of antiepileptic drugs in an astroglia/microglia co-culture model of inflammation, *Epilepsia*, DOI: [10.1111/epi.12473](https://doi.org/10.1111/epi.12473)

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