C0r0n@ 2 Inspect

Review and analysis of scientific articles related to experimental techniques and methods used in vaccines against c0r0n@v|rus, evidence, damage, hypotheses, opinions and challenges.

Wednesday, July 28, 2021

Behavior of graphene in EMF fields in-vivo and its relationship with neuromodulation

Reference

Manzo, LP; Ceragioli, H .; Bonet, IJ; Nishijima, CM; Vieira, WF; Oliveira, EC; Parada, CA (2017). Magnetic, but not non-magnetic, reduced graphene oxide in spinal cord increases nociceptive neuronal responsiveness. Nanomedicine: Nanotechnology, Biology and Medicine, 13 (5), pp. 1841-1851. https://doi.org/10.1016/j.nano.2017.02.019

Facts

1. The study shows that the electromagnetic fields on the reduced graphene oxide rGO stimulate the neuronal processes of nociception, in an in-vivo study in rats. Nociception is a neural process that is responsible for transmitting and processing stimuli that may be harmful to tissues, so nociceptor-type nerve endings are responsible for perceiving pain above the threshold established by the central nervous system.
2. Rats were injected with reduced graphene oxide rGO into the intrathecal space to overcome the BBB blood-brain barrier and were exposed to DEMF (dynamic electromagnetic field) - type electromagnetic fields with a zeta potential in a range of -10.7mV ± 0.40mV. . This is especially relevant since the authors discovered that this type of external DEMF fields affected analgesia and nociception, as they state "*it is important to note that an external dynamic magnetic field influences neuronal electrical activity, independently of the neuronal intrinsic magnetic field*."On the other hand, the zeta potential that affects graphene oxide in its relationship with rat neuronal cells, also affects its electrostatic repulsion charge, the ability to overcome the BBB blood-brain barrier (Mendonça, MCP; Soares, ES; de Jesus, MB; Ceragioli, HJ; Ferreira, MS; Catharino, RR; da Cruz-Höfling, MA 2015) and the pH value of neuronal cells (Prasad, H.; Rao, R. 2018 | Bai, H.; Li, C. ; Wang, X.; Shi, G. 2010) Therefore, 5G electromagnetic fields can be inferred in graphene (Chen, Y.; Fu, X.; Liu, L.; Zhang, Y.; Cao, L.; Yuan, D.; Liu, P. 2019) and according to the experiments carried out by the authors of this article, they can do it in-vivo. Deepening these facts, it is found that the value pH is correlated with the zeta potential, as indicated (Hu, X.; Yu, Y.; Hou, W.; Zhou, J.; Song, L. 2013) in figure 1,remember, the higher the negative zeta potential, the higher the pH value. This corroborates the relationship of these factors with endosomal acidification problems in astrocytes and the appearance of behavioral and psychiatric disorders (Prasad, H.; Rao, R. 2018).

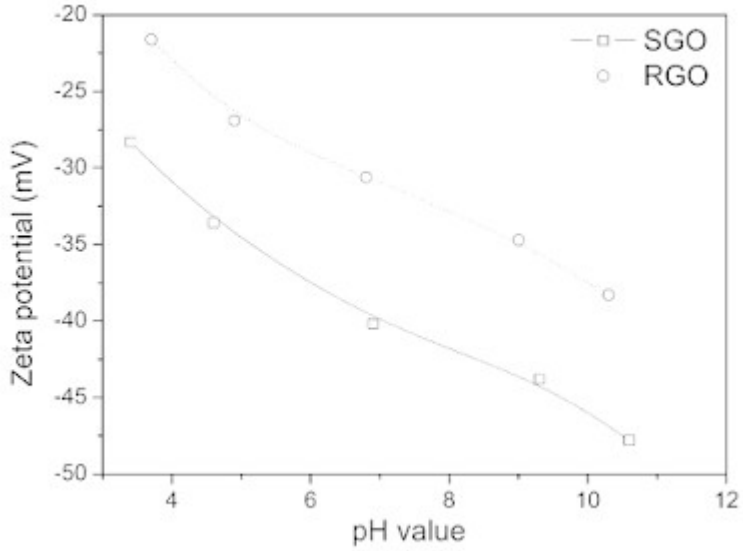

Fig. 1. Modulation of the pH of the reduced graphene oxide rGO as a function of the zeta potential (Hu, X.; Yu, Y.; Hou, W.; Zhou, J.; Song, L. 2013)

3. Another fundamental claim is the following " *The emerging interdisciplinary field of nanotechnology and neurophysiology, together with the synthesis of reduced graphene oxides (rGO), paved the way to facilitate our approach to study a possible role of the" intrinsic "magnetic field in neurobiology. Magnetic rGOs are similar to nanomagnets capable of aligning their dipoles in the presence of a magnetic field and, therefore, are capable of generating a static magnetic field. Consequently, at least in theory, the presence of this rGO highly magnetic field in the subarachnoid space of rats could cause an alteration in the neuronal intrinsic magnetic field and, hypothetically, alter their neuronal responsiveness* "

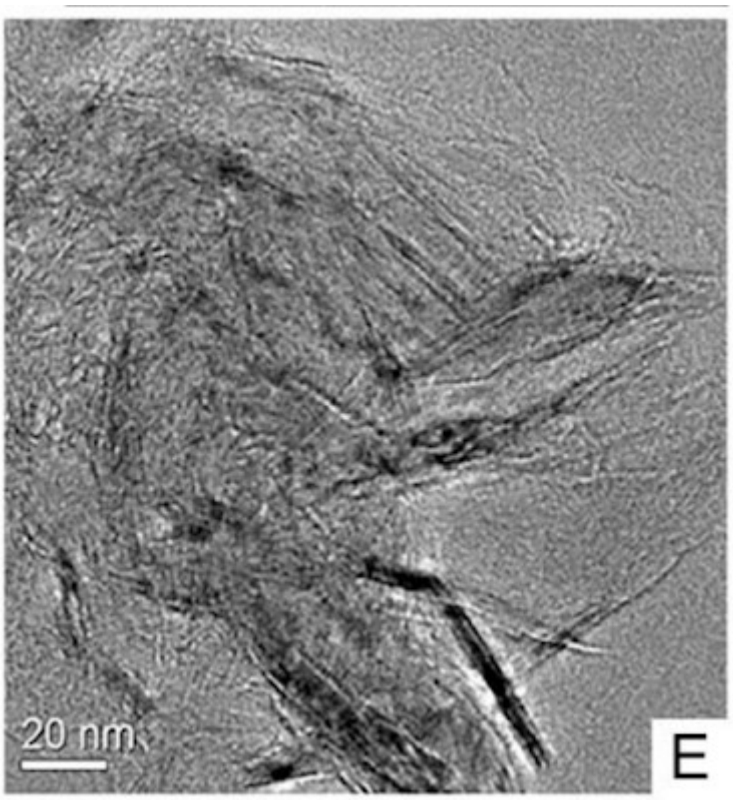

Fig. 2. Sample of reduced graphene oxide rGO from the study of (Manzo, LP; Ceragioli, H.; Bonet, IJ; Nishijima, CM; Vieira, WF; Oliveira, EC; Parada, CA 2017)

4. The results demonstrated that the rats with magnetized rGO presented a greater nociceptive response, due to the fact that DRG neurons (these are the neurons of the neonatal dorsal root ganglion of the rat) sensitive to KCL (Potassium Chloride injected in the experiment, used to provoke the pain response and study the nociceptive response), were mostly affected.
5. The researchers concluded that " *the alteration of the neural magnetic field in the spinal cord increases the nociceptive response capacity, suggesting a great relevance of the magnetic component of the electromagnetic field in neuronal transmission* ."

Bibliography

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