

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.

Thursday, July 15, 2021

Graphene oxide disrupts mitochondrial homeostasis

Reference

Xiaoli, F .; Yaqing, Z .; Ruhui, L .; Xuan, L .; Aijie, C .; Yanli, Z .; Longquan, S. (2021). Graphene oxide disrupted mitochondrial homeostasis by inducing intracellular redox deviation and autophagy-lysosomal network dysfunction in SH-SY5Y cells = Graphene oxide disrupted mitochondrial homeostasis through inducing intracellular redox deviation and autophagy-lysosomal network dysfunction in SH-SY5Y cells. *Journal of Hazardous Materials*, 416, 126158. <https://doi.org/10.1016/j.jhazmat.2021.126158>

Facts

1. Researchers analyze the risks and toxicity problems of graphene oxide that affects the normal functioning of mitochondria (cellular organelles responsible for providing energy to cells).
2. Biological adverse effects were experienced with cultured SH-SY5Y cells. SH-SY5Y cells are human-derived cell lines used for the research of brain cells and neurodegenerative diseases, because they are very similar to SK-N-SH neuroblasts, which are the embryonic cells of neurons.
3. In the abstract of the article one of his main discoveries is stated " *We discovered that the ultrasonic processing, changed the oxidation state and the surface reactivity on the flat surface of GO (graphene oxide) due to its hydration activity, which caused peroxidation. Of lipids and cell membrane damage* ".
4. The article indicates that the application of ultrasound can cause the destruction of the primary structure of graphene oxide nanomaterials " *producing fragmentation and defects on the surface or edges, and affecting their behavior in the biological system* ." According to the authors, ultrasound generates " *unpaired free radical electrons* " that react causing oxidation of cells, causing a REDOX imbalance (oxidative stress), causing DNA damage and generating ROS (reactive oxygen species, in other words, free radicals oxygen ions and peroxides). This process is responsible for the toxicological effects of graphene oxide.
5. When the concentration of graphene oxide is greater than 40 µg / ml (40 micrograms per milliliter), the survival of the cells is significantly reduced to less than 66% after 3 hours. In the experiments apoptotic cell death was confirmed, see figure 1.

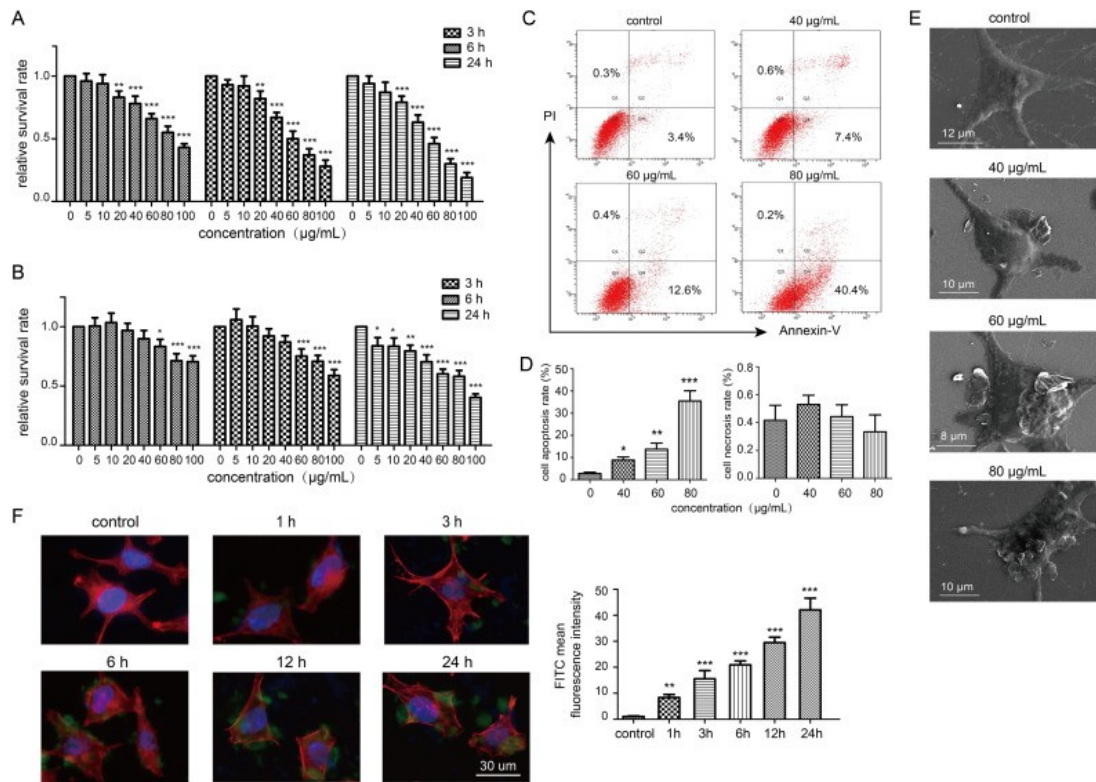


Fig. 1. Graphene Oxide Cell Death Tests

6. The article focuses on the cellular REDOX imbalance derived from unbalanced antioxidant systems. Cells treated with GO graphene oxide were found to trigger excessive ROS production, which was the step prior to cellular oxidative stress. In order to confirm this fact, the researchers applied NAC (N-Acetyl-Cysteine) treatments, which reduced ROS levels and confirmed that graphene oxide GO was responsible for activating the signaling pathway of NOX2 (oxidases) that caused this REDOX imbalance. In the authors' words, graphene oxide is responsible for "the weakened antioxidant capacity."
7. Therefore, it is confirmed that NAC (N-Acetyl-Cysteine) is an effective anti-oxidant to counteract the REDOX imbalances produced by GO graphene oxide.
8. Among the conclusions, the following is enlightening: " exposure to GO induced an alkalinizing effect in lysosomes, affecting the normal progression of autophagic flow and limiting clearance of autophagosomes, which ultimately resulted in an excessive accumulation of substrates related to autophagy, including dysfunctional mitochondria. Together, these toxic effects triggered apoptotic cell death mediated by mitochondria". The following figure 2 shows how the entire process that leads to cell death is triggered, note that its initiators are the graphene oxide GO nanosheets. This process is indicated as" interruption of the mitochondrial homeostasis ".

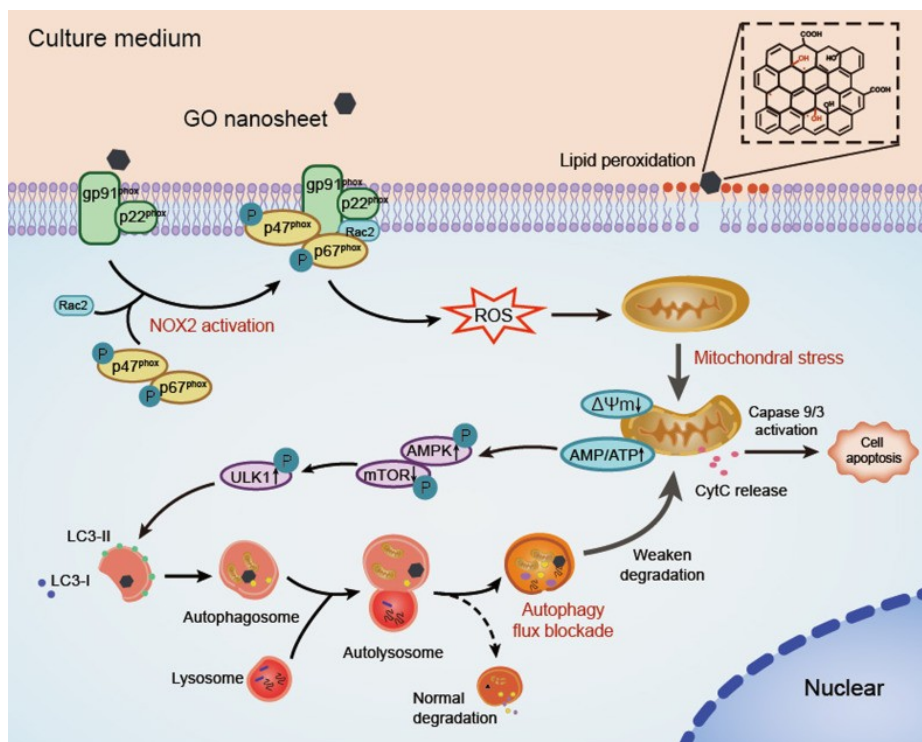


Fig. 2. Process of oxidation and cell death

Reviews

1. The article demonstrates the danger of graphene oxide, its toxicity and destabilizing effects of the REDOX balance, which cause cell death. This comes to endorse many of the consequences and symptoms described in relation to COVID-19. If vaccines are considered to contain graphene oxide (Campra, P. 2021), they could cause significant health problems in inoculated people.
2. It seems advisable to have some reserve of NAC (N-Acetyl-Cysteine) and antioxidants to protect against graphene oxide GO, in case of perceiving symptoms of COVID-19, in order to prevent the oxidation processes described by the researchers, see (Alamdari, DH; Moghaddam, AB; Amini, S.; Keramati, MR; Zarmehri, AM; Alamdari, AH; Koliakos, G. 2020 | De Flora, S.; Balansky, R.; La Maestra, S. 2020 | Ibrahim, H.; Perl, A.; Smith, D.; Lewis, T.; Kon, Z.; Goldenberg, R.; Williams, M. 2020 | Liu, Y.; Wang, M.; Luo, G.; Qian, X.; Wu, C.; Zhang, Y.; Tang, Y. 2020 | Poe, FL; Corn, J. 2020 | Puyo, C.; Kreig, D.; Saddi, V.; Ansari, E.; Prince, O. 2020).

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