

Effects of graphene materials on A375 and HaCaT cell lines due to exposure to visible light

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Abstract

The wide scale use of nanoparticles (NPs) due to their unique properties and important applications in sensor devices, clothing, alimentation and cosmetics makes human being more prone to the exposure of NPs and its potential to adverse effects. Exposure is mainly through skin. Therefore, the aim of the present study was to investigate the effects of graphene oxide nanoparticles complexed with titanium dioxide and copper or copper oxide (TiO₂/CuO/GO and TiO₂/Cu/TRGO) on A375 and HaCaT cell lines exposed to visible light. We explored the cytotoxicity and oxidative stress induced by nanoparticles. Cell viability, nitric oxide (NO) levels and extracellular release of lactate dehydrogenase (LDH) were assayed in A375 and HaCaT cells after 24 hours incubation with 0.01-1 mg/ml TiO₂/CuO/GO and TiO₂/Cu/TRGO nanoparticles. The results showed that nanoparticles under light irradiation reduced cell viability, induced nitric oxide generation and impaired cell membrane integrity of A375 and HaCaT in a dose dependent manner. It is valuable to inform that HaCaT cells appeared to be slightly more susceptible to TiO₂/CuO/GO treatment than A375 cells, TiO₂/Cu/TRGO nanocomposite has the potential for antitumor treatment by photooxidation, as green and blue lights intensify the toxicity. These results provide a basic comparative toxic effect of TiO₂/CuO/GO and TiO₂/Cu/TRGO nanoparticles on normal keratinocytes and cancerous epithelial cells. Considering the diverse results, further studies using different conditions are recommended.

Keywords: A375, cytotoxicity, graphene, HaCaT, nanoparticles;

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