Nanographene-based photo-immunotherapy

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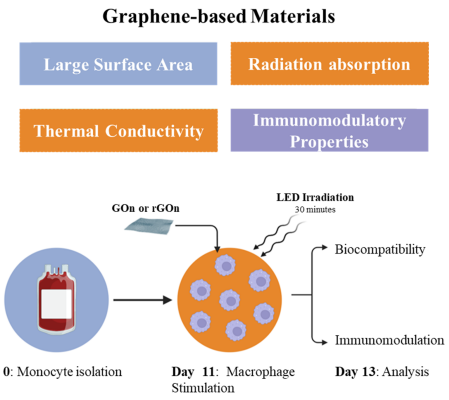
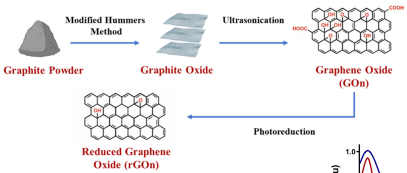
Nanotechnologies

1. Background and Goals

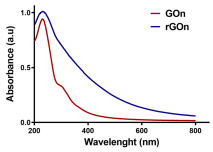
- Cutaneous squamous cell carcinoma (cSCC) is the second most common type of skin cancer, being responsible for 75% of non-melanoma skin cancer related deaths. [1]
- Despite the significant impact of immunotherapeutic approaches in cSCC treatment, important limitations and side effects remain. [2]
- Graphene-based materials (GBM) are ideal platforms for drug delivery, phototherapy, and other bioapplications, thanks to their nanosize, stability, large surface area and photoabsorption. [3-4]
- In this work, nanographene oxide (GOn) and reduced GOn (rGOn) biocompatibility, macrophage immunomodulation and applicability in cancer immunotherapy were studied.



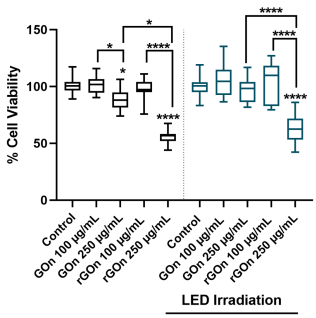
2.GBM Production and Characterization



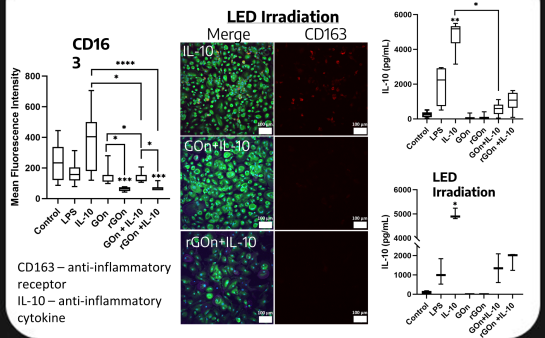
Sample	Size (nm)	Zeta Potential (mV)
GOn	247.7 ± 8.3	-51.5 ± 1.2
rGOn	169.8 ± 3.8	-38.7 ± 2.1



3.Biocompatibility



4. GBM Immunomodulation



CD163 – anti-inflammatory receptor
IL-10 – anti-inflammatory cytokine

5.Conclusions

·GOn and rGOn were biocompatible with primary human macrophages until 100 µg/mL.
·Materials reversed the anti-inflammatory conditions induced by IL-10, reducing CD163 expression.
·Therefore, GBM materials revealed being very promising to be used in cancer immunotherapy.
·Furthermore, LED-irradiation revealed not to affect immune cells, which perspectives uses in combined photoimmunotherapy to destroy cancer cells only.

6. References

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7. Acknowledgements

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