



Graphene-based Photoimmunotherapy of Skin Cancer

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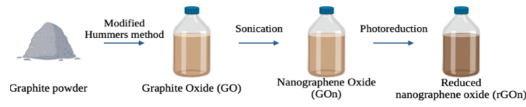
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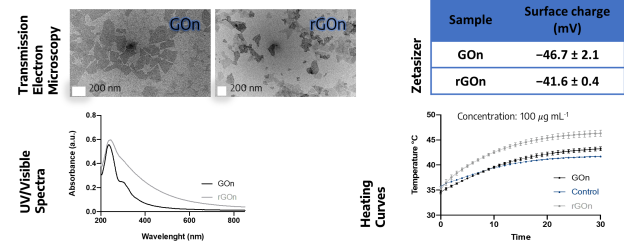
1. Background

- Skin cancer is one of the most frequent types of cancer being responsible for over 19 million new cases of cancer and almost 10 million deaths worldwide in 2020 [1]
- Common treatment options are surgery, radiotherapy, chemotherapy, with poor aesthetic outcomes, many side effects, and high recurrence rates [2]
- Graphene-based materials (GBM) have great biocompatibility, mechanical strength, high surface area, excellent thermal conductivity, and ideal light irradiation to heat conversion [3, 4]
- Here we proposed to combine GBM with an immunotherapeutic drug (ID-1) to identify possible synergic effects of combined photo/immunotherapy

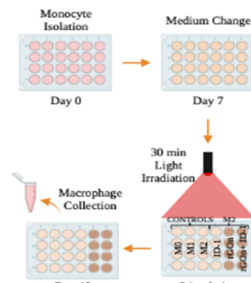
2. GBM Production



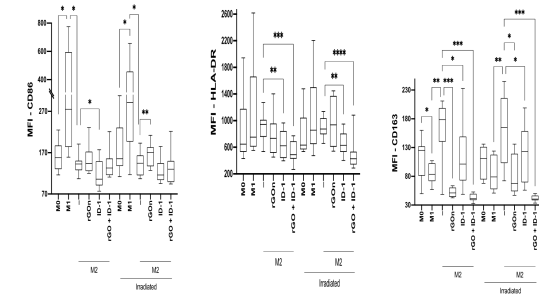
3. GBM Characterization



4. Experimental Setting

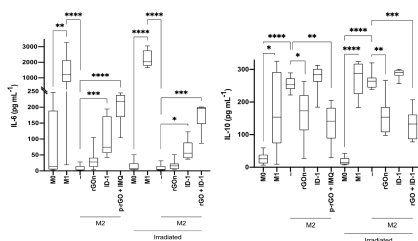


5. Flow Cytometry



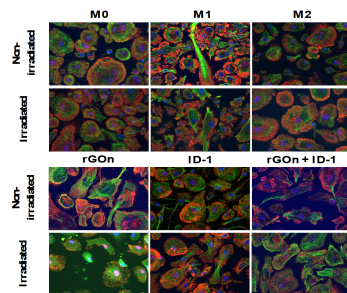
Markers:
 • CD86 and HLA-DR – pro-inflammatory markers
 • CD163 – anti-inflammatory marker

6. ELISA



Cytokines:
 • IL-6 – pro-inflammatory cytokine
 • IL-10 – anti-inflammatory cytokine

7. Morphology



8. Conclusions

- rGON combined with ID-1 can act synergistically to reduce the anti-inflammatory macrophage response and increase the secretion of IL-6, a pro-inflammatory response.
- rGON with ID-1 reveal a great potential to be used for skin cancer photoimmunotherapy.

9. References

- [1] Ferlay, J et al. 2021, Int. J. Cancer, 4, 778-789.
- [2] Simões, M et al. 2015, Cancer Lett. 1, 8-42.
- [3] Amaral, S et al. 2022, Carbon, 190, 194-244.
- [4] Azevedo, S et al. 2022, Applied Materials Today, 27, 101397



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