

Graphene oxide: a promising delivery platform to enhance cancer immunotherapy

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Despite cancer immunotherapies such as checkpoint inhibitors having demonstrated remarkable clinical efficacy in recent years, they remain effective in only a limited proportion of patients, with many experiencing severe inflammatory side effects. Novel approaches for activating and maintaining more targeted and effective anti-tumour immune responses are vitally needed. With properties such as large surface area and versatile functionalisation, the nanomaterial graphene oxide (GO) has been suggested as a promising therapeutic delivery platform for bespoke modification of immune responses and inflammation, to enhance the efficacy of cancer immunotherapies. We have investigated the use of GO in complex with immunostimulants such as polyinosinic:polycytidylic acid (Poly (I:C)) for activation of immune cells, and for targeted delivery of immunotherapies to enhance anti-cancer immune responses, *in vitro* and *in vivo*. We have found that appropriately functionalised GO can dramatically augment murine innate and adaptive immune cell activation and function, as well as restrict tumour growth and enhance efficacy of checkpoint inhibitor immunotherapy in murine cancer models. Our data highlight the potential of GO as a modifiable platform to increase effectiveness of cancer immunotherapies.

References

[1] Parker *et al.*, *Nanoscale*, 46 (2022), 17297