GOLD NANOPARTICLES TO MODULATE THE TUMOUR MICROENVIRONMENT

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The number of patients benefiting from Immune Checkpoint Inhibitors (ICIs) is still relatively low, restricted to specific tumour types [1]; those presenting specific inflammatory immune cell populations at tumour microenvironment: the so-called hot tumours. Development of protocols to selectively modulate inflammation and increase tumour sensitivity to ICIs is required. Some nanoparticles (NPs) are able to modulate the immune response [2]. Yet, their effect on tumour microenvironment and inflammation has not been explored.

M1/M2 macrophages and dendritic cells (DCs) were differentiated from mouse bone marrow. Gold nanoparticles (GNPs) were synthetized and characterised (Figure1). Production of inflammatory cytokines in myeloid cells and the mechanism involved were analysed in vitro. Immunomodulation in vivo was analysed in the B16 melanoma model.

As a result, GNPs are not cytotoxic in vitro at any tested concentration. Nevertheless, GNPs were able to induce the release of TNFα and IL6 in macrophages in vitro, and, in combination with LPS, they also induced IL1β. The latter depended on the canonical caspase-1-inflammasome. NPs also induced DC maturation in vitro. GNPs increased in vivo LPS immunomodulation in tumours, modifying the tumour growth and the microenvironment, including cell populations and the profile of inflammatory cytokines.

In conclusion, GNPs are able to modulate the inflammatory response in tumour microenvironment in vitro and in vivo. Further studies will required to analyse if they modulate the sensitivity of tumour to ICIs.

References

[1] P. Bonaventura *et al., Frontiers in Immunology* (2019).
[2] B. S. Zolnik, Á. González-Fernández, N. Sadrieh, and M. A. Dobrovolskaia, *Endocrinology* 151, 458–465 (2010).

Figures

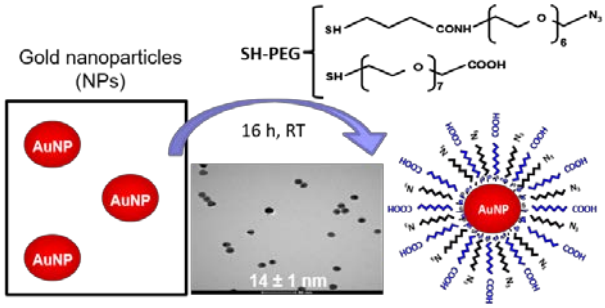

Figure 1: Synthesis of gold nanoparticles