Construction of Plasmonic Nanostructures for Targeting the Immune Check Point PD-L1

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Immune check points are expressed by tumor cells and have an active role in regulating the activity of the immune system against tumors. Nanostructures can be designed as active systems that strongly bind to tumor cells and influence their interaction with the immune system.

It will be shown that plasmonic nanostructures can be engineered to target the protein PD-L1 (programmed death ligand 1). This antigen, overexpressed on tumor cells, binds to the PD-1 protein expressed on activated CD8+ T-Cells, suppressing their activity and facilitating the immune escape of tumor cells.

It will be shown that gold plasmonic nanostructures, properly functionalized with thousands of peptides identified by phage-display for targeting to PD-L1, strongly bind to MDA-MB-231 breast cancer cells overexpressing PDL-1. The SERS signals of the nanostructures will be used for quantifying the targeting activity.

The binding of the nanostructures to tumor PDL-1, inhibits the interaction with PD-1 on T-cells preserving the activity of the T-Cells.