Multivalent and multiplexed interaction in nanomedicine

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Abstract

Each cell of our body exerts a unique function as a consequence of its distinctive phenotype, i.e. the cell's proteins and genes collective that defines its identity. Each cell so 'expresses' a unique combination of proteins on their membrane that distinguish them from their neighbours.
We use such information to engineer multivalent and multiplexed nanomedicines that comprise unique ligands combinations. We tune each ligand/receptor interaction to be weak enough that only when combined, they can bind to its complementary phenotype [1]. Ergo, each nanomedicine interacts with a high level of precision, enabling to target defined cell populations. Such a precision nanomedicine increases anticancer drugs therapeutic efficiency of several orders of magnitude allowing for personalised treatment down to the single cell level to compensate for patient to patient variations.
I'll discuss here how we can apply phenotypic targeting to brain delivery, tumour, immune cells as well as to understand viral infection.

REFERENCES

[1] Tian et al. ***Science Adv.*** 2020, 6,4, eaat0919